Chapter 4 Synthetic interpretation

4-1 Control factors of mineralization

In this survey, existing data analysis, satellite image analysis and a ground truth were carried out over two fiscal years of Phase-1 and Phase-2.

In the existing data analysis, a literature research was done regarding data owned by SEGEMAR, provincial governments and private companies in the Phase-1. In the Phase-2, analysis was done on airborne geophysical exploration data acquired in the Neuquen province, which is owned by SEGEMAR. In addition, 9,242 stream sediments samples, which were taken in the Neuquen province by SEGEMAR in past, were re-analyzed for 48 elements, and the chemical analysis results were interpreted.

In the satellite image analysis, the false color images of 13 scenes were made and geological interpretation was done for them, and alteration zones of total 244 places were extracted by making of ratio composite images. In the phase-2, detailed extraction of alteration zones was done for 6 scenes including promising district, and the alteration zones were divided into neutral alteration and acid alteration.

In the ground truth, survey districts were selected based on the results of the existing data analysis and the satellite image analysis. In the Phase-1, 31 districts were surveyed where the known mineralization and alteration zones are distributed. In the Phase-2, total 16 districts were surveyed. Among them, 9 districts were selected for follow-up survey based on the results of the Phase-1, and 7 districts were newly selected. Interpretation for above-mentioned survey results is as follows.

4-1-1 Interpretation on results of the existing data analysis

In the literature research of the existing data analysis, known deposits in the survey area are classified into vein deposits, porphyry copper deposits, high sulfidation gold deposits, placer gold deposits, sedimentary ore deposits and others. Vein deposits are subdivided into auriferous polymetallic vein deposits and non-auriferous polymetallic vein deposits. Important among these deposits as the subject of the exploration is gold and auriferous polymetallic vein deposits, high sulfidation gold deposits and porphyry copper deposits. Representative ore deposit for auriferous quartz vein is Joya del Sol, auriferous polymetallic vein is Andacollo, high sulfidation gold is Cerro Colorado and porphyry copper is Campana Mahuida.

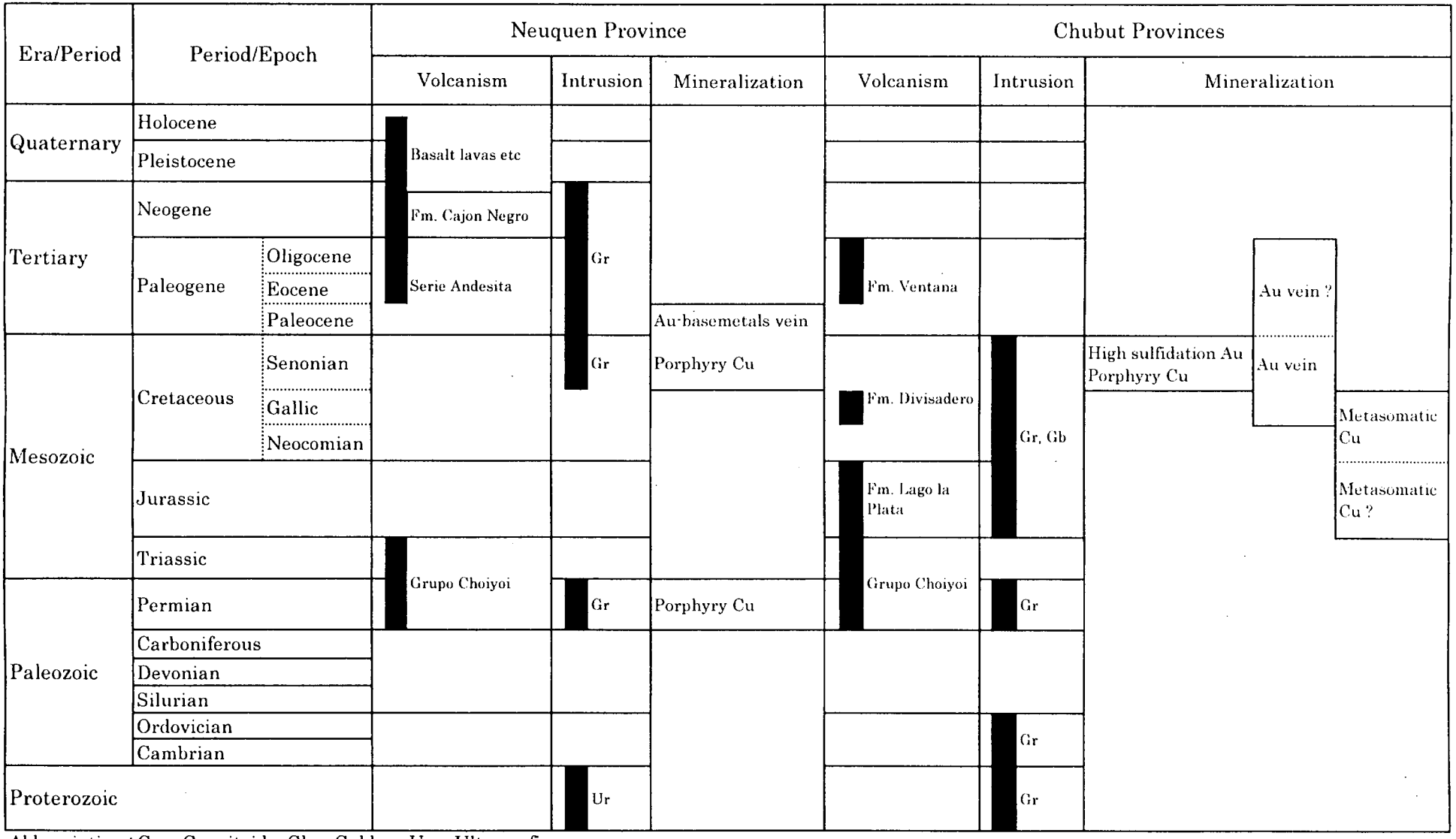
These ore deposits were formed in connection with hydrothermal activities, and magmatic activities played an important role as the heat source. Therefore, in order to

interpret the promising district regarding mineralization, it is important to understand the distribution of magmatic arcs related to mineralization. Table II-4-1 lists the age of granitic rocks and volcanic rocks, both of which have a possible relationship with mineralization, that were obtained by the K-Ar radiometric dating. Fig. II-4-1 shows the chronological relationship between magmatic activities and mineralization based on the data of Table II-4-1. In Fig. II-4-1, it is separately considered for the Neuquen province in the northern part and the Chubut province in the southern part. Concerning the Neuquen province, although La Voluntad porphyry copper deposit was generated in the Permian or the Triassic, there is a high possibility that the generation of Compana Mahuida porphyry copper deposit and Andacollo, Varvarco and Cerro del Diablo vein deposits is limited to the period between the late Cretaceous and the Paleocene. This period was before the Eocene, when intensive volcanic eruptions started due to Andean orogenic movement, and it is suggested that intrusive rocks without volcanic eruption brought about mineralization.

On the other hand, in Chubut Province, Cerro Gonzalo porphyry copper deposit generated in the late Cretaceous, and there is a high possibility that the Cerro Colorado high sulfidation gold deposit generated in the late Cretaceous based on the ages of granitoids. It is estimated that the mineralization age of Joya del Sol gold vein deposit is in the period between the middle and late Cretaceous because andesite, which is the host rock, was formed in the middle Cretaceous. In Laguna Sunica located about 30 km southeast from the Joya del Sol ore deposit, however, basalt rocks in Ventana formation of the Paleogene had received hydrothermal alteration, and igneous activity of the Neogene did not exist. Therefore, there is also a possibility that the Joya del Sol ore deposit was generated in the Paleogene. As to the Condorcanqui metasomatic copper deposits, it is highly possible that the age of mineralization is the early to middle Cretaceous. This is because the age of the andesite dyke that intrudes into the ore body while cutting it is the middle Cretaceous and the age of granitoid in the vicinity is the very end of the Jurassic. However, as it is considered that the host rock is of the Jurassic, there is also a possibility that the deposits were generated in the Jurassic. In making a summary of these ages of generation of the ore deposits in Chubut province, the late Cretaceous is considered to be important as the time when the age of generation of gold vein deposits, high sulfidation gold deposits and porphyry copper deposits was overlapping. This late Cretaceous is the period when the volcanic eruption was not active, and it is therefore suggested that intrusive rocks without volcanic eruption brought about mineralization similarly to Neuquen province. This is considered to mean that formation of promising ore deposits is difficult in the case that volcanic eruption is active because volatile components contained in magma are discharged, as pointed out by Sillitoe (1980). In addition, that there was no volcanic eruption even though intrusive activity existed suggests that there was a very strong compressive stress field.

Table II-4-1 List of age data to interpret the mineralization periods.

Period	Epoch	Data (Ma)	Locality	Province	Measured material	Method	Reference	Inferred mineralization
Tertiary	Paleocene (56.5 - 65Ma)	53.8	Cerro del Diablo	Neuquen	Plagioclase of tonalite	K-Ar	This project (Phase 1)	Cerro del Diablo (Cu vein)
		64.7	Varvarco	Neuquen	Plagioclase of tonalite	K-Ar	This project (Phase 1)	Varvarco (Au-Cu-Pb vein)
Cretaceous	Senonian (65 - 88.5Ma)	67	Los Maitenes	Neuquen	Tonalite-dacite	K-Ar	Mendez et al. (1995)	Andacollo (Au-Pb vein)
		72	Lago General Vintter	Chubut	Granitoid	K-Ar	Lizuain (1981)	Cerro Colorado (High sulfidation Au)
		74.2	Campana Mahuida	Neuquen	Biotite of andesite porphyry	K-Ar	Sillitoe (1976)	Campana Mahuida (Porphyry Cu)
		77	Cerro Gonzalo	Chubut	Granodiorite of hypogene porphyry Cu	K-Ar	This project (Phase 2)	Cerro Gonzalo (Porphyry Cu)
		81	Cordillera Viento	Neuquen	Andesite porphyry	K-Ar	Mendez et al. (1995)	Andacollo (Au-Pb vein)
		85	Lago General Vintter	Chubut	Granitoid	K-Ar	Lizuain (1981)	Cerro Colorado (High sulfidation Au)
		85.4	20km NNW of Tecka	Chubut	Hornblend of granodiorite	K-Ar	JICA/MMAJ (1983)	Cerro Gonzalo (Porphyry Cu)
	Gallic (88.5 - 132Ma)	108	Condorcanqui	Chubut	Post mineralization andesite dyke	K-Ar	This project (Phase 2)	Condorcanqui (Metasomatic Cu)
		119	Joya del Sol	Chubut	Andesite lava of host rock for Au veins	K-Ar	This project (Phase 1)	Joya del Sol (Au vein)
	Neokomian (132 - 146Ma)							
Jurassic (146 - 208Ma)		147	20km NE of Condorcanqui	Chubut	Biotite of granodiorite	K-Ar	JICA/MMAJ (1983)	Condorcanqui (Metasomatic Cu)
Triassic (208 - 245Ma)		225	La Voluntad	Neuquen	Tonalite	K-Ar	JICA/MMAJ (1984)	La Voluntad (Porphyry Cu)
Permian (245 - 290Ma)		281	La Voluntad	Neuquen	Biotite of tonalite porphyry	K-Ar	Sillitoe (1976)	La Voluntad (Porphyry Cu)



Abbreviation : Gr = Granitoids, Gb = Gabbro, Ur = Ultramafic.

Fig. II-4-1 Relation between magmatic activities and mineralization.

Fig. II-4-2 shows a distribution of magmatic arcs and ore deposits prepared based on data of Zappettini ed. (1998) and Zanettini et al. (1999). Magmatic arcs are shown with ages classified into the Cretaceous, the Paleogene and the Neogene. As mentioned above, there is a high possibility that the former two ages are related to mineralization. The Neogene magmatic arcs are shown for reference because El Teniente porphyry copper deposits were generated on the Chilean side north of the survey area in the Neogene. Ore deposits shown on the map are gold and auriferous polymetallic vein deposits, high sulfidation gold deposits and porphyry copper deposits, all of which are highly valuable from the economic point of view as mentioned above. Placer gold deposits are also shown because these deposits suggest the existence of gold deposits that were their source.

According to Fig. II-4-2, promising districts of No.1 to No. 11 are selected as places where the distribution of the Cretaceous and Paleogene magmatic arcs, which are highly possibly related to mineralization, harmonizes with the distribution of selected ore deposits. It is expected that new ore deposits of the same type as gold and auriferous polymetallic vein deposits, high sulfidation gold deposits and porphyry copper deposits exist in these districts. In the area where placer gold deposits are distributed, it is also expected that gold deposits which were their source exist.

Furthermore, in the Alto del Rio Barrancas district shown in Fig. II-4-2, geochemical anomalies of 102 to 133ppb Au is sporadically but widely recognized from the interpretation result for stream sediments geochemical exploration data in the existing data analysis. As there are no known ore deposits, the existence of new ore deposits is expected in this district.

In the Neogene magmatic arcs in the survey area, volcanic rocks are overwhelmingly dominant, with granitoids limited to small-scale bodies along the Chilean border in the northwest and southwest parts of Neuquen province. It is supposed that the Neogene magmatic arcs in the survey area are poor in mineralization capacity because intensive volcanic eruptions discharged volatile components of magma, as mentioned above.

4-1-2 Interpretation on results of the satellite image analysis

In the Phase-1, interpretations of geology and lineament were done for the false color images, and hydrothermal alteration zones were extracted from ratio composite images. In the Phase-2, detailed extraction of alteration zones was done in the unit of a pixel, which forms an image, by means of pattern matching of pseudo-reflectance between observed satellite image data and idealized alteration models. Although the accuracy of extraction of alteration zones was better in the Phase-2 due to nature of the analyzing method, there was not a wide difference for extraction of alteration zones between in the Phase-1 and Phase-2. Fig. II-4-3 shows lineaments and alteration zones extracted by the satellite image analysis in

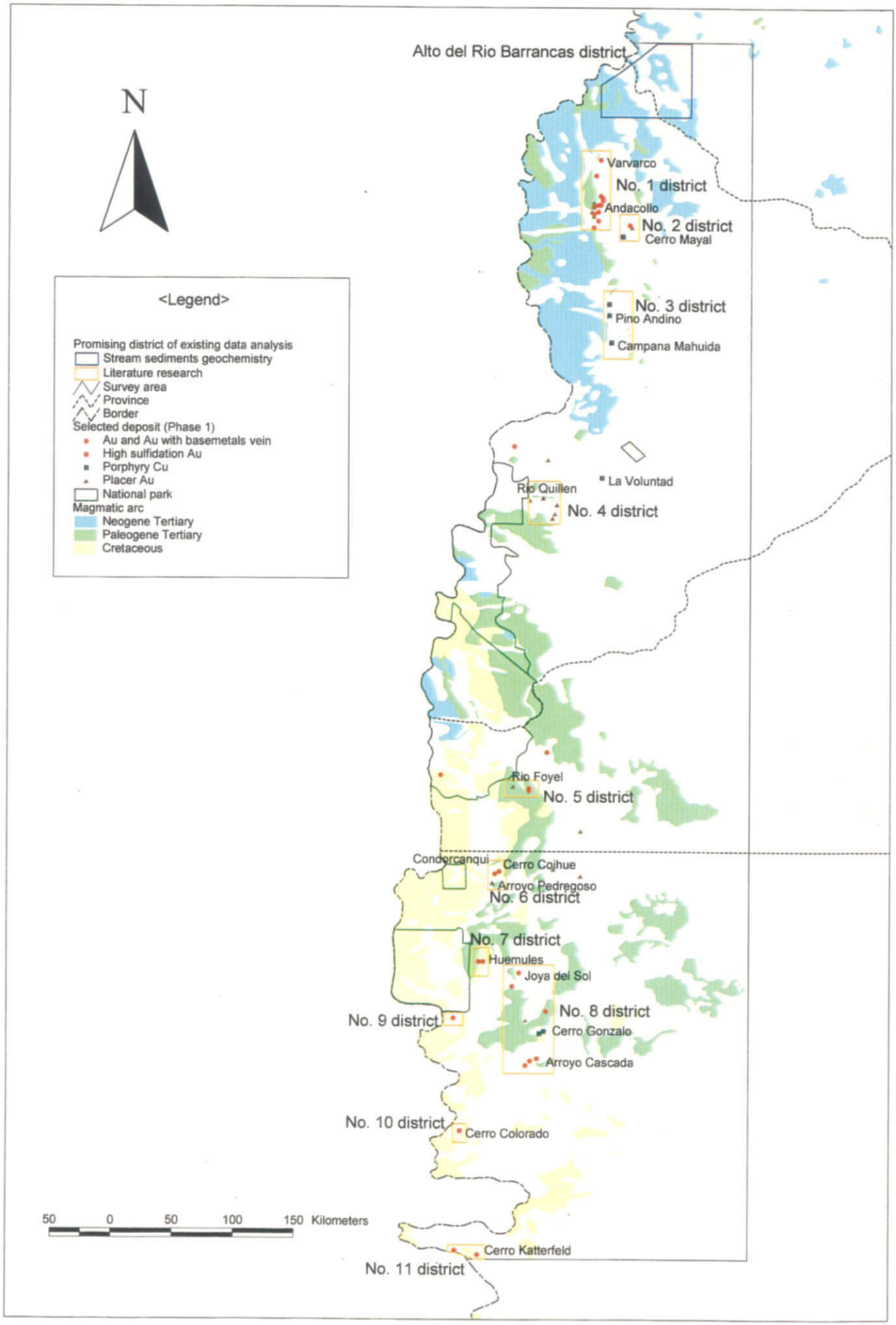


Fig. II-4-2 Interpretation result of the existing data analysis.

the Phase-1 and also shows locations of gold and auriferous polymetallic vein deposits, high sulfidation gold deposits, porphyry copper deposits and placer gold deposits.

Although various lineaments have been interpreted, with regard to the fact that the survey area has been under the influence of Andean orogenic movement since the end of the Cretaceous up to the recent, it is considered that lineaments exist in the compressive stress field in the direction of E-W due to subduction of the plate from the Pacific side. Under such stress, thrusts in the direction of N-S, sheer zones in the direction of NE-SE and NW-SE, and extension fractures in the direction of E-W were generated. As shown in Fig. II-4-3, lineaments in the direction of N-S, NE-SW and NW-SE are dominant on the whole, and lineaments in the direction of E-W exist in the southwestern part of the area although they are minor. This is considered to reflect that lineaments are in the compressive stress field in the direction of E-W.

However, as there were various tectonic movements before Andean orogenic movement, it is considered that various lineaments were also generated by collision of the Patagonia tarrane and Gondowana continent at the end of the Paleozoic, the extension tectonics that existed when the Atlantic Ocean opened in the Jurassic, and other events. In addition, various lineaments were also generated by the vertical movements of blocks. As an example, the ring structure observed in the Neogene volcanic zone can be mentioned. Moreover, lineaments just corresponding to the vein ore deposits were not interpreted, possibly because images were interpreted on a scale of 1 to 250,000. Therefore, systematic analysis for directions of lineaments is considered to be difficult to extract the promising districts.

On the other hand, hydrothermal alteration zones were extracted in a total of 244 places, but not all of them are related to mineralization. But the existence of hydrothermal activities and fractures that were conduits of the hydrothermal water is indispensable for mineralization. Because of this, it is considered that alteration zones existing on or near lineaments are important from the viewpoint of hydrothermal alteration zones along fractures. Alteration zones located within 2 km from each lineament have been selected and are shown in Fig. II-4-3. Reason of 2km is size in diameter of known large porphyry copper deposit is approximately 2km. The area within 2km from the lineaments has high possibility of the existence of ore deposit, if the ore deposit exists along the fault. As shown in Fig. II-4-3, promising district A to F are selected as places where alteration zones within 2 km from a lineament are distributed harmoniously with gold and auriferous polymetallic vein deposits, porphyry copper deposits and placer gold deposits. It is expected that new ore deposits of the same type as the gold and auriferous polymetallic vein deposits and porphyry copper deposits exist in these district. In the area where placer deposits are distributed, the existence of gold deposits, which were the source of these deposits, is also expected.

4-1-3 Interpretation on results of ground truth

In the ground truth, total 31 districts were surveyed in the Phase-1. As a result of this, high potential was recognized for five districts of Andacollo, Huemules, Joya del Sol, Cerro Colorado and Cerro Blanco, and decided not to include these in the Phase-2 survey.

In the Andacollo district, auriferous polymetallic vein deposit is already being exploited by Minera Andacollo Gold S.A. Concerning the auriferous polymetallic vein deposit in the Huemules district and the auriferous quartz vein deposit in the Joya del Sol district, Minera el Desquete S.A. is conducting a feasibility study, and the total volume of gold reached 2,451,700 oz according to information on the Internet. Concerning the high sulfidation gold deposit in the Cerro Colorado district and the auriferous polymetallic vein deposit in the Cerro Blanco district, Billiton Argentina B.V. is now ceasing the exploration. However, 7.95 g/t Au was reported for the hydrothermal braccia on ground surface of the Cerro Colorado district, and 1.575 g/t Au was confirmed for quartz veins in the Cerro Blanco district in this survey.

The Phase-2 survey was conducted for nine follow-up districts of Varvarco, Campana Mahuida, Palau Mahuida, Nireco, La Voluntad, Condorcanqui, Epuyen, Cerro Gonzalo and Arroyo Cascada, and seven new districts of Villa Aguas Calientes, Carro Collocho, Cerro Mayal, Cerro de los Bueyes, Rio Foyel, Laguna Sunica and Cerro Cuche. As a result for these, four districts of Varvarco, Cerro Mayal, Epuyen and Cerro Gonzalo are considered to be promising (Table II-4-2). The location map of these four districts is shown in Fig. II-4-4.

Varvarco ore deposit in the Varvarco district actually comprises the Mina Santos ore deposit and Mina Santos West ore deposit, and the host rock is granodiorite. At the old mine of Mina Santos ore deposit, network quartz veins with pyrite dissemination of about 50 cm in the maximum width were observed. The quartz veins with chalcopyrite and malachite revealed the analysis results of 14.04g/t Au, 524g/t Ag, 2.75% Cu and 2.69% Pb. Quartz veins with pyrite dissemination at the Mina Santos West ore deposit revealed analysis results of 15.27g/t Au and 37g/t Ag. In the Cerro Mayal district, there is distribution of andesite porphyry which has altered to white and intrudes into sedimentary rocks of the lower Cretaceous, and limonitized calcite veinlets is distributed in fracture zones. This channel sample revealed analysis results of 59.14 g/t Au and 3.4 g/t Ag. In the Epuyen district, quartz veins of about 20 cm in width are hosted in quartz porphyry intruding into the Cretaceous granite batholith and revealed analysis results of 9.14g/t Au and 12.4g/t Ag. This is described for the first time as a result of this survey, and we have named it the Rio Blanco ore deposit. Several other limonitic outcrops in the vicinity are seen from a distance. The Cerro Gonzalo district consists of Sectors 1 to 6, and Sector 1 is called Arroyo Luque. In Arroyo Luque,

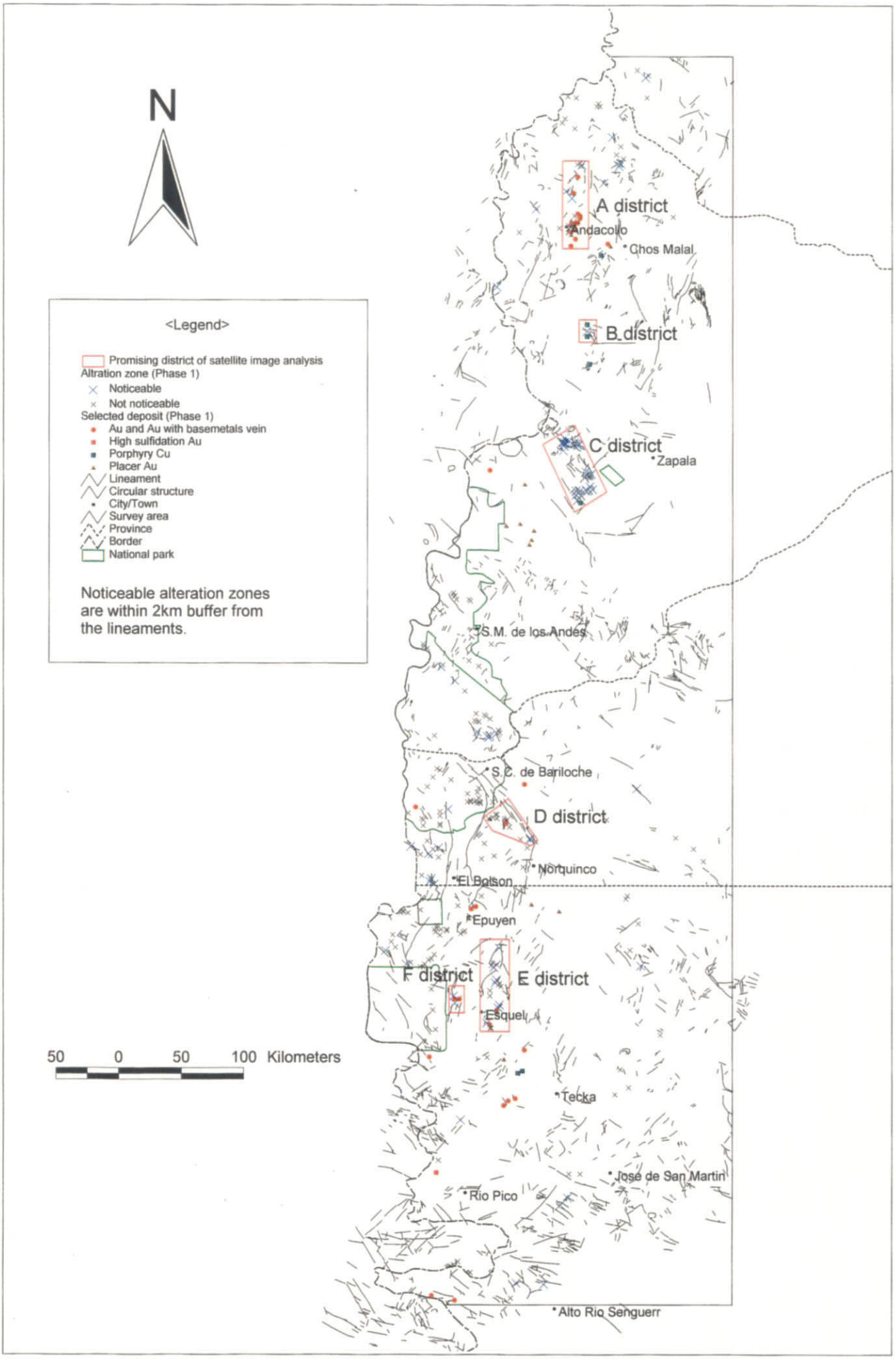


Fig. II-4-3 Interpretation result of the satellite image analysis.

Table II-4-2 Phase 2 ground truth survey conclusions.

No.	Survey district	Survey site	Category	NE corner	SW corner	Reason to be selected	Access	Topography	Vegetation	Unit	Formation	Rock	Intrusive	Fault	Lineament
1	Villa Aguas Calientes	Alteration zones near ML013, Arroyo Ailinco-Arroyo Atreuco	New district	S36°30'36", W70°34'12"	S36°43'12", W70°40'12"	Geothermal alteration zones, Au anomalies of stream sediments, alteration zones from satellite image	Car, Walk 3h	Mountains, valleys	Thin	Tα2	Cajón Negro Fm.	Andesite	Andesite porphyry, granite		
2	Varvarco	Alteration zones along Arroyo Auquen, Varvarco (Mina Santos, Mina Santos West)	Follow-up district	S36°44'24", W70°33'36"	S36°53'24", W70°41'24"	Known Au mineralization, alteration zones	Car, Horse 2h	Valleys	Thin	PTR	Choiyoi Fm.	Tuff, tuff breccia	Granite, Granodiorite		NE, NW, N-S
3	Cerro Collocho	Cerro Collocho	New district	S36°52'48", W70°23'24"	S36°56'24", W70°27'00"	Alteration zones from satellite image	Car, Walk 2h	Mountains	Thin	JK	Mendoza Gr.	Sandstone, shale	Dacitic andesite		NE
4	Cerro Mayal	Cerro Mayal	New district	S37°17'24", W70°21'00"	S37°22'12", W70°25'48"	Known Au mineralization	Car, Walk 2h	Mountains	Thin	JK	Mendoza Gr.	Sandstone, shale	Andesite porphyry		
5	Cerro de los Bueyes	Cerro de los Bueyes, El Espinal, Cerro los Potreritos	New district	S37°40'48", W70°18'36"	S37°52'48", W70°30'00"	Alteration zones from satellite image	Car, Horse 3h	Mountains	Thin	JK	Mendoza Gr.	Sandstone, shale	Granodiorite, andesite porphyry		NE
6	Campana Mahuida	Campana Mahuida, Pino Andino, alteration zones near Loncopue	Follow-up district	S37°57'36", W70°28'48"	S38°17'24", W70°39'00"	Porphyry Cu productive area, alteration zones from satellite image	Car	Hills	Thin	JK	Mendoza Gr.	Sandstone, shale	Granodiorite		NE, NW, NWW
7	Palau Mahuida	Cerro Cochico, ZA004, ZA007, ZA008	Follow-up district	S38°39'36", W70°35'24"	S38°54'00", W70°51'00"	Alteration zones from satellite image	Car, Horse 8h	Steep mountains	Non - thin	Tα2	Farallones Fm. eq.	Rhyolite, andesite			NE, NW, Circular
8	Nireco	ZA021, ZA022, ZA023	Follow-up district	S39°00'00", W70°29'24"	S39°06'36", W70°34'48"	Alteration zones from satellite image	Car, Horse 2h	Hills	Thin	PTR	Choiyoi Fm.	Rhyolite, andesite			NE, NW
9	La Voluntad	ZA001, ZA032, ZA034	Follow-up district	S39°07'12", W70°32'24"	S39°14'24", W70°39'36"	Alteration zones from satellite image	Car, Horse 6h	Steep mountains	Non	PTR, CPg	Choiyoi Fm., La Voluntad complex	Rhyolite, andesite, granitoids			NE, NW
10	Rio Foyel	Quilin Mahuida, Cerro Carrera (SB068), Cerro Carrera east, Rio Foyel west	New district	S41°28'48", W71°06'00"	S41°38'24", W71°22'48"	Placer Au area, alteration zones from satellite image	Car, Horse 7h	Steep mountains	Non - Thic	Tα1, Kg	Ventana Fm., granitoids	Andesite			N-S, NE
11	Condorcanqui	Condorcanqui	Follow-up district	S42°07'48", W71°22'12"	S42°12'36", W71°25'12"	Known Cu mineralization, noticeable S isotope data	Car, Walk 0.5h	Hills	Forrest	Jm	Piltriquitron Fm.	Andesite	Andesite, dacite		NE, NW
12	Epuyen	Cordon de Cholila	Follow-up district	S42°12'54", W71°22'48"	S42°22'12", W71°30'00"	Placer Au area, alteration zones from satellite image	Car, Walk 2h	Steep mountains	Forrest - Non	Jm, Kg	Piltriquitron Fm., granitoids	Silt - sandstone, dacite - andesite, granite	Quartz porphyry	E-W, N-S, NE-SW	NE, N-S
13	Laguna Sunica	Laguna Sunica	New district	S43°08'24", W70°58'12"	S43°12'36", W71°03'00"	Alteration zones from satellite image	Car, Walk 0.5h	Hills, steep valley	Thin	Tα1	Ventana Fm.	Basalt			NE
14	Cerro Gonzalo	Sector 1 (Arroyo Luque), Sector 2-6	Follow-up district	S43°15'36", W70°57'36"	S43°23'24", W71°08'24"	Porphyry Cu productive area	Car, Walk 2.5h	Hills	Thick grass and few trees	Kg	Granitoids	Granite, granodiorite	Quartz porphyry		
15	Arroyo Cascada	Arroyo Cascada, Princess	Follow-up district	S43°27'00", W71°0148"	S43°31'48", W71°07'48"	Known Au mineralization	Car	Gentle high land	Grass and trees	Jβa	Lago la Plata Fm.	Andesite	Micro granodiorite		N-S
16	Cerro Cuche	Cerro Cuche	New district	S43°30'00", W71°07'48"	S43°34'12", W71°11'24"	Alteration zones from satellite image	Car, Walk 1h	Steep slope and lower gentle hills	Grass, trees	Jβa	Lago la Plata Fm.	Sandstone, conglomerate	Quartz porphyry		NW

Table II-4-2 Phase 2 ground truth survey conclusions.

No.	Survey district	Alteration (Phase 1, TM image)	Alteration (Phase 2, TM image)	Alteration (X-ray diffraction)	Known mineralization	Results	Conclusion	Recommendation
1	Villa Aguas Calientes	ML013	Neutral, acid	Sericite, montmorillonite		No noticeable chemical analysis results for quartz veinlets	Geothermal alteration without mineraliation	Unpromising
2	Varvarco	CM004-007	Neutral, acid	Sericite, pyrophyllite, jarosite	Vervarco (Au-Cu vein), 16.97g/t Au, 302.25g/t Ag, 2.04% Cu	14.04g/t Au, 524g/t Ag, 2.75% Cu at Mina Santos, 15.27g/t Au, 37g/t Ag at Mina Santos West	Au-Cu mineralization was confirmed for quartz veins	Further exploration is recommended
3	Cerro Collocho	CM008	Neutral, acid	Sericite, kaolin		No noticeable chemical analysis result for quartz-pyrite veinlets, 13.2Ma for dacitic andesite	Weak and small alteration zone without mineralization	Unpromising
4	Cerro Mayal		Acid	Chlorite, calcite, sericite	Cerro Mayal (Au vein), 75.84g/t Au	59.14g/t Au, 3.4g/t Ag, >25% Fe for limonitic calcite veinlets	High grade Au mineralization was confirmed for gossan	Further exploration is recommended
5	Cerro de los Bueyes		Neutral, acid	Sericite	Cerro de los Bueyes (Cu-Barite vein)	281ppm Cu for marcasite-chlorite vein	Poor Cu mineralization, weak and small alteration	Unpromising
6	Campana Mahuida	CM015	Neutral, acid	Sericite	Campana Mahuida, Pino Andino (Porphyry Cu)	65Ma for post mineralization quartz diorite at Campana Mahuida. >0.5g/t Au area of Pino Andino had been drilled	Campana Mahuida and Pino Andino are drilled areas, and no other alteration zone from satellite image. No room for further exploration	Unpromising
7	Palau Mahuida	ZA004, 007-008	Nuetral, acid	Sericite, kaolin, montmorillonite		No noticeable chemical analysis results for altered rocks	Young age alteration at shallow level without mineralization	Unpromising
8	Nireco	ZA021-023	Nuetral, acid	Sericite, kaolin		No noticeable chemical analysis results for altered rocks	Low sulfidation system without mineralization	Unpromising
9	La Voluntad	ZA001, 032, 034	Nuetral, acid	Sericite, kaolin	La Voluntad (Porphyry Cu)	No noticeable chemical analysis results for altered rocks	Hydrothermal alteration without mineralization	Unpromising
10	Rio Foyel	SB068	Nuetral, acid	Sericite	Cullin Mahuida (Au vein), Rio Foyel (Placer Au)	0.42g/t Au, 1585g/t Ag, 25.4% Cu for oxide Cu vein of Cullin Mahuida	Mineralization is limited to small vein of Cullin Mahuida	Unpromising
11	Condorcanqui			Chlorite, epidote, calcite	Condorcanqui (Manto type Cu)	108Ma for post mineralization andesite dyke. 0.87 to 4.72% Cu for disseminated ore in Jurassic andesite. Dacite dyke with chalcopyrite dissemination was observed	Small scale mineralization at several sites	Unpromising
12	Epuyen	SB081-083	Neutral	Sericite, kaolin	Arroyo Pedregoso (Placer Au)	9.14g/t Au, 12.4g/t Ag for quartz vein in quartz porphyry	Existence of auriferous quartz vein was confirmed	Further exploration is recommended
13	Laguna Sunica		Neutral	Clorite, sericite	Laguna Sunica (Cu-Au Vein)	No noticeable chemical analysis results for altered rocks	Hydrothermal alteration with zeolite veinlets	Unpromising
14	Cerro Gonzalo			Sericite	Cerro Gonzalo (Porphyry Cu)	Max 0.17% Cu for hypogene porphyry Cu along the streams, and areas on hills are limonitized at Arroyo Luque	Secondary enrichment of Cu is expected below the limonitized hills at Arroyo Luque	Further exploration is recommended
15	Arroyo Cascada			Sericite, chlorite, montmorillonite	Arroyo Cascada (Au vein)	4.07g/t Au for quartz vein, 13.87g/t Au for silicified rock	Au mineralization is limited to a specific site	Unpromising
16	Cerro Cuche		Neutral	Chlorite, sericite	Cerro Cuche (Porphyry Cu)	0.87g/t Au, 4g/t Ag, 0.184% Pb for quartz vein	No noticeable mineralization of Cu-Au for quartz porphyry	Unpromising

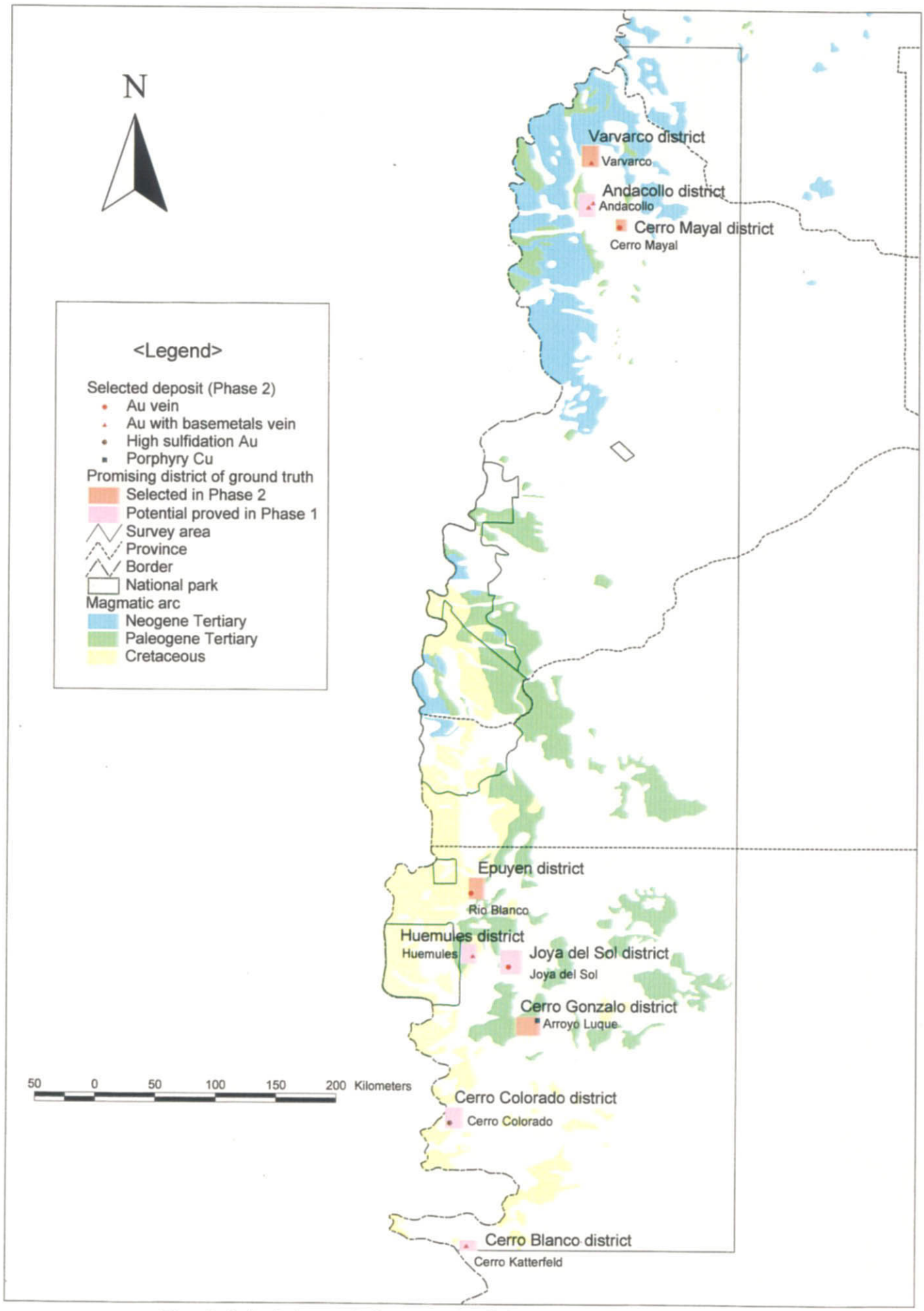


Fig. II-4-4 Interpretation result of the ground truth survey.

hypogene porphyry copper deposit is exposed at the level of the streams and revealed the content of 1295 to 1655ppm Cu. Oxidized leaching zone locally containing malachite is formed on the upper part of hills, and the existence of a secondary enrichment zone is expected beneath the hills. Sector 6 in Cerro Gonzalo is located on the topographically highest area, and alteration zones indicate conditions of supergene oxidized leaching. Therefore, the existence of a secondary enrichment zone is also expected in the lower part.

Meanwhile, the El Bolson and Lago Cholila districts (Fig. II-3-1-1) were selected as objects of follow-up from the results of the Phase-1 but which were not surveyed in the Phase-2 due to problems such as accesses. However, the El Bolson district does not deserve to explore actively because the chemical analysis result of 355ppm Cu was only obtained for the float sample in river running down from alteration zones. On the other hand, in the Lago Chilila district, 2490ppm Cu was obtained for the float sample in river running down from alteration zones where the upstream part of this water system is western adjacent to the Epuyen district. This indicates the possibility that promising places in Epuyen district will expand to the west.

Although Condorcanqui copper deposit was not judged to be promising, important geological information was obtained from this survey. The dissemination ore deposit of chalcopyrite, malachite and so on, whose host rock is andesite lava and pyroclastic rocks, have been considered up to now as ore deposits of the manto-type, whose host rock is Ventana formation of Paleogene. However, the existence of dacite dyke with chalcopyrite dissemination was observed in this survey, and 108 Ma, which means the middle Cretaceous, has been obtained as the age of an andesite dyke that intrudes into a mineralized zone while cutting it. Furthermore, 147 Ma, which means the last period of the Jurassic, has been obtained as the age of granitoid in the vicinity by JICA/MMAJ (1983). Therefore, it is considered that the host rock of ore deposits is Piltriquitron formation of Jurassic, and it is metasomatic copper deposit related to dacite dykes that derived from granitoids of the very end of the Jurassic to the early Cretaceous.

4-2 Selection of promising districts

The result of overlapping of promising districts selected by the existing data analysis, the satellite image analysis and the ground truth is shown in Fig. II-4-5. Fig. II-4-5 also shows alteration zones extracted from satellite image analysis for reference. Nine districts selected from the ground truth conform well to both or either of the promising districts selected from the existing data analysis and/or satellite image analysis, except for the Epuyen district. As to the Epuyen district, there is overlapping with only a part of the promising districts selected from the existing data analysis. This is because, for the

promising district selected from the existing data analysis, consideration was not given to the existence of Rio Blanco gold vein deposits in the Epuyen district, which is described here for the first time.

Among five districts of Andacollo, Huemules, Joya del Sol, Cerro Colorado and Cerro Blanco that the high potential were proved in the Phase-1 ground truth, it is considered regarding three districts of Andacollo, Huemules and Joya del Sol, exploration is sufficient because calculation of ore reserves has been already performed. As to two districts of Cerro Colorado and Cerro Blanco, although promising mineralizations have been known, calculation of ore reserves has not been performed yet. Therefore, exploration such as a drilling survey should be conducted.

Regarding four districts of Varvarco, Cerro Mayal, Epuyen and Cerro Gonzalo that have been selected in the Phase-2 ground truth, outcomes from further exploration hereafter are expected.

As an interpretation result of the stream sediments geochemistry in the existing data analysis, the Alto del Rio Barrancas district which is accompanied by geochemical anomalies of 102 to 133ppb Au has been selected although these are sporadically. In this district, the existence of new gold deposits is expected.

The range extending from south to north including the Varvarco and Andacollo districts is a promising district in satellite image analysis. Because the Butalon Norte district located between the two districts (Fig. II-3-1-1) is not, however, selected as a promising district in the ground truth, promising places in Varvarco and Andacollo districts are limited to each scope. The range including the Joya del Sol district and the northern area of it is also a promising district in satellite image analysis. But as Minera el Desquite S.A. has already acquired northern mining properties such as Leleque, it is considered that exploration has been sufficiently carried out.

Consequently, based on the ground truth results, six districts of Varvarco, Cerro Mayal, Epuyen, Cerro Gonzalo, Cerro Colorado and Cerro Blanco are recommended as promising districts. In addition, based on the stream sediments geochemistry in the existing data analysis, the Alto del Rio Barrancas district is recommended as a promising district.

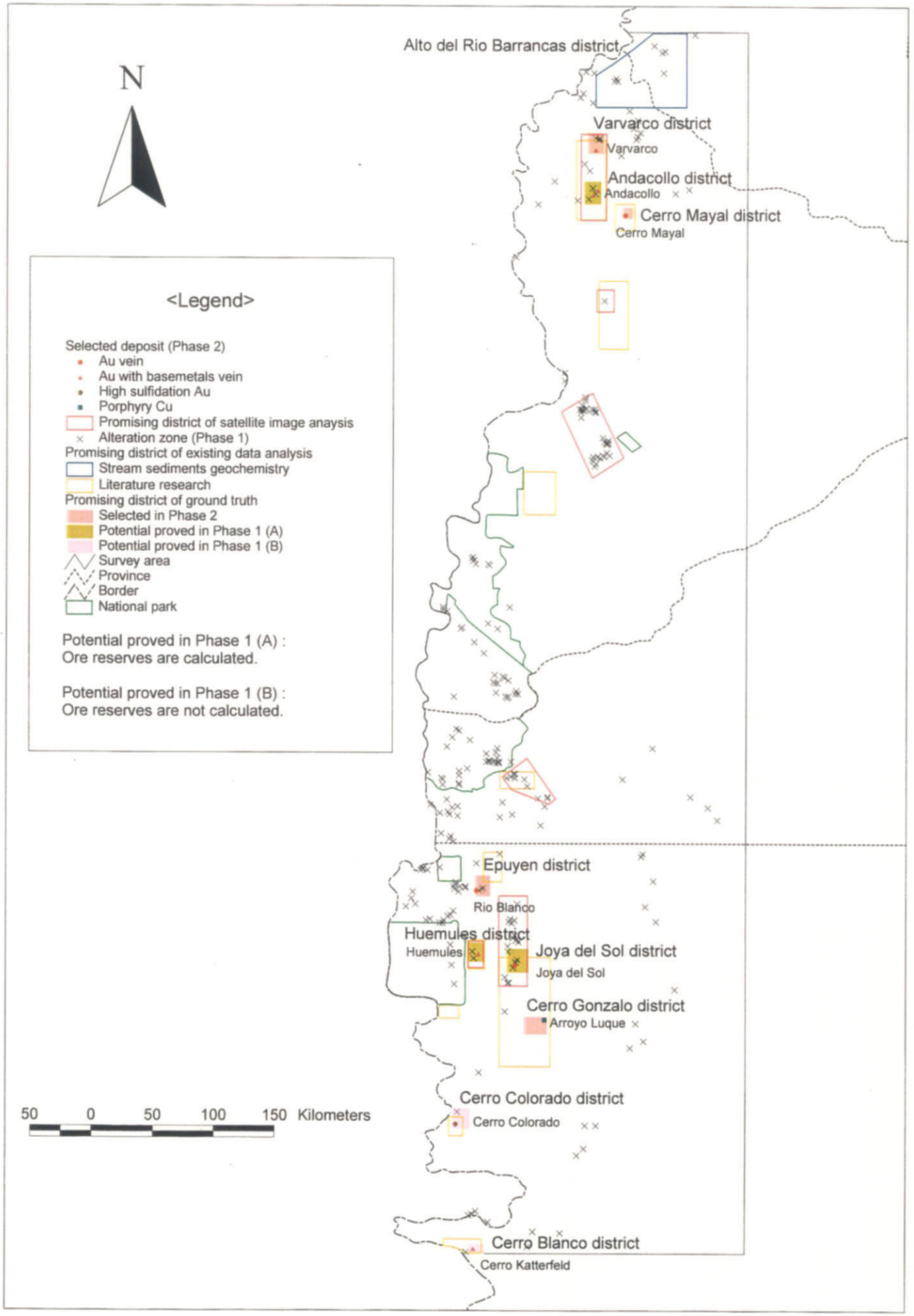


Fig. II-4-5 Synthetical interpretation result for the survey area.

Part III : CONCLUSIONS AND PRPPOSALS

Chapter 1 Conclusions

In this survey, existing data analysis, satellite image analysis and a ground truth were carried out over two fiscal years of Phase-1 and Phase-2.

In the existing data analysis, a literature research was done regarding data owned by SEGEMAR, provincial governments and private companies in the Phase-1. In the Phase-2, analysis was done on airborne geophysical exploration data acquired in the Neuquen province, which is owned by SEGEMAR. In addition, 9,242 stream sediments samples, which were taken in the Neuquen province by SEGEMAR in past, were re-analyzed for 48 elements, and the chemical analysis results were interpreted.

In the satellite image analysis, the false color images of 13 scenes were made and geological interpretation was done for them, and alteration zones of total 244 places were extracted by making of ratio composite images. In the phase-2, detailed extraction of alteration zones was done for 6 scenes including promising district, and the alteration zones were divided into neutral alteration and acid alteration.

In the ground truth, survey districts were selected based on the results of the existing data analysis and the satellite image analysis. In the Phase-1, 31 districts were surveyed where the known mineralization and alteration zones are distributed. In the Phase-2, total 16 districts were surveyed. Among them, 9 districts were selected for follow-up survey based on the results of the Phase-1, and 7 districts were newly selected. Interpretation for above-mentioned survey results is as follows.

Interpretation on results of the existing data analysis is shown in Fig. II-4-2. In the literature research of the existing data analysis, known deposits in the survey area are classified into vein deposits, porphyry copper deposits, high sulfidation gold deposits, placer gold deposits, sedimentary ore deposits and others. Important among these deposits as the subject of the exploration is gold and auriferous polymetallic vein deposits, high sulfidation gold deposits and porphyry copper deposits. These ore deposits were formed in connection with hydrothermal activities, and magmatic activities played an important role as the heat source. Therefore, in order to interpret the promising district regarding mineralization, it is important to understand the distribution of magmatic arcs related to mineralization. As a result of examination on the age of granitic rocks and volcanic rocks, both of which have a possible relationship with mineralization, that were obtained by the K-Ar radiometric dating (Table II-4-1, Fig. II-4-1), in the Neuquen province which is the northern part of the survey area, there is a high possibility that the formation of Compana Mahuida porphyry copper deposit and Andacollo, Varvarco and Cerro del Diablo vein deposits is limited to the period between the late Cretaceous and the Paleocene. This period was before the Eocene, when intensive volcanic eruptions started due to Andean orogenic movement, and it is suggested

that intrusive rocks without volcanic eruption brought about mineralization. In the Chubut province which is the southern part of survey area, there is a high possibility that Cerro Gonzalo porphyry copper deposit and Cerro Colorado high sulfidation gold deposit were formed in the late Cretaceous. Joya del Sol gold vein deposit has a high possibility that it was formed in the period between the middle and late Cretaceous. However, it also has a possibility of paleogene because the Ventana formation of Paleogene has received hydrothermal alteration in proximal Laguna Sunica. The late Cretaceous is considered to be important as the time when the age of formation of gold vein deposits, high sulfidation gold deposits and porphyry copper deposits was overlapping. This late Cretaceous is the period when the volcanic eruption was not active, and it is therefore suggested that intrusive rocks without volcanic eruption brought about mineralization similarly to Neuquen province. This is considered to mean that formation of promising ore deposits is difficult in the case that volcanic eruption is active because volatile components contained in magma are discharged, as pointed out by Sillitoe (1980).

Consequently, promising districts are selected as places where the distribution of the Cretaceous and Paleogene magmatic arcs harmonizes with the distribution of gold and auriferous polymetallic vein deposits, high sulfidation gold deposits, porphyry copper deposits and placer gold deposits.

Furthermore, as a result of interpretation on the stream sediments geochemistry, anomalies of 102 to 133ppb Au are recognized sporadically but widely in the Alto del Rio Barrancas district. As there are no known ore deposits, the existence of new ore deposits is expected in this district.

Interpretation on results of the satellite image analysis is shown in Fig. II-4-3. In the satellite image analysis, various lineaments were interpreted in addition to the geological interpretation. The lineaments in the direction of N-S, NE-SW and NW-SE are dominant on the whole. This is considered to reflect that lineaments are in the compressive stress field in the direction of E-W due to subduction of the plate from the Pacific side. However, as there were various tectonic movements before Andean orogenic movement, in addition, various lineaments were also generated by the vertical movements of blocks. Therefore, systematic analysis for directions of lineaments is considered to be difficult to extract the promising districts. Moreover, any lineaments just corresponding to fractures hosting the vein ore deposits were not interpreted.

On the other hand, hydrothermal alteration zones were extracted in a total of 244 places, but not all of them are related to mineralization. But the existence of hydrothermal activities and fractures that were conduits of the hydrothermal water is indispensable for mineralization. Because of this, it is considered that alteration zones existing on or near lineaments are important from the viewpoint of hydrothermal alteration zones along

fractures. As a result of selection for the alteration zones located within 2 km from each lineament, promising district are selected as places where the objective alteration zones are distributed harmoniously with gold and auriferous polymetallic vein deposits, porphyry copper deposits and placer gold deposits.

Interpretation on results of ground truth is shown in Fig. II-4-4. As a result of Phase-1 ground truth, high potential was recognized for five districts of Andacollo, Huemules, Joya del Sol, Cerro Colorado and Cerro Blanco, and decided not to include these in the Phase-2 survey. In the Andacollo district, auriferous polymetallic vein deposit is already being exploited by Minera Andacollo Gold S.A. Concerning the auriferous polymetallic vein deposit in the Huemules district and the auriferous quartz vein deposit in the Joya del Sol district, Minera el Desquete S.A. is conducting a feasibility study, and the total volume of gold reached 2,451,700 oz according to information on the Internet. Concerning the high sulfidation gold deposit in the Cerro Colorado district and the auriferous polymetallic vein deposit in the Cerro Blanco district, Billiton Argentina B.V. is now ceasing the exploration. However, 7.95 g/t Au was reported for the hydrothermal braccia on ground surface of the Cerro Colorado district, and 1.575 g/t Au was confirmed for quartz veins in the Cerro Blanco district in this survey.

The Phase-2 survey was conducted for nine follow-up districts of Varvarco, Campana Mahuida, Palau Mahuida, Nireco, La Voluntad, Condorcanqui, Epuyen, Cerro Gonzalo and Arroyo Cascada, and seven new districts of Villa Aguas Calientes, Carro Collocho, Cerro Mayal, Cerro de los Bueyes, Rio Foyel, Laguna Sunica and Cerro Cuche. As a result for these, four districts of Varvarco, Cerro Mayal, Epuyen and Cerro Gonzalo are considered to be promising.

Varvarco ore deposit in the Varvarco district actually comprises the Mina Santos ore deposit and Mina Santos West ore deposit, and the host rock is granodiorite. The quartz veins with chalcopyrite and malachite from Mina Santos ore deposit revealed the analysis results of 14.04g/t Au, 524g/t Ag, 2.75% Cu and 2.69% Pb. The quartz veins with pyrite dissemination from Mina Santos West ore deposit revealed analysis results of 15.27g/t Au and 37g/t Ag. In the Cerro Mayal district, there is distribution of andesite porphyry which has altered to white and intrudes into sedimentary rocks of the lower Cretaceous. The limonitized calcite veinlets in fracture zones revealed analysis results of 59.14g/t Au and 3.4g/t Ag. In the Epuyen district, quartz veins of about 20 cm in width are hosted in quartz porphyry intruding into the Cretaceous granite batholith and revealed analysis results of 9.14g/t Au and 12.4g/t Ag. This is described for the first time as a result of this survey, and we have named it the Rio Blanco ore deposit. The Cerro Gonzalo district consists of Sectors 1 to 6, and Sector 1 is called Arroyo Luque. In Arroyo Luque, hypogene porphyry copper deposit is exposed at the level of the streams and revealed the content of 1295 to 1655ppm Cu.

Oxidized leaching zone locally containing malachite is formed on the upper part of hills, and the existence of a secondary enrichment zone is expected beneath the hills. Sector 6 in Cerro Gonzalo is located on the topographically highest area, and alteration zones indicate conditions of supergene oxidized leaching. Therefore, the existence of a secondary enrichment zone is also expected in the lower part.

Although Condorcanqui copper deposit was not judged to be promising, important geological information was obtained from this survey. The dissemination ore deposit of chalcopyrite, malachite and so on, whose host rock is andesite lava and pyroclastic rocks, have been considered up to now as ore deposits of the manto-type, whose host rock is Ventana formation of Paleogene. However, it is considered from this survey results that the host rock of ore deposits is Piltriquitron formation of Jurassic, and it is metasomatic copper deposit related to dacite dykes that derived from granitoids of the very end of the Jurassic to the early Cretaceous.

The result of overlapping of promising districts selected by the existing data analysis, the satellite image analysis and the ground truth is shown in Fig. II-4-5. Nine districts selected from the ground truth conform well to both or either of the promising districts selected from the existing data analysis and/or satellite image analysis, except for the Epuyen district. As to the Epuyen district, there is overlapping with only a part of the promising districts selected from the existing data analysis. This is because, for the promising district selected from the existing data analysis, consideration was not given to the existence of Rio Blanco gold vein deposits in the Epuyen district, which is described here for the first time.

Among five districts of Andacollo, Huemules, Joya del Sol, Cerro Colorado and Cerro Blanco that the high potential were proved in the Phase-1 ground truth, it is considered regarding three districts of Andacollo, Huemules and Joya del Sol, exploration is sufficient because calculation of ore reserves has been already performed. As to two districts of Cerro Colorado and Cerro Blanco, although promising mineralizations have been known, calculation of ore reserves has not been performed yet. Therefore, exploration such as a drilling survey should be conducted.

Regarding four districts of Varvarco, Cerro Mayal, Epuyen and Cerro Gonzalo that have been selected in the Phase-2 ground truth, outcomes from further exploration hereafter are expected.

As an interpretation result of the stream sediments geochemistry in the existing data analysis, the Alto del Rio Barrancas district which is accompanied by geochemical anomalies of 102 to 133ppb Au has been selected although these are sporadically. In this district, the existence of new gold deposits is expected.

The range extending from south to north including the Varvarco and Andacollo districts

is a promising district in satellite image analysis. Because the Butalon Norte district located between the two districts (Fig. II-3-1-1) is not, however, selected as a promising district in the ground truth, promising places in Varvarco and Andacollo districts are limited to each scope. The range including the Joya del Sol district and the northern area of it is also a promising district in satellite image analysis. But as Minera el Desquite S.A. has already acquired northern mining properties such as Leleque, it is considered that exploration has been sufficiently carried out.

Consequently, based on the ground truth results, six districts of Varvarco, Cerro Mayal, Epuyen, Cerro Gonzalo, Cerro Colorado and Cerro Blanco are recommended as promising districts. In addition, based on the stream sediments geochemistry in the existing data analysis, the Alto del Rio Barrancas district is recommended as a promising district.

Chapter 2 Proposals for further exploration

Six districts of Varvarco, Cerro Mayal, Epuyen, Cerro Gonzalo, Cerro Colorado and Cerro Blanco are selected as promising districts based on the results of the ground truth. Besides, Alto del Rio Barrancas district is selected as promising district based on the interpretation on the stream sediments geochemistry in the existing data analysis (Fig. III-1, Table III-1).

Varvarco ore deposit in the Varvarco district actually comprises the Mina Santos ore deposit and Mina Santos West ore deposit, and the host rock is granodiorite. At the old mine of Mina Santos ore deposit, network quartz veins with pyrite dissemination of about 50 cm in the maximum width were observed. The quartz veins with chalcopyrite and malachite from Mina Santos ore deposit revealed the analysis results of 14.04g/t Au, 524g/t Ag, 2.75% Cu and 2.69% Pb. The quartz veins with pyrite dissemination from Mina Santos West ore deposit revealed analysis results of 15.27g/t Au and 37g/t Ag. It is recommended that drilling survey should be planned to unveil the scale of veins after execution of detailed geological survey, geochemical survey and geophysical survey.

In the Cerro Mayal district, there is distribution of andesite porphyry which has altered to white and intrudes into sedimentary rocks of the lower Cretaceous. The limonitized calcite veinlets in fracture zones revealed analysis results of 59.14g/t Au and 3.4g/t Ag. It is recommended to plan drilling survey to unveil the underground conditions of mineralization after careful tracing of limonitic calcite zone by detailed geological survey, geochemical survey and geophysical survey.

In the Epuyen district, quartz veins of about 20 cm in width are hosted in quartz porphyry intruding into the Cretaceous granite batholith and revealed analysis results of

9.14g/t Au and 12.4g/t Ag. This is described for the first time as a result of this survey, and we have named it the Rio Blanco ore deposit. Several other limonitic outcrops were seen from a distance. It is recommended to understand the scale and nature of mineralization more accurately by conducting of systematic geological survey and geochemical survey. Moreover, the Lago Cholila district is located next to the Epuyen district on the west side, and the chemical analysis result of 2490ppm Cu was obtained from float sample in the river running down from alteration zones in the Phase-1. Although it was planned to conduct the follow-up survey in the Phase-2, the survey was not carried out because permission for entry was not obtained from the landowner. Therefore, places requiring exploration in the Epuyen district have the possibility of expansion to the western part.

The Cerro Gonzalo district consists of Sectors 1 to 6, and Sector 1 is called Arroyo Luque. In Arroyo Luque, hypogene porphyry copper deposit is exposed at the level of the streams and revealed the content of 1295 to 1655ppm Cu. Oxidized leaching zone locally containing malachite is formed on the upper part of hills, and the existence of a secondary enrichment zone is expected beneath the hills. Although it is apprehended that a high grade has not been realized even by secondary enrichment because the grade of primary minerization is low, it is desired to confirm underground conditions by drilling survey. To conduct the drilling survey, additional IP method geophysical survey is recommended prior to drilling survey because the previous IP method geophysical survey did not cover the whole mineralized zone. Meanwhile, Sector 6 in Cerro Gonzalo is located on the topographically highest area, and alteration zones indicate conditions of supergene oxidized leaching. The existence of a secondary enrichment zone is also expected in underground. Therefore, it is also recommended to conduct IP method geophysical survey in order to judge the possibility of the existence of secondary enrichment.

In the Cerro Colorado district, the mineralization of 7.95g/t Au was reported for hydrothermal breccia on ground surface where the Jurassic andesite is distributed. From now on, further continuation of the drilling survey is recommended to unveil the ore reserve and the average grade.

In the Cerro Blanco district, quartz porphyry intrudes into the Cretaceous sedimentary rocks. The chemical analysis result of 1.575g/t Au was obtained for the quartz vein hosted in the sedimentary rocks in this survey. The trench survey has been already done for the mineralized area. From now on, drilling survey is recommended after conduction of the geophysical survey, etc.

In the Alto del Rio Barrancas district, geochemical anomalies of 102 to 133ppb Au by means of stream sediments were recognized although they are sporadically. In this district, although magmatic arcs of the Paleogene to the Neogene are distributed and alteration zones were extracted from the satellite image analysis, no known ore deposits exist. Accordingly,

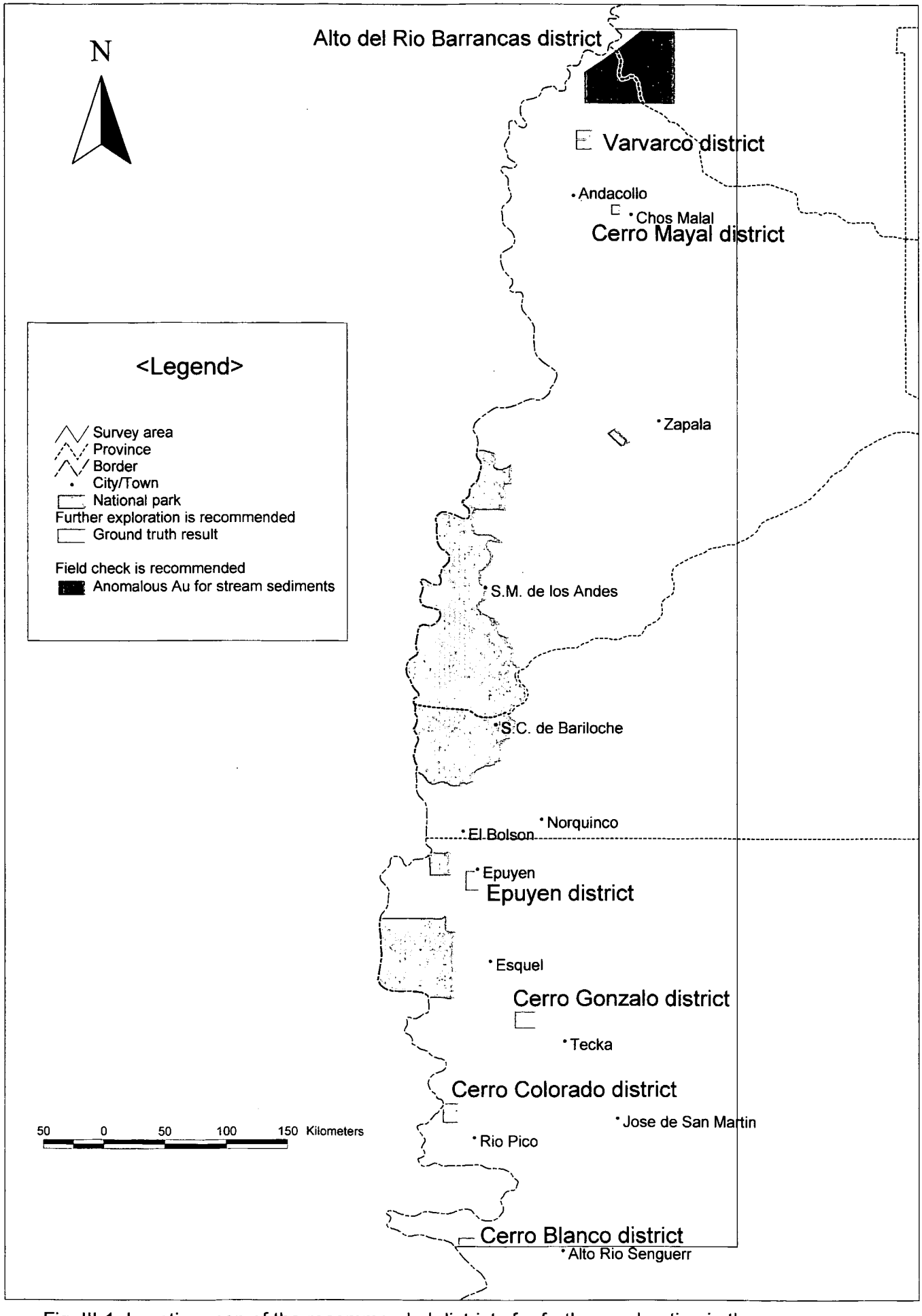


Fig. III-1 Location map of the recommended districts for further exploration in the survey area.

Table III-1 Recommendation for further exploration in the survey area.

No.	Promising district	NE corner	SW corner	Survey for conclusion	Unit	Formation	Rock	Intrusive	Lineament	Alteration (Phase 1, TM image)	Alteration (Phase 2, TM image)	Known mineralization	Survey results	Recommended program
1	Alto del Rio Barrancas	S36°00'00", W69°54'00"	S36°24'00", W70°36'00"	Exiting data analysis for stream sediments geochemistry	Tα2, TQβ	Cajón Negro Fm., basalt lavas	Andesite, basalt		NE, NW	ML002-005, 008-010	Neutral, acid		122 to 133ppb Au for stream sediments	Geological survey, geochemical survey by medium of rock and soil, re-interpretation of satellite image in scale of 1/100,000
2	Varvarco	S36°44'24", W70°33'36"	S36°53'24", W70°41'24"	Ground truth (Phase 2)	PTR	Choiyoi Fm.	Tuff, tuff breccia	Granite, Granodiorite	NE, NW, N-S	CM004-007	Neutral, acid	Vervarco (Au-Cu vein), 16.97g/t Au, 302.25g/t Ag, 2.04% Cu	14.04g/t Au, 524g/t Ag, 2.75% Cu at Mina Santos, 15.27g/t Au, 37g/t Ag at Mina Santos West	Detailed geological, geochemical and geophysical survey, then drilling survey
3	Cerro Mayal	S37°17'24", W70°21'00"	S37°22'12", W70°25'48"	Ground truth (Phase 2)	JK	Mendoza Gr.	Sandstone, shale	Andesite porphyry			Acid	Cerro Mayal (Au vein), 75.84g/t Au	59.14g/t Au, 3.4g/t Ag, >25% Fe for limonitic calcite veinlets	Detailed geological, geochemical and geophysical survey, then drilling survey
4	Epuyen	S42°12'54", W71°22'48"	S42°22'12", W71°30'00"	Ground truth (Phase 2)	Jm, Kg	Piltriquitron Fm., granitoids	Silt - sandstone, dacite - andesite, granite	Quartz porphyry	NE, N-S	SB081-083	Neutral	Arroyo Pedregoso (Placer Au)	9.14g/t Au, 12.4g/t Ag for quartz vein in quartz porphyry	Detailed geological, geochemical and geophysical survey, then drilling survey
5	Cerro Gonzalo	S43°15'36", W70°57'36"	S43°23'24", W71°08'24"	Ground truth (Phase 2)	Kg	Granitoids	Granite, granodiorite	Quartz porphyry				Cerro Gonzalo (Porphyry Cu)	Max 0.17% Cu for hypogene porphyry Cu along the streams, and areas on hills are limonitized at Arroyo Luque	IP method geophysical survey and drilling survey
6	Cerro Colorado	S43°55'48", W71°3148"	S44°05'24", W71°40'12"	Ground truth (Phase 1)	Jba, Kg	Lago la Plata Fm., granitoids	Andesite	Porphyrite		LM033	Neutral, acid	Cerro Colorado (High sulfidation Au)	Average 7.95g/t Au was reported for 66 samples from 2,200km2	Detailed geological, geochemical and geophysical survey, then drilling survey
7	Cerro Blanco	S44°55'48", W71°25'12"	S45°00'00", W71°33'00"	Ground truth (Phase 1)	Kim, Ka	Apeleg Fm., Divisadero Fm.	Sandstone, Mudstone, Volcanics	Qz porphyry, Andesite		SE006	Not conducted	Cerro Blanco (Au-Pb vein)	Hydrothermal alteration is developed, 1.575 g/t Au for quartz vein	Detailed geological, geochemical and geophysical survey, then drilling survey

the existence of new gold deposits is expected. It is desired to conduct general geological survey and geochemical survey by means of rock and soil samples. In the execution of these surveys, it is recommended to re-interpret the satellite images on scale of 1 to 100,000 or similar scale in detail though it was done on scale of 1 to 250,000 in this survey.

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Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
1	Argentina Mining Sector Review 1993	English		1993	World Bank	Argentina	Mining activities report
2	Directory of Mining Investment Opportunities in the Argentina Republic	English		1993	Mining Secretary, Ministry of Economy and Public Services	Argentina	Deposits in each province, Geological maps, Climate, Topographical sections
3	Depositos y Manifestaciones Minerales de la Cordillera Patagonica y Fueguina, Republica Argentina	Spanish		1994	Secretaria de Mineria de la Nacion	Argentina	Location map of deposits in Chubut, Santa Cruz, Tierra del Fuego
4	Encuentro Intermacional de Mineria, ACTAS	Spanish		1994	Secretaria de Mineria de la Nacion	Argentina	Technical papers
5	Annual Reort 1995, Eldorado Gold Corpration	English		1995	Erdrado Gold Corporation	Argentina	Andes project in Catamarca
6	Environment for mining development in Argentina	Japanese		1995	MERIC, MMAJ	Argentina	Country report
7	Geologia y Matalogenesis del Orogeno Andino Central	Spanish	Mendez, V., Zanettini, J.C. and Zappettini, E.O.	1995	SEGEMAR	Argentina	Note on geological map of 32°to 40°Central Andean area (1/400,000).
8	Geologia y Metalogenesis del Orogeno Andino Cenral, Republica Argentino	Spanish	Mendez, V., Zanettini, J.C. and Zappettini, E.O.	1995	SEGEMAR	Argentina	Note on geological map of 32°to 40°Central Andean area (1/400,000).
9	Geologia y Metalogenesis del Orogeno Andino Cenral, Republica Argentino	Spanish	Mendez, V., Zanettini, J.C. and Zappettini, E.O.	1995	SEGEMAR	Argentina	Geological map of 32°to 40°Central Andean area (1/400,000).
10	Argentina Mining '96, A New Frontier Opportunity	English		1996	Engineering & Mining Journal, Latinomineria	Argentina	Investment promotion
11	Argentina's Mining Sector 1997	English		1997	Ministry of Economy and Public Works and Services	Argentina	Mining ativities
12	Estadistica de la Produccion Minera de la Republica Argentina	Spanish		1997	Subsecretaria de Mineria	Argentina	Mining production statistics
13	Estadistica Minera de la Republica Argentina, 1994-1996	Spanish		1997	Direccion de Evaluacion Minera	Argentina	Mining statistics
14	Sector Minero Argentina 1977	Spanish		1997	Ministrerio de Economia y Obras y Servicios Publicos	Argentina	Mining activities
15	Argentina's Mining Sector	Spanish/English		1998	Ministrerio de Economia y Obras y Servicios Publicos	Argentina	Outline of mining activities.

No.	Title	Language	Author	Year	Organization	Category	Comments
16	Argentina's Mining Sector 1998	Spanish		1998	Ministrerio de Economia y Obras y Servicios Publicos	Argentina	Mining activities
17	Mineria Argentina, La Calidad como Filosofia	Spanish		1998	Subsecretaria de Mineria	Argentina	Mning policy
18	Mining Right Information (La Rioja, Mendoza, San Juan)	English	Lavandario, E.	1998	SEGEMAR	Argentina	Letter, Mining Right Information
19	X Congreso Latinoamericano de geologia, VI Congreso Nacionalde Geologia Ecomica	Spanish		1998	Subsecretaria de Mineria de la Nacion, Sevicio Geologico Minero Argentina, Asociacion Argentina de Geologos Economistas	Argentina	Proceeding of the geological conference
20	Compendio 1999/2000 de las Industrias de Base Mineral y de la Mineria Argentina	Spanish		1999	Panorama Minero	Argentina	Mining magazine for mining activities
21	Panorama Minero	Spanish		1999	Una Organizacion Periodistica al servicio de la Mineria	Argentina	Andacollo project etc.
22	Panorama Minero	Spanish		1999	Panorama Minero	Argentina	Mining magazine in Argentina
23	Geomapa, Republica Argentina	Spanish		?	?	Argentina	Map of Argentina 1/3,500,000
24	Legal and Tax Framework	Spanish		?	?	Argentina	Mining law and Revenue law
25	Marco Juridico Ambient para la Actividad Minera	Spanish		?	Unidad de Gestion Ambient Nacional	Argentina	Environmental law
26	Rutas de la Argentina	Spanish		?	Automapa	Argentina	Road maps
27	Indexof 1:250,000 topography maps	Spanish				Argentina	Index map of 1/250,000
28	Caracteristicas y Edad del Plutonismo en los Alrededores del Lago Puelo, Provincia del Chubut	Spanish	Lizuain, A.	1981	Servicio Geologico Nacional	Chubut	Age of plutonic rocks of Cordillera Patagonia.
29	Investigaciones Detalladas del Cateo Huemules, Informe Final: Parte I	Spanish		1983	United Nations Revolving Fund for Natural Resources Exploration	Chubut	Final report of UNRF project (1977-1982)
30	Mineralizacion asociada a diques terciarios de Dacita-Andesita-Basalto en la Cordillera Patagonica Septentrional y Central, Provincias de Rio Negro y Chubut	Spanish	Genini, A.D., Grizinik, M. and Pezzuchi, H.D.	1989	Dir. Nac. Min. y Geol. Centro Explor. Patag. Sur y Dept. Geologia - Univ. Nac. de la Patagonia San Juan Basco	Chubut	Mineralization model.

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
31	Mapa Geologico de la Provincia del Chubut	Spanish		1995	Direccion Nacional del Servicio geologico	Chubut	Provincial geological map
32	Mapa Geologico Simplificado de la Cordillera de la Provincia del Chubut	Spanish	Marquez, M.J.	1999	Servicio Nacional Minero Geologia	Chubut	Outline geology of cordillera area of Chubut province.
33	Properties map of Chubut Province (4 pc.)	Spanish		1999	Com. Rivadavia, SEGEMAR	Chubut	Properties map of Chubut Province.
34	Mapa de ubicacion de UNRF project	Spanish		?	?	Chubut	Location maps of Gaste, Esquel-Corcovado, Lagos Fontana-La Plata areas
35	Provincia Chubut, Geochemica de Rocas/Sedimentos/Suelo	Spanish		?	?	Chubut	Geochemical survey in Chubut province
36	Indexof 1:100,000 topography maps, Provincia del Chubut	Spanish				Chubut	Index map of 1/100,000, Chubut.
37	Metalogenesis de la region Apeleg-Alto Rio Sebguerr, Chubut	Spanish	Lanfranchini, M.E., Etcheverry, R.O. and Schlamuk, I.B.	1999	XIV Congreso Geologico Argentino	Chubut (Apeleg)	Aloteration and mineralization in Apeleg-Alt Rio Senguerr district
38	Informe expeditivo, proyect Arroyo Cascada	Spanish	Genini, A. and Zubia, M.	1989	SEGEMAR	Chubut (Arroyo Cascada)	Mineral exploration report, Au mineralization
39	Estudio de las Alteraciones en el Cerro Coihue. Provincia del Chubut. Republica Argentina	Spanish	Genini, A. and Nillni, A.	1994	Universidad nacional de la Patagonia San Juan Bosco	Chubut (Cerro Coihue)	Investigation on alteration of Cerro Coihue deposits
40	Informe Preliminar Proyect 04 HA. Epuyen. Area No 8. Cerro Coihue	Spanish	Genini, A. and Grizinic, M.	1999	Delegacion Regional Patagonia, SEGEMAR	Chubut (Cerro Coihue)	Outline of Cerro Coihue deposits, vein-type, pyritization with Cu-Mo mineralization
41	Geologia y Mineralizacion del Sector Suroriental del Cerro Coihue, Provincia del Chubut	Spanish		?	Secretaria de Estado de Mineria y Universidad Nacional de la Patagonia San Juan Basco	Chubut (Cerro Coihue)	Outline of Cerro Coihue deposits.
42	Mapa Geologico Minero del Arroyo de los Alevinos - Lago Fontana, Provincia del Chubut.	Spanish	Marquez, M.J. y Parisi, C.	1995	SEGEMAR	Chubut (Cerro Colorado)	Geological map of the area of Cerro Colorado
43	El prospect aurifero Cerro Colorado, Chubut	Spanish	Perez, H.D. and Sureda, R.J.	1999	XIV Congreso Geologico Argentino	Chubut (Cerro Colorado)	Discovery of high sulfidation gold deposit
44	Estudio geologico en la Republica Argentina, Fase IV, Sector Cerro Cuche	Spanish		1981	JICA/MMAJ, Secretaria de Estado de Mineria	Chubut (Cerro Cuche)	Mineral exploration report, porphyry Cu type alteration
45	Informe geofisico, sector Cerro Gonzalo and Arroyo Luque, area reserva No. 29 Cordon Caquel	Spanish	Pancetti, N.	1984	SEGEMAR	Chubut (Cerro Gonzalo)	Mineral exploration report, IP and EM Turam methods

No.	Title	Language	Author	Year	Organization	Category	Comments
46	Estudio preliminar, sector No. 2 - Cerro Gonzalo, area No. 29 - Cordon Caquel, proyect 04 HC - Tevelin	Spanish	Marquez, M.J.	1985	SEGEMAR	Chubut (Cerro Gonzalo)	Mineral exploration report, geological works
47	Proyect de exploracion, sector 2 - Cerro Gonzalo, area Cordon Caquel, 04 HC - Trevelin Chubut	Spanish	Marquez, M.J.	1988	SEGEMAR	Chubut (Cerro Gonzalo)	Mineral exploration report, drilling survey results
48	Proyect 04 HC Area Cordon caquel, Bosquejo Geologico entre Arroyp Luque y Arroyo el Rapid.	Spanish			SEGEMAR	Chubut (Cerro Gonzalo)	Geological map of the area of Arroyo Luque - Cerro Gonzalo
49	Estudio Geologico-Minero del Yacimiento Cuprifero "Condorcanqui"	Spanish	Tabacchi, M.H.	1953		Chubut (Condorcanqui)	Outline of Condorcanqui deposit, Low Cu grades.
50	Reconocimient Geologico Area Epuyen, Prov. Del Chubut	Spanish	Genini, A.	1976	S.N.M., P.P.C.	Chubut (Condorcanqui)	Outline of Condorcanqui deposits, 4,400t reserves by FM's drillings.
51	Mineralizacion de Cobre Asociada al Plutonismo Terciario en la Zona de la Mina Condorcanqui, Provincia de Chubut	Spanish	Silva, A., Beatriz, C., Eva, D. and Norra, P.	1979	Secretaria de Estada de Minelia, Ministerio de Economia	Chubut (Condorcanqui)	Geochemical survey for Condorcanqui deposit area.
52	Geologia de la Cordillera Patagonia entre las localizades de Lago Puelo y Leleque, Provincia del Chubut	Spanish	Lizuain, A.	1983	Universidad de Buenos Aires	Chubut (Condorcanqui, Epuyen)	Geological research report
53	Geologia y Area de Alteracion en el Cerro Cororado y Alrededores. Chubut Noroccidental	Spanish	Sepulveda, E.G. and Viera, R.M.	1980	Asociacion Geologica Argentina, Revista XXXV (2) 195-202	Chubut (Esquel NW)	Technical paper, alteration with possibility of porphyry copper deposit
54	Informe Preliminar sobre la Prospeccion Reginal del Cordon de Esquel, Proyect 04 HB Esquel	Spanish	Herrero, J.C.	1982	Servicio Nacional Minero Geologia	Chubut (Esquel)	Field survay report, inc. 1/100,000 geological map
55	Informe Proyect Cordon Situacion, Centro de Exploracion Patagonia Sur	Spanish	Marquez, M., Parisi, C. and Butron, F.	1987	Direccion Nacional de Mineria y Geologia, Secretaria de Mineria	Chubut (Esquel)	Field survay report, inc. 1/2,000 route map
56	Informe Proyecto 04, HB, Esquel. Plan Patagonia Comaue Geologico Minero	Spanish		1997	Servicio Nacional Minero Geologico	Chubut (Esquel)	Field survey report with mineral occurrences, inc. 1/100,000 maps
57	Annual report and Financil Statements for the year ended 31 December 1998	English		1999	Brancote Holding PLC	Chubut (Hoya del Sol)	Annual report of 1998
58	Geologia-Reservas y Modelo Teorico de Estructuras Mineralizadas del Yacimiento de Oro Huemules	Spanish	Viera, R., Herrero, J.C. and Hughes, G.E.	1982	Direccion General de Minas y Geologia Provincia Chubut	Chubut (Huemules)	Hemules deposit, 0.02 to 815g/t Au, guide for galleries.
59	Investigaciones Detalladas del Cateo Humules, Informe Final: Parte II	Spanish		1983	Fond Rotatorio de las Naciones Unidas para la Exploracion de Recursos Naturales	Chubut (Huemules)	Final report of UNRF project (1977-1982) for Huemules deposit.
60	Mapas anexas de Informe Final Parte II	Spanish		1983	Fond Rotatorio de las Naciones Unidas para la Exploracion de Recursos Naturales	Chubut (Huemules)	Plans of final report of UNRF project (1977-1982) for Huemules deposit.

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
61	Proyect Huemules (Provincia de Chubut)	Spanish		1984	Ministrio de Economia, Servicios y Obras Publicas/Subsecretaria de Promocion y Desarollo/Provincia del Chubut	Chubut (Huemules)	Abstract of UNRF project, Huemules deposit, 2,975,000t (10.3g/t Au, <1,000,000t)
62	El Prospecto Huemules, Cordon Oriental del Futalaufquen, Chubut, Argentina	Spanish	Viera, R.L.M. and Hughes, G.	1999	SEGMAR, Direccion de Minas y Geologia del Chubut	Chubut (Huemules)	Huemules deposit, 750,000t, 9g/t Au.
63	Mineralogia del yaimiento polimetarico Huemules, Cordillera Patagonia Septentrional, Chubut	Spanish	Schalamuk, I., Bario, R.E. and Vasconcellos, M.	1999	XIV Congreso Geologico Argentino	Chubut (Huemules)	Mineralogy, fluid inclusion and isotopic data
64	Informe Preliminar Proyecto 04 HA "Lago Epuyen"	Spanish	Beltramone, C.A.	1978	Plan Patagonia Comahue, Subseda los Alamos	Chubut (Lago Epuyen)	Five alteration zones, geochemical survey, Cu max 320ppm.
65	Proyecto Lago Fontana, Chubut	Spanish	Silvia Ametrano	1885	Secretaria de Mineria	Chubut (Lago Fontana)	Detailed survey report, 700,000t reserves, 1.63% Pb, 4.49% Zn, 0.61% Cu
66	No Title (Lago Fontana y otros)	Spanish		1951		Chubut (Lago Fontana)	Survey for mineral occurrences of Chubut and Santa Cruz.
67	Genesis y Geoquimica de la Mineralizacion de los Yacimientos "Los Manantiales y Lago Fontana", Provincia del Chubut	Spanish	Dominguez, E.A.	1981	Asociacion Gelogica Argentina, Revista, XXXVI (2) : 123-142.	Chubut (Lago Fontana)	Study on the genesis of Los Manantiales deposit and Lago Fontana deposit
68	Informe Geologico Preliminar, Lago Fontana Sur	Spanish	Marquez, M.J. and Parisi, C.	1994		Chubut (Lago Fontana)	Survey for mineral occurrences, Arroyo Cangan is thought to be promising.
69	Informe de Avance Programa Cordillea Patagonica Area Arroyo Canogas	Spanish	Marquez, M.J. and Parisi, C.	1995	Delegacion Regional Patagonia, Direccion Nacional del Servicio Geologico	Chubut (Lago Fontana)	Geology and mineraliztion of Arroyo Canogas area.
70	Informe de Avance Programa Cordillea Patagonica Area Katterfeld	Spanish	Marquez, M.J.	1995	Delegacion Regional Patagonia, Direccion Nacional del Servicio Geologico	Chubut (Lago Fontana)	Geology and mineraliztion of Katterfeld area.
71	Yacimientos de Oro y Plata de la Patagonia, Republica Argentina, Principales Posibilidades de Inversion	Spanish		1997	SEGEMAR	Chubut (Lago Fontana)	La Ilision Propiedad(Zn,Pb,Ag,Au), Cerro Colorado propiedad (Au 7.95g/t)
72	Informe Preliminar de la Hoja 45a, Lago General Vinter	Spanish	Pesce, A.H.	1976	Servicio Nacional Minero Geologia	Chubut (Lago Grl. Vintter)	Field survey report, inc 1/200,000 geological map
73	Estratigrafia de la Cordillera Patagonica entre los de 43° 30′ y 44° de latitud sur y sus areas Mineralizadas	Spanish	Pesce, A.H.	1978	Servicio Nacional Minero Geologia	Chubut (Lago Grl. Vintter)	Geology, alteration and mineralization
74	Informe Preliminar Hoja Lago General Vintter (Hoja 45A)	Spanish	Pezzuchi, H.D.	1979		Chubut (Lago Grl. Vintter)	Geological description
75	Informe Proyecto 04, HB, Cerro Rinon y Cerro Steffen. Plan Patagonia Comaue Geologico Minero	Spanish	Parisi, C.	1981	Servicio Nacional Minero Geologia	Chubut (Lago Vintter)	Field survey report, inc. 1/50,000 maps

No.	Title	Language	Author	Year	Organization	Category	Comments
76	Informe Proyecto 04, HB, Esquel, parque Nacional Los Alerces	Spanish	Viera, R.	1976	Servicio Nacional Minero Geologia	Chubut (Los Alerces)	Field survey report, inc. 1/150,000 geological map
77	Informe Geologico Preliminar, Proyecto 04 HB Esquel y 04 HC Trevelin	Spanish	Marquez, M.J.	1980	Servicio Nacional Minero Geologia	Chubut (Los Alerces)	Field survey report, inc. 1/150,000 alteration map
78	Estudio de los Yacimiento de Caolin del Oeste de la Provincia del Chubut, Minas Susana, Gato y Estrella Gaucha	Spanish	Maiza, P.J.	1981	VIII Congreso Geologico Argentino, San Luis, Atas IV : 471-484.	Chubut (Sakmata)	Acid hydrothermal alteration
79	Mapeo de Semidetalle y Muestreo de las Zonas de Alteracion del Cerro Bayo (Cordillera de Sakmata) Apeleg ; Chubut	Spanish	Parisi, C. and Butron, F.	1993		Chubut (Sakmata)	Geochemical exploration by rock samples. No noticeable Au values.
80	Geologia y Mineralizacion de la Cordillera de Sakmata, Aldea Apeleg.	Spanish	Marquez, M. and Pezzuchi, H.	?	Direccion Nacional de Mineria y Geologia	Chubut (Sakmata)	Geology and mineralization of Sakmata (Apeleg), Qz veins with sulfides.
81	Informe sobre las Minas de Caolin, Alunita, y Minerales Metaliferos en la Promincia del Chubut	Spanish	Dr.Hayase, K.	1970	Universidad Nacional del Sur	Chubut (Sakmata, Lago Fontana)	Geological survey for the known deposits. No significant mineralization.
82	Estructura y Mineralizacion en la Cordillera Patagonica, Tesis Doctoral	Spanish	Haller, M.J.	1981	Universidad de Buenos Aires	Chubut (Trevelin~ Lago Grl. Vintter)	Doctoral dissertation, Universidad de Buenos Aires
83	Informe Geologico Preliminar, Proyecto 04 HC Trevelin, Sector Oriental	Spanish	Marquez, M.J.	1979	Servicio Nacional Minero Geologia	Chubut (Trvelin)	Field survey report, inc. 1/100,000 and 1/50,000 maps
84	Informe Proyect 04, HC, Trevelin. Plan Patagonia Comaue Geologico Minero	Spanish	Marquez, M.	1981	Servicio Nacional Minero Geologia	Chubut (Trvelin)	Field survey report, inc. 1/50,000 alteration map
85	Informe sobre la Prospeccion Semidetallada del Cerro Riscoso, Proyecto 04, HB, Esquel.	Spanish	Herrero, J.C. and Parisi, C.	1981	Servicio Nacional Minero Geologia	Chubut (Trvelin)	Field survey report, inc. 1/11,500 and 1/1,000 maps
86	Tehnical Specifications, Airborne Geophysical Survey in Argentina, SEGEMAR PASMA Project 1997-1998	Spanish		1997	SEGEMAR	Geophysics	SEGEMAR's specification for Airbone geophysics
87	Simposio Geofisica Aerea y Geoquimica en la Prospeccion Geologica-Minera	Spanish		1998	X Congreso Latinoamaricano de Geologia, VI Congreso Nacional de Geologia Economica	Geophysics	Proceedings of international geophysical conference.
88	Minerals Yearbook Volume III, 1995 International Review	English		1995	U.S. Department of the Interior/U.S. Geological Survey	Latin America	1995 Review, Mineral industries of Latin America and Canada
89	Mapa Metalogenetico de la Republica Arentina (GIS etc)	Spanish/English		1998	SEGEMAR	Maps (CD-ROM)	Metallogenic maps of Argentina inc. GIS.
90	Mapa Geologico de la Provincia de Rio Negro, 1:750,000; Direccion Nacional del Servicio Geologico (1) y (2)	Spanish		1994	Direccion Nacional del Servicio geologico, Secretaria de Mineria.	Maps (Geol. Map)	Geological map (1/750,000)

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
91	Geologia y Metalogenesis del Orogeno Andino Central; 1:400,000; Direccion Nacional del Servicio Geologico (1) y (2)	Spanish		1995	SEGEMAR	Maps (Geol. Map)	Geological map (1/400,000)
92	Mapa Geologico de la Provincia del Chubut, 1:750,000; Direccion Nacional del Servicio Geologico	Spanish		1995	Direccion Nacional del Servicio geologico, Secretaria de Mineria.	Maps (Geol. Map)	Geological map (1/750,000)
93	Mapa Geologico y de Recursos Minerales de la Provincia del Neuquen, 1:500,000; Direccion Nacional del Servicio Geologico	Spanish		1995	Direccion Nacional del Servicio geologico, Secretaria de Mineria.	Maps (Geol. Map)	Geological map (1/500,000)
94	Mapa Geologico de la Republica Argentina, 1:2,500,000; Secretaria de Industria, Comercio y Mineria (1) y (2)	Spanish		1997	SEGEMAR	Maps (Geol. Map)	Geological map (1/2,500,000)
95	Mapa de Recursos Minerales del Area Fronteriza Argentino-Chilena entre los 34 y 56 S, 1:1,000,000; Servicio Geologico MineroAargetino (2 hojas)	Spanish		1998	SEGEMAR/SERNAGEOMIN	Maps (Geol. Map)	Geological map (1/1,000,000)
96	Mineral survey in the Andean Cordillera, Argentina.	English		1968	United Nations Development Programme	Neuquen	Mineral exploration report
97	Investigation of porphyry copper type mineralization in the Provinces of Mendoza, Neuquen and San Juan, Argentina.	English		1970	United Nations Development Programme	Neuquen	Mineral exploration report
98	Informe de evaluacion preliminar, Contrato de exploracion · explotacion CORMINE Placer Dome, etapa1	Spanish		1993	Placer International Exploration Inc.	Neuquen	Compilation of several prospects in Neuquen
99	Mapa Geologico y de Recursos Minerales de la Provincia del Neuquen	Spanish		1995	Servicio Geologico Neuquino	Neuquen	Provincial geological map
100	Prospectos Metaliferos, Provincia del Neuquen	Spanish		1998	CORMIN S.E.P.	Neuquen	Information of CORMIN Properties of Butalon Norte, Cajon de los Chenques, Cerro Caicayen, La Voluntad, Cochico.
101	Airbone and Ground Instrumentation	English		?	?	Neuquen	Neuquen province, airbone mag. spec.
102	Areas de Reservas Minera, Provincia Neuquen	Spanish		?	CORMIN S.E.P.	Neuquen	Information of properties of Neuquen Province
103	Investing for Growth, Neuquen	English		?	Secretaria de Estado del COIPADE y Energia, Provincia del Neuquen	Neuquen	Investiment climate in Neuquen Province.
104	No.2 Campana Mahuida (Cu), No.3 Proyect disrito Aurifero Andacollo (Au)	Spanish	?	?		Neuquen	Outline of Campana Mahuida, Andacollo deposits etc.
105	Indexof 1:100,000 topography maps, Provincia del Neuquen	Spanish				Neuquen	Index map of 1/100.000, Neuquen.

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
106	Prospectos y Areas de Alteracion Hidrothermal de la Provincia del Neuquen	Spanish		1996	CORMIN S.E.P.	Neuquen	Information of 23 alteration zones in Neuquen Province.
107	Mapa Official de la Provincia del Neuquen	Spanish		1997	Provincia del Neuquen	Neuquen	Information map of 1/500,000 utilizing TM image
108	Prospecto y Areas de Alteracion Hidrotermal, Entre 36°46′ - 38°12′ L.S. y 70°01′ - 71°30′ L.O.	Spanish			Provincia del Neuquen	Neuquen	Geological map of 1/200,000 with distribution of hydrothermal alteration zones
109	Proyecto Andacollo, Resumen de actividades de exploración periodo sep. 1996 a agosto 1997, Resultados y programa de trabajo	Spanish		1997	CAMECO	Neuquen (Andacollo)	Geological and geochemical map and alteration map
110	Sector Norte Distrito Minero Andacollo	Spanish/English		1998	Gobierno de la Provincia del Neuquen	Neuquen (Andacollo)	Information of CORMIN property at North Andacollo.
111	Exploracion Geologica Proyecto Andacollo, vol.1	Spanish	Fuentes, J.S.	1998	CAMECO Argentina S.A.	Neuquen (Andacollo)	Conceptual geological model
112	Nuevo Contrato de Exploracion para Andacollo	Spanish		1999	Panorama Minero/No232-Enero de 1999	Neuquen (Andacollo)	New contract between CORMIN and Mineral Andacollo Gold S.A.
113	Explotacion del distrito aurifero Andacollo en la Provincia del Neuquen	Spanish		1999	Panorama Minero	Neuquen (Andacollo)	Exploitation at the Andacollo gold mine
114	Longitudinal Mina Sofia	Spanish		2000	Minera Andacollo Gold S.A.	Neuquen (Andacollo)	Section map of the Sofia Mine
115	Estudio Comparativo de los Distritos Mineros "Andacollo" y "Cerro Atravesada", Pcia. Del Neuquen, Argentina.	Spanish	Danieli, J.C. and Ronconi, N.	1979	Direccion General de Mineria de la Pcia. de Neuquen	Neuquen (Andacollo, Carreri)	Geological comparative study for Andacollo and Careri districts. Tertiary age mineralization is supposed for both districts.
116	Geoquimica de los intrusivos hallados entre los arroyos Butalon y Quebrada felix. Departamento Minas, Neuquen	Spanish	Case, A.M., Danieli, J.C. and Schlamuk, I.	1999	XIV Congreso Geologico Argentino	Neuquen (Butalon)	Petrological chemistry of intrusive rocks
117	Reserva Cajón de los Cheques	Spanish		1995	Placer Exploration Inc.	Neuquen (Cajón de los Cheques)	Mineral exploration report, geological and geochemical works
118	Geologia de la Comarca de Campana Mahuida (Provincia del Neuquen)	Spanish	Zanettini, J.C.M.	1979	Asociacion Gelogica Argentina, Revista, XXXVI (1) : 61-68.	Neuquen (Campana Mahuida)	Outline geology of Campana Mahuida deposit. Intrusions of Cretacaous to Ologocene.
119	Summary of 1997 Activities, Campana Mahuida Copper Property, Neuquen Province, Argentina	English		1997	Grupo Minero Aconcagua, S.A.	Neuquen (Campana Mahuida)	Summary of drilling, geophysics, hydrogeology and metallurgical test works
120	Campana Mahuida - Porfido Cuprifero Neuquen - Argentina Informe de Exploración Anexo II Logs de Sondeos a Diamantina (NU, CM, FM)	Spanish	Chabert, M.	1998	Grupo Minero Aconcagua, S.A.	Neuquen (Campana Mahuida)	Tables

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
121	Campana Mahuida - Porfido Cuprifero Neuquen - Argentina Informe de Exploración Anexo III Plano de secciones, Secciones NW-SE (zonas de Mena), Secciones NW-SE (meds)	Spanish	Chabert, M.	1998	Grupo Minero Aconcagua, S.A.	Neuquen (Campana Mahuida)	Plans and sections
122	Estudio Minero-Geologico del Yacimiento de Plomo "Carreri", Neuquen, Argentina.	Spanish	Aparicio, E.	1960		Neuquen (Carreri)	Description on the Carreri deposits, including ore grades and reserve (500t).
123	Fax-Area de Reserva La Atravesada, Neuquen, Argentina.	Spanish		1993	American Resource Corpration	Neuquen (Carreri)	Memoramdum on the information of La Atravesada area.
124	Area la Atravesada, Neuquen, Argentina.	Spanish		1993	Ingeoma S.A.	Neuquen (Carreri)	Geochimical sampling report in La Atravesada area.
125	Prospecto "La Atravesada", Muestreo Geoquimico, Pcia. del Neuquen, Argentina.	Spanish	Horacio, G.	1993		Neuquen (Carreri)	Stream-sediments geochemical survey results with Cu anomalies of 50 to 100ppm.
126	Area de Reserva Carreri.	Spanish		1995	Provincia del Neuquen	Neuquen (Carreri)	Information on Careri properties
127	Area de Reserva Cochico-Carreri-Cachil, Neuquen, Argentina.	Spanish	Campbell, J.	1996	RTZ Mining and Exploration Limited	Neuquen (Carreri)	Geochemical survey reports. RTZ withdrew to ontract with CORMINE.
128	Area de Reserva Carreri, Neuquen, Argentina.	Spanish		1998	Direccion Pcial. de Mineria	Neuquen (Carreri)	Description for previous works in the Carreri district.
129	La Formacion Chachil (Liasico) y sus Niveles Manganesiferos en el Area del Cerro Atravesada, Neuquen, Argentina.	Spanish	Leanza, H.A., De Brodtkorb, M.K., Brodtkorb, A. and Danieli, J.C.		Tercer Congreso Nacional de Geologia Economica	Neuquen (Carreri)	Description for Mn mineralization in the Cerro Atravesada district (Carreri-Nireco).
130	An Appraisal of the Chañas Project of Cormine SEP Neuquen Province, Argentina	Spanish	Bussandri, D.J.	1998	Billiton Argentina	Neuquen (Chañas)	Mineral exploration report, geological and geochemical works
131	Proyecto El Alamo, Informe Impacto Ambientál	Spanish	Bussandri, D.J.	1996	GATRO Argentina Minera S.A.	Neuquen (El Alamo)	Environmental impact assessment report
132	La Voluntad porphyry copper - gold deposit geological report	English	Farnstrom, H., Figueroa, G. and Rochefort, G.	1993	Placer International Exploration Inc.	Neuquen (La Voluntad)	Mineral exploration report, geochemical data
133	La Voluntad cobre porfirico deposito de oro informe geologico	Spanish	Farnstrom, H., Figueroa, G. and Rochefort, G.	1993	Placer International Exploration Inc.	Neuquen (La Voluntad)	Mineral exploration report, geochemical data, tanslation
134	Interpretation report on induced polarization and resistivity surveys at La Voluntad Project on behalf of Placer International Exploration Inc.	English	Rideout, M.	1993	Quantec Geofisica Limitada	Neuquen (La Voluntad)	Mineral exploration report, IP and resistivity methods

No.	Title	Language	Author	Year	Organization	Category	Comments
135	Proyect La Voluntad, Provincia del Neuquen, Republica Argentina, Informe de la Campaña de sondajes	Spanish	Acosta, H., Van Treek, G. and Zapatta, F.	1994	Placer International Exploration Inc.	Neuquen (La Voluntad)	Mineral exploration report, drilling information
136	Proyect III, Geoquimica del yacimiento La Voluntad, Provincia de Neuquen, Republica Argentina	Spanish	Ugalde, I. and Vivallo, W.	1994 ?	Universidad de Chile, Departamento de Geologia	Neuquen (La Voluntad)	Mineral exploration report, geological works
137	Reconocimiento geologico y muestreo orientativo en la zona norte de Pichi Neuquen	Spanish		1989	Corp. Minera del Neuquen	Neuquen (la zona norte de Pichi Neuquen)	Geological exploration report, geological and geochemical works
138	Reserva Quica	Spanish		1985	Placer Exploration Inc.	Neuquen (Palau Mahuida)	Mineral exploration report, geochemical data (Au-Cu)
139	Prospect Pino Andino	Spanish/English		?	Gobierno de la Provincia del Neuquen	Neuquen (Pino Anino)	Information of CORMIN property at Pino Andino, drillings, weak Cu mineralization.
140	Informe Final, Pino Andino	Spanish	Gonzáles, R.M.	1996	Cominco Argentina	Neuquen (Pino Andino)	Mineral exploration report, geological, geochemical, geophysical and drilling works
141	Target Progress Report	English	Lienhard, W.D.	1996	Minera Andes	Neuquen (Pino Andino)	Mineral exploration report, geological and drilling works
142	Proyecto Tocuyo, Prospección geochimica Informe Final	Spanish	Lopez, S.R.	1996	G.A.M.S.A.	Neuquen (Tocuyo)	Geochemical exploration report
143	Reserva Varvarco Campos	Spanish		1995	Placer Exploration Inc.	Neuquen (Varvarco Campos)	Mineral exploration report
144	Report on the geothermal energy development in the north of Neuquen Province.	Japanese		1984	JICA	Neuquen (Varvarco)	Geothermal energy exploration report
145	Informe de avance, Gira al area de Butalo	Spanish	Sanchez, R.	1995	Minamerica, S.A.	Neuquen (Varvarco)	Geochemical exploration report (brief)
146	Programa Nacional de Cartas Geologicas de la Republica Argentina. Hoja Geologica 4169-I, Piedra del Aguila.	Spanish	Cucchi, R., Espejo, P. and Gonzalez, R.	1998	SEGEMAR	Neuquen y Rio Negro	Geological map of 1/250,000 and note
147	Actualizacion Metalogenica de la Region Patagonica al Sur del Paralelo de 42°00′ sur, Republica Argentina	Spanish	Giacosa, R.E., Marquez, M.M. and Pezzuchi, H.D.	1980	Tercer Congreso Nacional de Geologia Economica Tomo III : A1-20.	Patagonia	Mineral deposits of Chubut to Tierra del Fuego
148	Report of mineral exploration in the Patagonia area (phase 2)	Japanese		1983	JICA/MMAJ	Patagonia	Technical cooperation project
149	Report of mineral exploration in the Patagonia area (consolidated)	Japanese		1984	JICA/MMAJ	Patagonia	Technical cooperation project

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
150	Report of mineral exploration in the Patagonia area (phase 3)	Japanese		1984	JICA/MMAJ	Patagonia	Technical cooperation project
151	Depositos y Manifestaciones Minerales de la Cordillera Patagonica y Fueguina, Republica Argentina	Spanish	Marquez, M.J., Parisi, C., Covaro, M.I.F. and Jones, M.E..	1994	Actas del Encuentro Interncional de Mineria, I : 66-83	Patagonia	Mineral deposits of Chubut to Tierra del Fuego
152	Mapa de recursos minerales del area fronteriza Argentino-Chilena entre los 34 y 56 de latitud sur	Spanish		1998	SEGEMAR and SERNAGEOMIN	Patagonia	Note on geological map (1/1,000,000)
153	Mineral resourves map of the frontier zone between Argentine and Chile, 34-56 south latitude	English		1998	SEGEMAR and SERNAGEOMIN	Patagonia	Note on geological map (1/1,000,001)
154	Region : Patagonia, Regiones mineras de la Republica Argentina	Spanish		1999	Subsecretaria de Mineria	Patagonia	Data of social, infrastructure and economics
155	Mapa de Recursos Minerales del Area Fronteriza Argentino-Chilena entre los 34 y 56S.	Spanish	Zanettini, J.C.M., Marquez, M.J., Gonzalez, R.A., Vivallo, W.P., Gardeweg, M.C. and Tassara, A.H.	1999	SEGEMAR y SERNAGEOMIN	Patagonia	Geological maps of 1/1,000,000 and note for the area along the border
156	Property map of Chubut Province (4 pc.)	Spanish		1999		Properties (Chubut)	Property map
157	Padron Minero, Provincia de Chubut	Spanish		2000	Provincia de Chubut	Properties (Chubut)	Mining properties of Chubut (Auto-Cad files) without list
158	Expedientes, Provincia del Nauquen.	Spanish		1999	CORMINE	Properties (CORMINE)	Informations on CORMINE's 11properties
159	Property map of Neuquen Province (A3 size)	Spanish		1998		Properties (Neuquen)	Property map
160	Padron Minero, Provincia de Neuquen	Spanish		2000	Provincia de Neuquen	Properties (Neuquen)	Mining properties of Neuquen (map, floppy)
161	Property map of Rio Negro Province (3 pc.)	Spanish		1999		Properties (Rio Negro)	Property map
162	Padron Minero, Provincia de Rio Negro	Spanish		2000	Provincia de Rio Negro	Properties (Rio Negro)	Mining properties of Rio Negro (map, floppy, list)
163	Informe sobre la Prospeccion Geoquimica Realizada en Areas de la Cordillera de Rio Negro	Spanish	Giacosa, R.E..	1981	S.M.N. Plan Patagonia Comahue	Rio Negro	Stream sediments geochemical survey results.

No.	Title	Language	Author	Year	Organization	Category	Comments
164	Mapa Geologico de la Provincia de Rio Negro	Spanish		1994	Direccion Nacional del Servicio geologico	Rio Negro	Provincial geological map
165	Proyecto Rio Negro	Spanish		1996	SEGEMAR	Rio Negro	Project in Rio Negro province
166	Geologia y Recursos Minerales del Sector Rionegrino de las Hojas 4172-IV, San Carlos de Bariloche y 4172-II, San Martin de los Andes. Informacion Geologico Minera de la Provincia de Rio Negro	Spanish	Giacosa R., Heredia N., Cesari O., Zubia M. y Gonzalez R.	1999	Gobierno de la Provincia Rio Negro y SEGEMAR	Rio Negro	Note on geological map (1/250,000) of San Carlos de Baliloche area.
167	San Carlos de Bariloche, Carta Geologica de la Republica Argentina, Escala 1:250,000	Spanish	Giacosa R., Heredia N., Cesari O., Zubia M. y Gonzalez R.	1999	Giacosa R., Heredia N., Cesari O., Zubia M. y Gonzalez R. (1999) ; Gobierno de la Provincia Rio Negro y SEGEMAR	Rio Negro	Geological map (1/250,001) of San Carlos de Baliloche area.
168	Geologia y Recursos Minerales del sector rionegrino de las Hojas 4172-IV, San Carlos de Bariloche y 4172-II, San Martin de los Andes.	Spanish	Giacosa, R., Heredia, N.C., Ceari, O., Zubia, M. and Gonzalez, R.	1999	Direccion de Mineria de Rio Negro y SEGEMAR	Rio Negro	Geological maps of 1/250,000 and note
169	Geologia y Recursos Minerales de la Hoja 4169-III, Ingeniero Jarcobacci.	Spanish	Gonzalez, P., Coluccia, A., Franchi, M., Caba, R. and Dalponte, M.	1999	Direccion de Mineria de Rio Negro y SEGEMAR	Rio Negro	Geological map of 1/250,000 and note
170	Indexof 1:100,000 topography maps, Provincia de Rio Negro	Spanish				Rio Negro	Index map of 1/100,000, Rio Negro.
171	Informe Geologico Minero, Proyect 15 AL-Lago Mascardi, Mosaico 4172-IV-B2, Zona del Codon Tres Morros, Provncia de Rio Negro	Spanish	Giacosa, R.E.	1982	S.M.N.-Plan Patagonia Comahue, Saubsede los Alamos-Rio Negro	Rio Negro (Lago Mascardi)	Cordon Tres Morros district, 920ppm Cu, 2,800ppm Zn, stockwork, further survey is required.
172	Prospeccion y Exploracion Minera en el Cordon Tres Morros, Cerro Granito y Cerro del Medio, Cordillera Nord Patagonia, Provincia de Rio Negro, Proyect 15 AL-Lago Mascardi Mosaicos 4172-IV-B1 y B2,	Spanish	Giacosa, R.E.	1986	Dirccion Naional de Mineria y Geologia, Dept. Centro de Exploracion Patagonia Sur	Rio Negro (Lago Mascardi)	Max 88g/t Au in Cerro del medio o Alcorta district, hydrothermal mineralization.
173	Estudio Geologico de la Mina de Plomo, Zinc, Plata y Cobre "MARIA". Dept. Norquinco. Pcia de Rio Negro	Spanish	Greco, E.A. and Bornabo de Greco, E.	1973		Rio Negro (Maria)	Outline of Maria deposits, 11.75% Pb, 12.70% Zn, 1.8% Cu, 45.41g/t Ag.
174	Estudio Geologico de la Mina de Plomo, Zinc, Plata y Cobre "MARIA". Dept. Norquinco. Pcia de Rio Negro	Spanish	Greco E.A. and Bernabo de Greco E.A.	1973		Rio Negro (Maria)	Outline of Maria deposits.
175	No.9 Mina Maria (Pb-Zn-Ag-Au-Cu), Provincia de Rio Negro	Spanish	?	?		Rio Negro (Maria)	Outline of Maria deposits, Vein 250m×1.6m, 12% Pb, 13% Zn, 45g/t Ag, 3g/t Au, 2% Cu.
176	Informe Geologico Minero Proyecto 15 AF-Bariloche, Mosaico 4172-IV-10a, Zona: Nacientes del Rio Foyel, Prov. De Rio Negro	Spanish	Giacosa, R.E.	1982	S.M.N. Plan Patagonia Comahue	Rio Negro (Rio Foyel)	Follow-up S.S. geochemistry for Rio Foyel, but no noticeable results.
177	Ubicacion de areas mineralizados a visitar y reconocer en conjunto con la mission tecnica japonesa, en las provincias de Rio Negro y Chubut, desde Norquinco hasta Lago Fontana - La Plata.	Spanish	Viera, R.L.M.	2000	SEGEMAR - Delegacion Regional Patagonia Sur	Rio Negro and Chubut	List of known mineralization to visit in Rio Negro and Chubut Provinces

Appendix-1 Collected literatures for the existing data analysis, sorted in order of category and year.

No.	Title	Language	Author	Year	Organization	Category	Comments
178	Hoja Geologica 4969-II: Tres Cerros, Provincia de Santa Cruz	Spanish	Panza, J.L., Zubia, M., Genini, A. and Godeas, M.	1995	Direccion de Nacional del Servicio Geologico, Secretaria de Mineria da la Nacion	Santa Cruz	Note on geological map (1/250,000) inc. Cerro Vanguardia deposit.
179	Emprendimiento Minero Cerro Vanguardia	Spanish	Lasanta, M.	1998		Santa Cruz (Cerro Vanguardia)	Development of the Cerro Vanguardia mine

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
1	A00NK001	37' 14' 51.3'	70' 39' 15.2'	Andacollo	Sur los Maitenez	Intrusive	Andesite	Silicification / sericite /	GC
2	A00NK002	36' 47' 17.3'	70' 36' 33.5'	Varvarco	Varvarco		Qz vein		GC
3	A00NK003	36' 47' 26.8'	70' 36' 34.6'	Varvarco	Varvarco		Silicified rock	Silicification / /	GC
4	A00NK004	36' 47' 32.3'	70' 36' 34.6'	Varvarco	Varvarco	Intrusive	Granite	/ montmorillonite /	XR
5	A00NK005	36' 47' 04.4'	70' 37' 04.4'	Varvarco	Varvarco	Intrusive	Granite	/ kaolinite /	XR
6	A00NK006	36' 47' 16.6'	70' 36' 31.4'	Varvarco	Varvarco		Rhyolite	/ pyrophyllite /	XR
7	A00NK007	37' 26' 58.3'	70' 26' 10.1'	Cerro Caycayen	Cerro Caycayen		Iron ore	Limonitization / /	GC
8	A00NK008	37' 26' 44.4'	70' 26' 03.8'	Cerro Caycayen	Cerro Caycayen	Gr. Lotena?	Sandstone	/ sericite /	
9	A00NK009	37' 26' 57.4'	70' 26' 16.6'	Cerro Caycayen	Cerro Caycayen	Gr. Cuyo	Slate	/ sericite /	
10	A00NK010	37' 27' 01.3'	70' 26' 19.7'	Cerro Caycayen	Cerro Caycayen		Iron ore	Limonitization / /	GC
11	A00NK011	37' 26' 55.7'	70' 26' 21.5'	Cerro Caycayen	Cerro Caycayen	Gr. Lotena?	Sandstone	/ sericite /	
12	A00NK012	38' 13' 07.5'	70' 32' 37.4'	Campana Mahuida	Campana Mahuida	Tordillo Fm.	Sandstone	Phyllic / sericite /	XR
13	A00NK013	38' 13' 07.5'	70' 32' 34.5'	Campana Mahuida	Campana Mahuida		Qz vein		FI
14	A00NK014	39' 13' 09.6'	70' 35' 53.1'	La Voluntad	La Voluntad	Intrusive (La Voluntad Complex)	Biotite granite	Chloritization / / malachite	TS
15	A00NK015	39' 13' 15.1'	70' 35' 58.8'	La Voluntad	La Voluntad		Qz vein		GC
16	A00NK016	39' 03' 02.0'	70' 31' 49.5'	Nireco	ZA027	Campos basalticos de Zapala	Dacite	Silicification, Limonitization / montmorillonite /	GC
17	A00NK017	39' 02' 41.9'	70' 31' 58.1'	Nireco	ZA027	Campos basalticos de Zapala	Dacite	Silicification, Limonitization / montmorillonite /	GC
18	A00NK018	39' 02' 40.1'	70' 32' 11.2'	Nireco	ZA027	Campos basalticos de Zapala	Rhyolite	Phyllic / sericite /	TS
19	A00NK019	41' 40' 02.0'	71' 06' 16.8'	Mina Maria	Mina Maria		Ore	/ / gn, cp, py	PT,OA
20	A00NK020	41' 40' 02.0'	71' 06' 16.8'	Mina Maria	Mina Maria		Qz Vein		
21	A00NK021	42' 08' 43.5'	71' 19' 18.8'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granite	Tourmalinization, Limonitization / / py	GC
22	A00NK022	42' 08' 00.2'	71' 19' 10.3'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granite	Chloritization, Limonitization / /	
23	A00NK023	42' 08' 00.2'	71' 19' 10.3'	Cerro Coihue	Quebrada Ferreyro		Tourmaline breccia		GC
24	A00NK024	42' 08' 00.2'	71' 19' 10.3'	Cerro Coihue	Quebrada Ferreyro		Sulfide vein in granite	Limonitization / /	
25	A00NK025	42' 08' 02.2'	71' 19' 10.3'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granite		TS
26	A00NK026	42' 09' 27.5'	70' 30' 28.5'	Cushamen	Cushamen	Intrusive	Pegmatite	/ kaolinite /	XR
27	A00NK027	42' 09' 30.0'	70' 30' 25.1'	Cushamen	Cushamen		Qz vein		GC
28	A00NK028	42' 09' 31.2'	70' 30' 25.9'	Cushamen	Cushamen		Qz vein		GC
29	A00NK029	42' 09' 31.2'	70' 30' 25.9'	Cushamen	Cushamen	Intrusive	Rhyolite	Silicification / /	GC
30	A00NK030	42' 09' 35.0'	70' 30' 31.3'	Cushamen	Cushamen	Cushamen Fms.	Schist	Silicification / /	XR
31	A00NK031	42' 09' 47.9'	70' 30' 24.4'	Cushamen	Cushamen	Intrusive	Rhyolite	montmorillonite? / /	XR
32	A00NK032	42' 09' 43.2'	70' 30' 19.4'	Cushamen	Cushamen		Flaky qz		GC
33	A00NK033	42' 09' 44.4'	70' 30' 17.8'	Cushamen	Cushamen		Qz vein	Tourmalinization / /	XR,GC

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
34	A00NK034	43' 17' 00.0'	70' 59' 16.8'	Cerro Gonzalo	Cerro Gonzalo	Intrusive	Granodiorite porphyry	K-feld.? / / cp,py,bo	XR,GC
35	A00NK035	43' 18' 46.7'	71' 02' 31.0'	Cerro Gonzalo	Cerro Gonzalo		Qz vein	qz / /	GC
36	A00NK036	43' 18' 46.7'	71' 02' 31.0'	Cerro Gonzalo	Cerro Gonzalo		Qz vein	qz / /	GC
37	A00NK037	43' 17' 19.7'	70' 59' 28.8'	Cerro Gonzalo	Arroyo. Luques	Intrusive (Aleusco Fm.)	Granodiorite	Phyllic / sericite /	XR
38	A00NK038	42' 52' 56.9'	71' 12' 53.2'	Joya del Sol	Brancote-Antonio		Qz vein		FI
39	A00NK039	42' 52' 56.9'	71' 12' 53.2'	Joya del Sol	Brancote-Antonio	Lago La Plata Fm.	Andesite	/ montmorillonite /	XR
40	A00NK039-1	42' 52' 56.9'	71' 12' 53.2'	Joya del Sol	Brancote-Antonio	Lago La Plata Fm.	Andesite		PT
41	A00NK040	43' 37' 55.5'	71' 25' 26.0'	Poncho Moro	Arroyo Pedregoso		Andesite? (Float)	Chloritization, Limonitization / / py	GC
42	A00NK041	43' 41' 45.6'	70' 34' 03.5'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PT,PC
43	A00NK042	43' 41' 59.0'	70' 34' 00.0'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PC
44	A00NK043	43' 42' 34.0'	70' 33' 07.1'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PC
45	A00NK044	44' 50' 20.2'	71' 08' 19.2'	Mina Gato	Mina Gato	Divisadero Fm.	Rhyolite?	Silicification / alunite /	XR
46	A00NK045	44' 50' 18.1'	71' 08' 21.5'	Mina Gato	Mina Gato	Divisadero Fm.	Andesite	Silicification / /	GC
47	A00NK046	44' 50' 26.9'	71' 08' 01.2'	Mina Gato	Mina Gato	Divisadero Fm.	Porphyritic andesite	/ montmorillonite /	XR
48	A00NK047	44' 50' 33.7'	71' 08' 34.3'	Mina Gato	Mina Gato	Divisadero Fm.	Andesite	Silicification / /	XR,GC
49	A00NK048	44' 50' 38.0'	71' 08' 36.2'	Mina Gato	Mina Gato	Divisadero Fm.	Andesite		TS
50	A00NK049	45' 00' 45.8'	71' 27' 22.1'	Cerro Blanco	Cerro Blanco	Lago La Plata Fm.	Dacite	Phyllic / sericite /	XR
51	A00NK050	42' 53' 30.0'	71' 12' 40.7'	Joya del Sol	Brancote-Julia	Lago La Plata Fm.	Andesite		KA
52	A00HH001	37' 15' 03.8'	70' 39' 21.5'	Andacollo	Sur los Maitenez	Intrusive	Altered rhyolite	Limonitization / sericite /	
53	A00HH002	37' 11' 26.9'	70' 37' 51.0'	Andacollo	Mina Sofia		Qz-py-gn ore	/ / qz with py, gn	PT,OA
54	A00HH003	36' 58' 47.1'	70' 38' 49.6'	Butalon Norte	Cerro Panta	Choiyoi Fm.	Tuff breccia	sericite, kaoline ? / not identified /	
55	A00HH004	37' 01' 10.8'	70' 39' 49.3'	Butalon Norte	CM010	Choiyoi Fm.	Altered rock	/ sericite /	XR,GC
56	A00HH005	37' 07' 17.8'	70' 37' 24.8'	Andacollo	CM011	Choiyoi Fm.	Altered rock	/ sericite /	
57	A00HH006	37' 37' 42.5'	70' 26' 02.6'	Cerro del Diablo	Barite mine	Intrusive	Altered granite	White mineral / kaolinite / barite	
58	A00HH007	37' 37' 43.0'	70' 26' 05.0'	Cerro del Diablo	Barite mine		Altered rock	/ montmorillonite(A), sericite(C) /	XR
59	A00HH008	37' 37' 57.8'	70' 26' 21.4'	Cerro del Diablo	Barite mine	Intrusive	Felsic rock	Silicification, qz network / /	
60	A00HH009	37' 37' 57.8'	70' 26' 21.4'	Cerro del Diablo	Barite mine	Intrusive	Granite	Weak / /	
61	A00HH010	37' 38' 14.5'	70' 25' 59.2'	Cerro del Diablo	Cu mine		Cu ore	/ montmorillonite / chrysocolla, iron oxide	
62	A00HH011	37' 38' 19.2'	70' 25' 44.5'	Cerro del Diablo	Cu mine		Altered rock	/ kaolinite /	
63	A00HH012	37' 13' 04.9'	70' 40' 32.8'	Andacollo	Cerro Colo	Intrusive	Andesitic porphyry	Weak / /	WR
64	A00HH013	37' 13' 04.9'	70' 40' 32.8'	Andacollo	Cerro Colo	Intrusive	Dacite		TS,XR,GC
65	A00HH014	38' 13' 09.6'	70' 32' 41.3'	Campana Mahuida	Campana Mahuida	Tordillo Fm.	Altered rock	qz, sericite / /	
66	A00HH015	38' 12' 47.4'	70' 32' 37.1'	Campana Mahuida	Campana Mahuida		Cu oxide with diorite (Float)	/ / Cu oxide	

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
67	A00HH016	38' 12' 37.7'	70' 32' 30.7'	Campana Mahuida	Campana Mahuida		Silicified rock	Silicification / /	GC
68	A00HH017	38' 12' 48.1'	70' 35' 28.8'	Campana Mahuida	Campana Mahuida	Tordillo Fm.	Altered sand stone	qz, white mineral / /	
69	A00HH018	39' 13' 00.8'	70' 36' 01.4'	La Voluntad	La Voluntad	Intrusive (La Voluntad Complex)	Granite		
70	A00HH019	39' 04' 56.0'	70' 31' 56.4'	Nireco	ZA028/029	Campos basalticos de Zapala	Silicified rock	Silicification / kaolinite /	XR,GC
71	A00HH020	39' 05' 47.6'	70' 31' 26.7'	Nireco	ZA028/029	Campos basalticos de Zapala	Green tuff/altered rock	/ chlorite, zeolite, calcite-montmorillonite, sericite /	
72	A00HH021	39' 06' 00.0'	70' 31' 29.8'	Nireco	ZA028/029	Campos basalticos de Zapala	Green tuff/altered rock		
73	A00HH022	38' 57' 56.3'	70' 36' 47.4'	Carreri Malal	Carreri Malal	Intrusive	Granite		XR
74	A00HH023	38' 58' 27.5'	70' 35' 03.7'	Carreri Malal	Carreri Malal		Altered rock	Argillization / /	XR
75	A00HH024	41' 40' 12.0'	71' 06' 43.1'	Mina Maria	Mina Maria		Qz-py-cp-malachite-ga ore	/ / qz, py, cp, malachite, gn	PT,OA
76	A00HH025	42' 08' 40.8'	71' 18' 27.0'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Granite with tourmaline	Weakly whitened / /	
77	A00HH026	42' 08' 40.8'	71' 18' 27.0'	Cerro Coihue	Quebrada Baya	Intrusive	Andesite dyke	Almost fresh / /	
78	A00HH027	42' 08' 35.3'	71' 18' 35.3'	Cerro Coihue	Quebrada Baya		Altered rock	/ laumontite /	XR
79	A00HH028	42' 08' 49.7'	71' 18' 36.0'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Altered granite	/ calcite /	XR,GC
80	A00HH029	42' 08' 49.7'	71' 18' 36.0'	Cerro Coihue	Quebrada Baya		Qz, tourmaline (Float)		
81	A00HH030	42' 08' 42.9'	71' 18' 33.0'	Cerro Coihue	Quebrada Baya	Intrusive	Andesite		
82	A00HH031	42' 09' 07.4'	71' 24' 13.4'	Condorcanqui	Condorcanqui		Altered rock	Argillization, white clay mineral / not identified /	
83	A00HH032	42' 09' 07.4'	71' 24' 13.4'	Condorcanqui	Condorcanqui		Altered rock	Argillization, white clay mineral dot / /	
84	A00HH033	42' 09' 48.0'	71' 24' 03.2'	Condorcanqui	Condorcanqui		Malachite-chrysocolla-py-cp ore	/ / malachite, chrysocolla, py, cp	
85	A00HH034	42' 09' 48.0'	71' 24' 03.2'	Condorcanqui	Condorcanqui	Ventana Fm.	Andesite	Chloritic or fresh (with cp) / /	XR,GC
86	A00HH035	42' 09' 48.0'	71' 24' 03.2'	Condorcanqui	Condorcanqui		Altered rock	qz, K-fel., cp, limonite / / qz with cp	
87	A00HH036	42' 13' 10.3'	71' 25' 17.9'	Epuyen	Arroyo Pedregoso de Epuyen	Ventana Fm.	Zeolite in altered andesite	/ laumontite /	
88	A00HH037	41' 58' 05.9'	71' 34' 30.0'	El Bolson	Rio Lindo		Granite with py (float)		GC
89	A00HH038	41' 58' 05.9'	71' 34' 30.0'	El Bolson	Rio Lindo		Silicified rock with py (float)	Silicification / /	
90	A00HH039	41' 58' 05.9'	71' 34' 30.0'	El Bolson	Rio Lindo		Pyroclastics with py (float)		GC
91	A00HH040	41' 55' 33.0'	71' 33' 28.1'	El Bolson	Rio Azul		Andesite with py, chl (float)	Silicification / /	
92	A00HH041	42' 47' 31.0'	71' 29' 46.3'	Huemules	Huemules Sur		Ore	/ / malachite, cp, py	
93	A00HH042	42' 47' 25.7'	71' 29' 50.4'	Huemules	Huemules Sur		Ore	/ / galena	
94	A00HH043	42' 47' 25.7'	71' 29' 50.4'	Huemules	Huemules Sur	Canadon Huemules Fm.	Andesite	Relatively fresh to argillization / sericite /	XR
95	A00HH044	42' 47' 17.1'	71' 29' 58.7'	Huemules	Huemules Sur		Altered rock	Silicification-argillization, py / /	XR,GC
96	A00HH045	42' 47' 17.1'	71' 29' 58.7'	Huemules	Huemules Sur	Intrusive	Micro granodiorite	Fresh / /	
97	A00HH046	42' 47' 28.9'	71' 29' 42.0'	Huemules	Huemules Sur		Ore	Oxidized cp / / qz, cp, py	
98	A00HH047	42' 45' 37.5'	71' 06' 29.3'	Joya del Sol	Arroyo Cancha		Altered rock	Silicification, py / /	GC
99	A00HH048	42' 53' 46.5'	71' 12' 45.8'	Joya del Sol	Brancote-Elena Sur		Qz vein		

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
100	A00HH049	42' 52' 22.4'	71' 12' 08.8'	Joya del Sol	Brancote-Galadriel		Qz vein		
101	A00HH050	42' 51' 49.3'	71' 11' 08.1'	Joya del Sol	Near LM024	Lago La Plata Fm.	Altered rock	/ sericite /	XR
102	A00HH051	43' 57' 47.7'	71' 34' 09.4'	Cerro Colorado	Near Cerro Riñon		Silicified rock (Float)	Silicification / pyrophyllite /	
103	A00HH052	43' 30' 23.8'	71' 06' 25.6'	Arroyo Cascada	Arroyo Cascada	Lago La Plata Fm.	Qz with white altered mineral	/ montmorillonite /	
104	A00HH053	43' 30' 19.0'	71' 06' 12.1'	Arroyo Cascada	Arroyo Cascada		Altered rock (Float)	/ montmorillonite /	
105	A00HH054	43' 30' 19.0'	71' 06' 12.1'	Arroyo Cascada	Arroyo Cascada	Lago La Plata Fm.	Altered rock	/ montmorillonite /	XR
106	A00HH055	44' 41' 33.1'	71' 07' 07.0'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	/ kaolinite /	
107	A00HH056	44' 41' 33.1'	71' 07' 07.0'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	/ kaolinite /	
108	A00HH057	44' 41' 33.1'	71' 07' 07.0'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	/ kaolinite /	XR
109	A00HH058	44' 41' 18.8'	71' 07' 13.0'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	/ kaolinite /	
110	A00HH059	44' 41' 23.3'	71' 07' 13.4'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Kaoline/dickite/greysh kaoline	/ kaolinite /	
111	A00HH060	44' 41' 25.0'	71' 05' 40.1'	Estrella Gaucha	Estrella Gaucha	Intrusive	Andesite	Propylitic ? / /	TS,GC
112	A00HH061	44' 56' 24.0'	71' 35' 16.1'	Ferrocarrilera	Ferrocarrilera		Galena ore	/ / galena	
113	A00HH062	44' 56' 24.0'	71' 35' 16.1'	Ferrocarrilera	Ferrocarrilera	Lago La Plata Fm.	Andesite		XR
114	A00HH063	44' 56' 19.2'	71' 35' 08.3'	Ferrocarrilera	Ferrocarrilera		Galena-sphalerite-qz ore	/ / galena, sphalerite	PT
115	A00HH064	44' 56' 18.2'	71' 35' 08.4'	Ferrocarrilera	Ferrocarrilera		Qz-py-cp-sphalerite ore	/ / cp, sphalerite	
116	A00HH065	44' 56' 20.3'	71' 35' 11.8'	Ferrocarrilera	Ferrocarrilera		Galena-sphalerite ore	/ / galena, sphalerite	
117	A00MZ001	37' 15' 05.0'	70' 39' 24.2'	Andacollo	Sur los Maitenez	Intrusive	Rhyolite	Silicification / sericite /	GC
118	A00MZ002	37' 14' 29.0'	70' 39' 40.7'	Andacollo	Sur los Maitenez	Intrusive	Volcanic rock	Silicification / sericite / limonite-qz network	GC
119	A00MZ003	37' 11' 32.5'	70' 37' 54.6'	Andacollo	Mina Sofia	Intrusive	Dacite	Argillization / sericite / pyrite diss.	XR,GC
120	A00MZ004	36' 58' 47.3'	70' 38' 49.5'	Butalon Norte	Butalon Norte	Choiyoi Fm.	Pebble dyke	Silicification / / magnetite	XR,GC
121	A00MZ005	36' 58' 47.7'	70' 38' 52.7'	Butalon Norte	Butalon Norte	Choiyoi Fm.	Volcanic rock	Silicification / / magnetite	GC
122	A00MZ006	37' 01' 08.1'	70' 39' 50.5'	Butalon Norte	CM010	Choiyoi Fm.	Volcanic rock	Silicification / kaolinite / limonite	GC
123	A00MZ007	37' 07' 20.2'	70' 37' 23.4'	Andacollo	CM011	Choiyoi Fm.	Volcanic rock	Silicification / sericite / pyrite diss.	GC
124	A00MZ008	37' 26' 39.3'	70' 26' 35.8'	Cerro Caicayen	Quebrada el Bronce	Cuyo Gr.	Mudstone	Silicification / / pyrite diss.-network	GC
125	A00MZ009	37' 26' 35.5'	70' 26' 59.9'	Cerro Caicayen	Quebrada el Bronce	Intrusive (Grupo Molle)	Granite	Potassic / /	GC
126	A00MZ010	37' 27' 10.8'	70' 26' 48.1'	Cerro Caicayen	Mina Hierro	Ore deposit	Massive ore	/ / pylite-limonite	OA
127	A00MZ011	37' 11' 30.1'	70' 37' 58.5'	Andacollo	Mina Sofia	Intrusive	Qz porphyry	Weak / /	WR
128	A00MZ012	37' 11' 30.1'	70' 37' 58.5'	Andacollo	Mina Sofia, Level1	Ore deposit	Vein ore	/ / qz-calcite-py-gn	OA,DS,DO,FI
129	A00MZ013	37' 11' 25.3'	70' 37' 51.2'	Andacollo	Mina Sofia	Intrusive	Dacite porphyry	Fresh / /	TS,WR
130	A00MZ014	37' 11' 25.3'	70' 37' 51.2'	Andacollo	Mina Sofia	Huaraco Fm. (Andacollo Gr.)	Mudstone	/ / pyrite	DS
131	A00MZ015	37' 13' 15.8'	70' 40' 32.7'	Andacollo	Cerro Colo	Intrusive (Cretaceous)	Tonalite	Fresh / / py-green Cu stain	TS,WR
132	A00MZ016	37' 11' 30.1'	70' 37' 58.5'	Andacollo	Mina Sofia, Level4	Ore deposit	Vein ore	/ / qz-calcite-py-gn	PT,OA,FI

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
133	A00MZ017	37' 11' 30.1'	70' 37' 58.5'	Andacollo	Mina Sofia, Level4	Ore deposit	Vein ore	/ / qz-calcite-py-gn	FI
134	A00MZ018	38' 12' 48.6'	70' 32' 18.1'	Campana Mahuida	Campana Mahuida	Intrusive (Tres Puntas)	Granodiorite	Fresh / /	TS,WR
135	A00MZ019	38' 12' 47.2'	70' 35' 24.9'	Campana Mahuida	Mina Angelica	Ore deposit	Vein ore	/ / barite-Fe oxides	OA
136	A00MZ020	38' 12' 48.5'	70' 35' 30.5'	Campana Mahuida	Mina Angelica	Ore deposit	Vein ore	/ / barite-galena-Fe oxides	OA
137	A00MZ021	39' 12' 50.2'	70' 36' 22.1'	La Voluntad	La Voluntad	Intrusive	Vein ore	/ / qz-malachite	OA
138	A00MZ022	39' 12' 52.1'	70' 36' 23.1'	La Voluntad	La Voluntad	Intrusive (La Voluntad Complex)	Granite	Potassic / /	TS,GC
139	A00MZ023	39' 02' 59.8'	70' 32' 02.1'	Nireco	ZA027	Campos basalticos de Zapala	Volcanic rock	Silicification / montmorillonite /	GC
140	A00MZ024	39' 02' 22.1'	70' 32' 10.7'	Nireco	ZA027	Campos basalticos de Zapala	Volcanic rock	Silicification / sericite /	XR,GC
141	A00MZ025	39' 01' 53.3'	70' 32' 35.4'	Nireco	ZA026	Campos basalticos de Zapala	Volcanic rock	Silicification / kaolinite /	GC
142	A00MZ026	38' 57' 50.5'	70' 36' 50.9'	Carreri Malal	Carreri Malal	Ore deposit	Vein ore	Argillization / / Fe-Mn oxides (gossan)	GC
143	A00MZ027	38' 57' 48.3'	70' 36' 53.9'	Carreri Malal	Carreri Malal	Ore deposit	Vein ore	Chloritization / / Mn oxide	GC
144	A00MZ028	38' 57' 59.1'	70' 36' 46.3'	Carreri Malal	Carreri Malal	Ore deposit	Vein ore	/ / qz-py-gn-bornite	OA
145	A00MZ029	41' 40' 11.3'	71' 06' 41.0'	Mina Maria	Mina Maria	Ore deposit	Vein ore	/ / galena	DS
146	A00MZ030	41' 40' 11.3'	71' 06' 41.0'	Mina Maria	Mina Maria	Ore deposit	Vein ore	/ / gn-py-cp	PT,OA
147	A00MZ031	42' 08' 39.5'	71' 19' 17.3'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granite (Float)	/ / limonite	GC
148	A00MZ032	42' 08' 29.5'	71' 19' 18.8'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granodiorite (Float)	Fresh / /	TS,WR
149	A00MZ033	42' 08' 05.3'	71' 19' 28.3'	Cerro Coihue	Quebrada Ferreyro	Lago Puelo granitic complex	Granodiorite (Float)	/ / chrysocolla	GC
150	A00MZ034	42' 09' 09.9'	71' 24' 13.9'	Condorcanqui	Condorcanqui	Ventana Fm.	Andesitic tuff	Propylite / / pyrite diss.	GC
151	A00MZ035	42' 09' 09.9'	71' 24' 13.9'	Condorcanqui	Condorcanqui	Zeolite vein	Zeolite	Propylite / laumontite /	GC
152	A00MZ036	42' 09' 46.1'	71' 24' 03.8'	Condorcanqui	Condorcanqui	Ventana Fm.	Andesite	Propylite / / cp diss.-veinlet	OA
153	A00MZ037	42' 09' 46.1'	71' 24' 03.8'	Condorcanqui	Condorcanqui	Ventana Fm.	Andesite	Propylite / / malachite	OA
154	A00MZ038	42' 09' 46.1'	71' 24' 03.8'	Condorcanqui	Condorcanqui	Ventana Fm.	Andesite	Propylite / / pyrite diss.	PT
155	A00MZ039	42' 13' 51.9'	71' 25' 17.7'	Epuyen	Arroyo Pedregoso de Epuyen	Ventana Fm.	Andesite (Float)	Propylite / / pyrite diss.	GC
156	A00MZ040	42' 28' 03.8'	71' 35' 53.2'	Lago Chilila	A. Pedregoso de Lago Cholila	Granitodes Cordilleranos	Sil., breccia (Float)	Silicification / / limonite	GC
157	A00MZ041	42' 47' 32.1'	71' 29' 45.9'	Huemules	Huemules Sur	Ore deposit	Veinlet	/ / qz-py-gn	OA
158	A00MZ042	42' 47' 32.1'	71' 29' 45.9'	Huemules	Huemules Sur	Ore deposit	Veinlet	/ / galena mass	PT,OA,DS
159	A00MZ043	42' 47' 32.1'	71' 29' 45.9'	Huemules	Huemules Sur	Ore deposit	Veinlet	/ / qz-py	DO,FI
160	A00MZ044	42' 47' 18.6'	71' 29' 54.8'	Huemules	Huemules Sur	Intrusive	Microdiorite	Propylite / /	TS,WR
161	A00MZ045	42' 47' 32.1'	71' 29' 45.9'	Huemules	Huemules Sur	Ore deposit	Vein Ore	/ / galena mass	
162	A00MZ046	42' 47' 32.6'	71' 29' 43.5'	Huemules	Huemules Sur	Ore deposit	Veinlet	/ / qz-cp-py-gn	OA,DO,FI
163	A00MZ047	42' 45' 39.1'	71' 06' 33.5'	Joya del Sol	Arroyo Cancha	Alluvium	Qz veinlet (Float)		GC
164	A00MZ048	42' 53' 40.9'	71' 12' 32.9'	Joya del Sol	Brancote-Elena Sur	Ore deposit	Qz vein	/ / Aurifeous qz vein	OA,DO,FI
165	A00MZ049	42' 53' 40.9'	71' 12' 32.9'	Joya del Sol	Brancote-Elena Sur	Ore deposit	Qz vein	/ / Aurifeous qz vein	OA

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
166	A00MZ050	42° 53' 20.7"	71° 12' 45.3"	Joya del Sol	Brancote-Julia	Ore deposit	Hydrothermal breccia	/ / Aurifeous qz vein	
167	A00MZ051	42° 52' 43.0"	71° 12' 19.5"	Joya del Sol	Brancote-Galadriel	Ore deposit	Qz vein	/ / Aurifeous qz vein	DO,FI
168	A00MZ052	43° 10' 38.2"	71° 40' 51.4"	Poz. de Navarro	Poz. de Navarro	Qz vein	Qz vein	/ / pyrite diss.	GC
169	A00MZ053	43° 10' 38.2"	71° 40' 51.4"	Poz. de Navarro	Poz. de Navarro	Lago la Plata Fm.	Andesite	Propylite / / qz-cp veinlets	GC
170	A00MZ054	43° 11' 17.8"	71° 39' 56.7"	Poz. de Navarro	Ea. el Triunfo	Intrusive	Qz porphyry	Silicification / sericite / py-cp? diss.	GC
171	A00MZ055	43° 24' 09.3"	71° 32' 33.1"	Las Mentas	Las Mentas	Qz vein	Qz ein	/ / qz-cp-gn-malachite	OA
172	A00MZ056	43° 37' 55.1"	71° 25' 30.7"	Poncho Moro	Arroyo Pedregoso	Alluvium	Qz vein (Float)	/ / Slight pyrite diss.	GC
173	A00MZ057	43° 30' 22.9"	71° 06' 24.7"	Arroyo Cascada	Arroyo Cascada	Qz vein	Qz vein	/ / pyrite diss.	GC
174	A00MZ058	43° 30' 22.9"	71° 06' 24.7"	Arroyo Cascada	Arroyo Cascada	Lago la Plata Fm.	Silicified rock	Silicification / montmorillonite /	XR
175	A00MZ059	43° 30' 17.0"	71° 06' 10.1"	Arroyo Cascada	Arroyo Cascada	Lago la Plata Fm.	Silicified rock	Silicification / / pyrite diss.	GC
176	A00MZ060	43° 30' 17.0"	71° 06' 10.1"	Arroyo Cascada	Arroyo Cascada	Qz vein (F)	Cubic pyrite	/ / Cubic pyrite in qz vein	DS
177	A00MZ061	44° 50' 13.6"	71° 08' 30.6"	Mina Gato	Mina Gato	Divisadero Fm.	Soft silky rock	Kaolinitization / kaolinite /	GC
178	A00MZ062	44° 50' 05.0"	71° 08' 43.7"	Mina Gato	Mina Gato	Divisadero Fm.	Silicified rock	Silicification / alunite /	GC
179	A00MZ063	44° 50' 10.2"	71° 07' 54.6"	Mina Gato	Mina Gato	Divisadero Fm.	Silicified rock	Silicification / sericite-montmorillonite / pyrite diss.	GC
180	A00MZ064	44° 54' 11.1"	71° 14' 43.6"	Ea. Arroyo Victoria	Arroyo Huemul	Alluvium	Silicified rock	Silicification / alunite / Slight limonitic	GC
181	A00MZ065	44° 56' 21.8"	71° 35' 05.4"	Ferrocarrilera	Ferrocarrilera	Lago la Plata Fm.	Andesite	Propylite / / pyrite diss.	TS,GC
182	A00MZ066	44° 56' 21.8"	71° 35' 05.4"	Ferrocarrilera	Ferrocarrilera		Vein ore	/ / pyrite diss.	DS,DO,FI
183	A00MZ067	44° 56' 21.8"	71° 35' 05.4"	Ferrocarrilera	Ferrocarrilera		Vein ore	/ / gn-sp-py	
184	A00MZ068	44° 56' 21.8"	71° 35' 05.4"	Ferrocarrilera	Ferrocarrilera		Vein ore	/ / gn-sp-py	OA
185	A00TM001	37° 15' 05.6"	70° 39' 16.8"	Andacollo	Sur los Maitenez	Intrusive	Dacite	Silicification / sericite / limonite	GC
186	A00TM002	37° 11' 27.7"	70° 37' 45.8"	Andacollo	Mina Sofia level4	Huaraco Fm. (Andacollo Gr.)	Black shale	Silicification / sericite / gn, sp, cp, py diss.	GC
187	A00TM003	36° 47' 16.0"	70° 36' 27.4"	Varvarco	CM005		White altered rock	Weak silicification, argillization / pyrophyllite /	XR,GC
188	A00TM004	36° 47' 08.1"	70° 35' 32.4"	Varvarco	CM006	Choiyoi Fm.	Rhyolitic tuff	Fresh / /	GC
189	A00TM005	36° 50' 54.5"	70° 39' 54.4"	Varvarco	Varvarco	Intrusive	Tonalite	Weak silicification / /	GC
190	A00TM006	36° 50' 54.5"	70° 39' 54.4"	Varvarco	Varvarco	Intrusive	Tonalite	Weak alteration / /	TS
191	A00TM007	37° 37' 43.4"	70° 25' 58.8"	Cerro del Diablo	Cerro del Diablo (Colorado)		Qz vein	/ / qz-barite	GC
192	A00TM008	37° 37' 43.4"	70° 25' 58.8"	Cerro del Diablo	Cerro del Diablo (Colorado)	Vaca Muerta Fm.	Shale	Argillization / /	XR,GC
193	A00TM009	37° 37' 59.0"	70° 26' 25.1"	Cerro del Diablo	Cerro del Diablo (Colorado)	Intrusive	Tonalite	Fresh / /	TS,WR,KA
194	A00TM010	37° 38' 10.3"	70° 26' 20.6"	Cerro del Diablo	Cerro del Diablo	Vaca Muerta Fm.	Shale	Silicification, argillization / sericite / limonite	GC
195	A00TM011	37° 38' 10.3"	70° 26' 20.6"	Cerro del Diablo	Cerro del Diablo	Vaca Muerta Fm.	Shale	Silicification, argillization / sericite, kaolinite / limonite	XR
196	A00TM012	37° 38' 10.3"	70° 26' 20.6"	Cerro del Diablo	Cerro del Diablo		Qz vein	/ / qz-barite	GC
197	A00TM014	37° 38' 21.5"	70° 25' 48.5"	Cerro del Diablo	Cerro del Diablo	Intrusive	Granite?	Silicification, argillization / / malachite, azurite, limonite	GC
198	A00TM015	37° 38' 21.5"	70° 25' 48.5"	Cerro del Diablo	Cerro del Diablo	Intrusive	Granite?	Silicification,argillization/kaolinite,sericite/malachite,azurite,limonite	XR

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
199	A00TM016	37' 38' 20.3'	70' 25' 37.6'	Cerro del Diablo	Cerro del Diablo	Intrusive	Granite?	Silicification,argillization/kaolinite/malachite-limonite Stain	XR,GC
200	A00TM017	36' 47' 19.1'	70' 37' 31.8'	Varvarco	CM004	Intrusive	Tonalite	Tourmalinization, qz+epidote vein / /	TS,GC
201	A00TM018	36' 47' 19.1'	70' 37' 31.8'	Varvarco	CM004	Intrusive	Tonalite	Weak alteration / /	TS,WR
202	A00TM019	36' 47' 19.1'	70' 37' 31.8'	Varvarco	CM004	Intrusive	Diorite porphyry	Tourmalinization, qz+epidote vein / /	TS,WR
203	A00TM020	36' 49' 51.0'	70' 40' 20.1'	Varvarco	Varvarco	Valvalco granite	Tonalite	Fresh / /	TS,WR,KA
204	A00TM021	39' 12' 50.1'	70' 36' 26.6'	La Voluntad	La Voluntad	Intrusive	Qz vein in granitoid	/ / malachite	GC
205	A00TM022	39' 05' 04.4'	70' 32' 11.5'	Nireco	ZA028	Campos basalticos de Zapala	Lapilli tuff	Silicification / /	GC
206	A00TM023	39' 05' 45.5'	70' 31' 21.5'	Nireco	ZA029	Campos basalticos de Zapala	Andesite?	Fresh / /	TS
207	A00TM026	39' 06' 00.7'	70' 31' 26.8'	Nireco	ZA029	Campos basalticos de Zapala	Tuff	Argillization, weak silicification / / limonite	GC
208	A00TM027	39' 06' 00.7'	70' 31' 26.8'	Nireco	ZA029	Campos basalticos de Zapala	Lapilli tuff	Argillization, weak silicification / montmorillonite / limonite	XR,GC
209	A00TM028	41' 40' 05.2'	71' 06' 16.9'	Mina Maria	Mina Maria	Nahuel Huapi Fm.	Tuff	Silicification / / limonite	GC
210	A00TM029	42' 08' 36.0'	71' 18' 09.4'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Porphyritic Tonalite	Propylitic / / pyrite diss.	GC
211	A00TM030	42' 08' 35.7'	71' 18' 25.1'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Tonalite	Potassic? / / limonite stain	TS,WR
212	A00TM031	42' 08' 38.2'	71' 18' 33.9'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Tonalite	Argillization, weak silicification / / limonite	GC
213	A00TM032	42' 08' 38.2'	71' 18' 33.9'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Tonalite	Argillization / zeolite, loumontite / limonite	XR,GC
214	A00TM033	42' 08' 42.5'	71' 18' 30.4'	Cerro Coihue	Quebrada Baya		Argillic vein	Argillization, weak silicification / sericite, montmorillonite /	XR,GC
215	A00TM034	42' 08' 43.2'	71' 18' 30.4'	Cerro Coihue	Quebrada Baya		Qz vein (Float)	/ / limonite	GC
216	A00TM035	42' 08' 45.6'	71' 18' 27.1'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Granodiorite	Potassic / / pyrite diss, limonite	GC
217	A00TM037	42' 09' 40.7'	70' 30' 33.2'	Cushamen	Cushamen	Intrusive	Rhyolite	Argillization / kaolinite, sericite /	XR
218	A00TM038	42' 09' 40.7'	70' 30' 33.2'	Cushamen	Cushamen		Qz vein	/ / limonite	GC
219	A00TM039	42' 09' 43.5'	70' 30' 38.4'	Cushamen	Cushamen		Qz vein	/ / limonite	GC,DO,FI
220	A00TM040	43' 17' 05.5'	70' 59' 06.6'	Cerro Gonzalo	Arroyo Luques	Aleusco Fm.	Granodiorite	Silicification, agillization / /	GC
221	A00TM041	43' 17' 02.2'	70' 59' 17.6'	Cerro Gonzalo	Arroyo Luques	Intrusive	Granodiorite	Potassic, silicification, argillization/ /cp vein, diss.	GC
222	A00TM042	43' 18' 54.4'	71' 02' 22.8'	Cerro Gonzalo	Cerro Gonzalo		Qz vein	/ / limonite	DO,FI
223	A00TM043	43' 18' 54.4'	71' 02' 22.8'	Cerro Gonzalo	Cerro Gonzalo	Aleusco Fm.	Granodiorite	Silicification, argillization / / malachite, limonite stain	XR
224	A00TM044	43' 18' 25.0'	71' 01' 29.4'	Cerro Gonzalo	Cerro Gonzalo		Hydrothermal breccia	Weak silicification / / malachite stain	GC
225	A00TM045	42' 53' 42.0'	71' 12' 30.6'	Joya del Sol	Brancote-Galadriel	Lago la Plata Fm.	Andesite	Argillization, weak silicification / sericite, montmorillonite /	
226	A00TM046	42' 53' 42.0'	71' 12' 30.6'	Joya del Sol	Brancote-Galadriel	Lago la Plata Fm.	Andesite	Argillization, weak silicification / sericite, montmorillonite /	XR
227	A00TM047	42' 53' 42.0'	71' 12' 30.6'	Joya del Sol	Brancote-Galadriel	Lago la Plata Fm.	Andesite	Argillization / montmorillonite /	XR
228	A00TM049	42' 53' 12.9'	71' 12' 47.8'	Joya del Sol	Brancote-Galadriel		Qz vein		OA
229	A00TM050	42' 53' 12.9'	71' 12' 47.8'	Joya del Sol	Brancote-Galadriel	Lago la Plata Fm.?	Andesite?	Argillization / sericite /	XR
230	A00TM051	42' 53' 12.9'	71' 12' 47.8'	Joya del Sol	Brancote-Galadriel		Qz vein		OA
231	A00TM053	43' 57' 47.1'	71' 34' 13.6'	Cerro Colorado	Near Cerro Riñon		Granite (Float)	Silicification, argillization / montmorillonite, sericite/ py diss.	GC

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
232	A00TM054	43° 57' 52.6"	71° 33' 50.8"	Cerro Colorado	Near Cerro Riñon		Granite? (Float)	Silicification / / pyrite diss.	GC
233	A00TM055	44° 41' 25.0"	71° 06' 47.2"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	Silicification, argillization / kaolinite / limonite	XR,GC
234	A00TM056	44° 41' 26.0"	71° 07' 00.9"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	Silicification / / limonite stain	GC
235	A00TM057	44° 41' 23.7"	71° 07' 05.9"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	Argillization / kaolinite /	XR
236	A00TM058	44° 41' 21.5"	71° 07' 10.9"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	Argillization / kaolinite / limonite stain	XR,GC
237	A00TM059	44° 41' 31.1"	71° 05' 47.3"	Estrella Gaucha	Estrella Gaucha		Qz vein	Silicification, argillization / sericite, montmorillonite / limonite stain	GC,DO,FI
238	A00TM060	44° 41' 31.1"	71° 05' 47.3"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock		XR,GC
239	A00TM061	44° 41' 36.8"	71° 05' 44.5"	Estrella Gaucha	Estrella Gaucha		Hydrothurmal breccia	Silicification / / limonite stain	GC
240	A00TM062	44° 41' 20.9"	71° 05' 32.2"	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Altered rock	Argillization / sericite, montmorillonite/ cubic py(limonite) diss.	XR,GC
241	A00TM065	45° 00' 13.7"	71° 27' 28.2"	Cerro Blanco	Cerro Blanco		Qz vein	/ / limonite	GC
242	A00TM066	45° 00' 24.7"	71° 27' 31.8"	Cerro Blanco	Cerro Blanco		Qz vein	/ / pyrite (limonite)	GC
243	A00TM067	45° 00' 24.7"	71° 27' 31.8"	Cerro Blanco	Cerro Blanco	Lago la Plata Fm.?	Altered rock	Argillization / sericite, montmorillonite / limonite stain	XR
244	A00TM068	45° 00' 32.7"	71° 27' 25.3"	Cerro Blanco	Cerro Blanco		Qz vein	/ / limonite	GC
245	A00RM001	37° 15' 06.9"	70° 39' 18.1"	Andacollo	Sur los Maitenez	Intrusive	Volcanic rock	Silicification / sericite / limonite, hematite	
246	A00RM002	37° 14' 30.4"	70° 39' 37.5"	Andacollo	Sur los Maitenez	Intrusive	Volcanic rock	Silicification / kaolinite / limonite-qz network	
247	A00RM003	37° 11' 27.0"	70° 37' 45.4"	Andacollo	Mina Sofia nivel4	Huaraco Fm. (Andacollo Gr.)	Mudstone(ore)	Phyllic / / py-cp-gn-sp diss.	
248	A00RM004	37° 11' 27.0"	70° 37' 45.4"	Andacollo	Mina Sofia nivel4	Huaraco Fm. (Andacollo Gr.)	Mudstone(ore)	Phyllic / / py-cp-gn-sp diss.	
249	A00RM005	36° 58' 50.2"	70° 38' 45.3"	Butalon Norte	Butalon Norte	Coiyoi Fm.	Volcaniclastic rock	Silicification / / magnetite	XR
250	A00RM006	36° 58' 49.0"	70° 38' 45.0"	Butalon Norte	Butalon Norte	Coiyoi Fm.	Pebble dyke	Silicification / / magnetite	
251	A00RM007	37° 01' 08.5"	70° 39' 48.2"	Butalon Norte	CM010	Coiyoi Fm.	Volcanic rock	Silicification / / limonite	XR
252	A00RM008	37° 01' 03.1"	70° 39' 54.8"	Butalon Norte	CM010	Coiyoi Fm.	Volcanic rock	Silicification / sericite / limonite	
253	A00RM009	37° 07' 21.2"	70° 37' 19.9"	Andacollo	CM011	Coiyoi Fm.	Volcanic rock	Silicification / sericite / pyrite diss.	GC
254	A00RM010	37° 26' 41.3"	70° 26' 45.1"	Cerro Caicayen	Cerro Caicayen	Cuyo Gr.	Mudstone	Silicification / montmorillonite, kaolinite / limonite	
255	A00RM011	37° 27' 11.8"	70° 26' 44.1"	Cerro Caicayen	Cerro Caicayen	Intrusive (Grupo Molle)	Dacite porphyry	Phyllic / sericite / pyrite-limonite	GC
256	A00RM012	37° 11' 29.8"	70° 37' 47.0"	Andacollo	Mina Sofia nivel4	Intrusive	Dacite porphyry	Weak / /	GC
257	A00RM013	37° 11' 59.0"	70° 35' 59.2"	Andacollo	Arroyo Huaraco	Permian Intrusive	Granite	Weak / / qz vein-py diss.	TS,WR
258	A00RM014	37° 13' 08.1"	70° 40' 31.2"	Andacollo	Cerro Colo	Intrusive	Granite		
259	A00RM015	37° 13' 08.7"	70° 40' 32.0"	Andacollo	Cerro Colo	Intrusive	Dacite porphyry	Potassic? / / qz vein	
260	A00RM016	38° 12' 59.2"	70° 32' 22.8"	Campana Mahuida	Campana Mahuida	Tordillo Fm.	Sed. Rock	Phyllic / /	GC
261	A00RM017	38° 12' 46.4"	70° 32' 25.6"	Campana Mahuida	Campana Mahuida	Tordillo Fm.	Sed. Rock	Phyllic / / limonite	GC
262	A00RM018	38° 12' 49.7"	70° 35' 25.2"	Campana Mahuida	Mina Angelica	Ore deposit	Barite vein	/ / barite-gn-sp-mo	
263	A00RM019	38° 11' 50.1"	70° 35' 50.2"	Campana Mahuida	Mina Angelica	Ore deposit	Barite vein	/ / barite-Fe oxides	
264	A00RM020	39° 12' 49.5"	70° 36' 25.3"	La Voluntad	La Voluntad	Intrusive	Qz. vein in Granodiorite	Potassic / / Fe oxides, muscovite	GC

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
265	A00RM021	39° 12' 50.8'	70° 36' 24.2'	La Voluntad	La Voluntad	Intrusive (La Voluntad Complex)	Granodiorite	Potassic / / Fe oxide, green Cu	GC
266	A00RM022	39° 03' 01.9'	70° 31' 51.3'	Nireco	Near ZA027	Campos basalticos de Zapala	Volcaniclastic rock	Silicification / sericite /	XR
267	A00RM023	39° 02' 51.2'	70° 31' 58.5'	Nireco	Near ZA027	Campos basalticos de Zapala	Volcaniclastic rock	Silicification / montmorillonite, sericite /	XR,GC
268	A00RM024	39° 01' 54.5'	70° 32' 28.9'	Nireco	ZA026	Campos basalticos de Zapala	Volcaniclastic rock	Silicification / kaolinite, pyrophyllite /	XR
269	A00RM025	39° 03' 06.5'	70° 32' 07.7'	Nireco	Near ZA027	Campos basalticos de Zapala	Volcaniclastic rock	/ sericite /	TS
270	A00RM026	38° 57' 58.0'	70° 36' 47.5'	Carreri Malal	Carreri Malal	Intrusive	Granite	Weak / /	
271	A00RM027	38° 58' 37.0'	70° 35' 02.0'	Carreri Malal	Near Carreri Malal	Campos basalticos de Zapala	Basalt		
272	A00RM028	41° 40' 02.3'	71° 06' 15.6'	Mina Maria	Mina Maria	Nahuel Huapi Fm. (Fuapi?)	Andesite?	Propyritic / /	XR,GC
273	A00RM029	41° 40' 10.0'	71° 06' 43.0'	Mina Maria	Mina Maria		Qz vein (ore)	Silicification / / gn-py-cp-green Cu	PT,OA
274	A00RM030	42° 08' 36.4'	71° 18' 27.6'	Cerro Coihue	Quebrada Baya	Lago Puelo granitic complex	Tonalite	Silicification / zeolite /	XR,GC
275	A00RM031	42° 08' 37.7'	71° 18' 29.0'	Cerro Coihue	Quebrada Baya		Tourmaline vein		TS
276	A00RM032	42° 08' 45.4'	71° 18' 33.0'	Cerro Coihue	Quebrada Baya	Intrusive (Tertiary?)	Andesitic dyke	Propyritic / montmorillonite / K-feldspar,calcite vein	TS
277	A00RM033	42° 08' 44.9'	71° 18' 27.3'	Cerro Coihue	Quebrada Baya	Intrusive (Tertiary?)	Andesitic dyke	Propyritic / chlorite,epidote,calcite / limonite-pyrite	PT,XR,GC
278	A00RM034	42° 09' 38.7'	70° 30' 32.1'	Cushamen	Cushamen	Intrusive (Tertiary?)	Rhyolite	Argillization / sericite, kaolinite /	XR
279	A00RM035	42° 09' 36.1'	70° 30' 30.6'	Cushamen	Cushamen	Intrusive (Tertiary?)	Rhyolite	Argillization / gypsum, sericite /	XR
280	A00RM036	42° 09' 43.7'	70° 30' 35.9'	Cushamen	Cushamen	Intrusive (Tertiary?)	Rhyolite	Silicification / sericite /	GC
281	A00RM037	42° 09' 47.2'	70° 30' 31.6'	Cushamen	Cushamen		Qz vein	Silicification / gypsum, sericite, montmorillonite / py-limonite	GC
282	A00RM038	42° 09' 42.9'	70° 30' 17.3'	Cushamen	Cushamen	Intrusive (Tertiary?)	Rhyolite	Silicification/sericite,montmorillonite/qz vein network, tourmaline veinlet	TS
283	A00RM039	43° 17' 03.0'	70° 59' 11.0'	Cerro Gonzalo	Arroyo Luques	Intrusive (Aleusco Fm.)	Granodiorite	Silicification, potassic?/ sericite/ qz vein, hematite	
284	A00RM040	43° 17' 01.0'	70° 59' 16.0'	Cerro Gonzalo	Arroyo Luques	Intrusive	Granodiorite/Porphyry	Silicification, potassic?/ / qz vein, cp-py-limonite	PT,XR,GC
285	A00RM041	43° 18' 53.2'	71° 02' 24.5'	Cerro Gonzalo	Cerro Gonzalo	Intrusive	Breccia pipe	Silicification, phyllic / / qz vein,limonite-green Cu, tourmaline	XR,GC
286	A00RM042	43° 18' 25.2'	71° 01' 26.2'	Cerro Gonzalo	Arroyo Luques	Intrusive	Hydrothermal breccia	Silicification / / qz, green Cu, cp, tourmaline	PT,GC
287	A00RM043	43° 17' 35.0'	71° 00' 25.0'	Cerro Gonzalo	Arroyo Luques		Altered rock	Limonitization / / limonite, hematite, green Cu	GC
288	A00RM044	43° 17' 06.3'	71° 00' 24.9'	Cerro Gonzalo	Arroyo Luques		Altered rock	Limonitization / / limonite, hematite, green Cu	
289	A00RM045	43° 17' 28.7'	70° 59' 37.1'	Cerro Gonzalo	Arroyo Luques	Intrusive (Aleusco Fm.)	Granodiorite	Phyllic / sericite / py-cp-mo-biotite	GC
290	A00RM046	42° 52' 22.1'	71° 12' 09.6'	Joya del Sol	Brancote-Galadriel Norte		Banded Qz vein	Silicification / / qz-white chalcedony	OA
291	A00RM047	42° 53' 28.3'	71° 12' 30.4'	Joya del Sol	Brancote-Elena Sur		Banded Qz vein	Silicification / / qz-black chalcedony	
292	A00RM048	42° 53' 38.7'	71° 12' 30.4'	Joya del Sol	Brancote-Elena Sur	Lago la Plata Fm.	Andesitic rock	Argillization / /	TS
293	A00RM049	42° 53' 24.0'	71° 12' 44.0'	Joya del Sol	Brancote-Julia	Intrusive	Hydrothermal breccia	Silicification / / Vuggy silica	TS
294	A00RM050	42° 51' 51.0'	71° 11' 19.5'	Joya del Sol	Brancote-North of Galadriel		Qz vein	Silicification / / Massive white qz	
295	A00RM051	42° 51' 51.6'	71° 11' 15.5'	Joya del Sol	Brancote-North of Galadriel	Lago la Plata Fm.	Altered rock	Silicification, argillization / sericite / py-limonite	
296	A00RM052	42° 51' 50.1'	71° 11' 15.0'	Joya del Sol	Brancote-North of Galadriel	Lago la Plata Fm.	Altered rock	Argillization / sericite / limonite	
297	A00RM053	43° 57' 42.0'	71° 34' 33.0'	Cerro colorado	Near Cerro Riñon		Float	Silicification / pyrophyllite / py-limonite	

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
298	A00RM054	43° 41' 49.0'	70° 33' 58.0'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PC
299	A00RM055	43° 41' 58.0'	70° 34' 12.0'	Gabros de Tecka	Gabros de Tecka	Osta Arena Fm. (Liasic)	Hornfels	Contact metamorphism/ /clinopyroxene, diopside	
300	A00RM056	43° 42' 33.0'	70° 33' 56.0'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		
301	A00RM057	43° 43' 15.1'	70° 33' 32.8'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PT,PC
302	A00RM058	43° 43' 12.1'	70° 37' 12.7'	Gabros de Tecka	Gabros de Tecka	Intrusive (Tecka Fm.)	Gabbro		PT
303	A00RM059	44° 41' 23.9'	71° 06' 47.4'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Sed. Rock	Silicification, argillization / kaolinite /	XR
304	A00RM060	44° 41' 24.0'	71° 06' 49.3'	Estrella Gaucha	Estrella Gaucha	Divisadero Fm.	Ignimbrite (welded tuff)	Silicification, argillization / kaolinite /	TS
305	A00RM061	44° 41' 20.7'	71° 07' 06.8'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Sed. Rock	Silicification, argillization / kaolinite /	
306	A00RM062	44° 41' 21.7'	71° 07' 07.7'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Sed. Rock (Float)	Argillization / /	XR
307	A00RM063	44° 41' 23.0'	71° 07' 12.5'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.	Sed. Rock	Argillization / kaolinite / dickite	XR
308	A00RM064	44° 41' 36.5'	71° 05' 45.2'	Estrella Gaucha	Estrella Gaucha	in Apeleg Fm.	Brecciated qz vein	Silicification / /	GC
309	A00RM065	44° 41' 19.3'	70° 05' 29.4'	Estrella Gaucha	Estrella Gaucha	Apeleg Fm.?	white altered rock	Silicification, argillization / montmorillonite-sericite /	XR
310	A00RM066	45° 00' 13.7'	71° 27' 25.2'	Cerro Blanco	Cerro Blanco	in Lago La Plata Fm.	Brecciated qz vein (Float)	Silicification / / py-limonite-hematite	GC
311	A00RM067	45° 00' 12.9'	71° 27' 28.2'	Cerro Blanco	Cerro Blanco	Lago la Plata Fm.?	white altered rock	Silicification, argillization / sericite /	XR
312	A00RM068	45° 00' 21.4'	71° 27' 33.6'	Cerro Blanco	Cerro Blanco	Lago la Plata Fm.	white altered rock with qz pheno.	Silicification, argillization/ sericite, montmorillonite /qz phenocrystal	XR
313	A00RM069	45° 00' 24.9'	71° 27' 30.9'	Cerro Blanco	Cerro Blanco	in Lago La Plata Fm.	Qz vein (Float)	Silicification / / qz-limonite	GC
314	A00RM070	45° 01' 00.2'	71° 27' 06.8'	Cerro Blanco	Cerro Blanco	Tres Lagunas Fm.?	Laminated Sed. Rock	Silicification / / qz-chalcedony-calcite-limonite-sulfide	GC
315	A00NK101	39° 01' 49.4'	70° 32' 06.7'	Nireco	Nireco (ZA021)	PTR, Fm. Choiyoi	Quartz	/ / Limonite	GC
316	A00NK102	39° 00' 56.8'	70° 31' 40.7'	Nireco	Nireco (ZA021)	PTR, Fm. Choiyoi	Rhyolite	Silicification, argillization / /	XR, GC
317	A00NK103	39° 00' 53.9'	70° 31' 13.8'	Nireco	Nireco (ZA021)	PTR, Fm. Choiyoi	Quartz vein (float)	/ / Small metallic mineral	GC
318	A00NK104	39° 00' 55.0'	70° 31' 12.4'	Nireco	Nireco (ZA021)	PTR, Fm. Choiyoi	Crystal tuff	/ /	TS
319	A00NK105	39° 12' 41.0'	70° 36' 46.4'	La Voluntad	La Voluntad North (ZA001)	PRg, Granitoids (La Voluntad complex)	Quartz porphyry	Silicification, potassium feldspar / /	TS
320	A00NK106	39° 12' 41.0'	70° 36' 46.4'	La Voluntad	La Voluntad North (ZA001)	PRg, Granitoids (La Voluntad complex)	Quartz porphyry	Silicification, sugary / /	
321	A00NK107	39° 12' 38.2'	70° 36' 48.6'	La Voluntad	La Voluntad North (ZA001)	PRg, Granitoids (La Voluntad complex)	Quartz porphyry	Silicification, argillization / /	XR
322	A00NK108	39° 12' 25.1'	70° 36' 48.6'	La Voluntad	La Voluntad North (ZA001)	PRg, Granitoids (La Voluntad complex)	Grnitoid	Argillization / /	XR
323	A00NK109	39° 07' 33.6'	70° 37' 48.1'	La Voluntad	La Voluntad North (ZA034)	PRg, Granitoids (La Voluntad complex)	Granite	/ /	TS
324	A00NK110	39° 07' 33.6'	70° 37' 48.1'	La Voluntad	La Voluntad North (ZA034)	PRg, Granitoids (La Voluntad complex)	Aplite	Tourmaline? / /	TS
325	A00NK111	39° 07' 30.2'	70° 38' 05.2'	La Voluntad	La Voluntad North (ZA034)	PRg, Granitoids (La Voluntad complex)	Granitoid	/ / Limonite	XR
326	A00NK112	39° 07' 32.2'	70° 38' 07.8'	La Voluntad	La Voluntad North (ZA034)	PRg, Granitoids (La Voluntad complex)	Granitoid	/ / Limonite	XR
327	A00NK113	39° 07' 49.0'	70° 38' 14.2'	La Voluntad	La Voluntad North (ZA034)	PRg, Granitoids (La Voluntad complex)	Ryolite dike	/ / Limonite, small pyrite	GC
328	A00NK114	39° 08' 28.9'	70° 34' 41.5'	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Rhyolitic tuff	Argillization / / Limonite	XR, GC
329	A00NK115	39° 08' 28.9'	70° 34' 41.5'	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Rhyolitic lapili tuff	Argillization / /	XR
330	A00NK116	39° 08' 34.3'	70° 34' 33.9'	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Andesite	/ /	XR

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
331	A00NK117	39° 08' 34.3"	70° 34' 33.9"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Rhyolitic tuff	Argillization / / Limonite	GC
332	A00NK118	39° 08' 30.9"	70° 34' 49.3"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Andesitic tuff breccia	Chlorite / /	XR
333	A00NK119	39° 08' 33.5"	70° 34' 49.9"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Quartz vein & tuff	Silicification / /	GC
334	A00NK120	39° 08' 43.2"	70° 34' 47.6"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Rhyolitic tuff	Silicification, argillization / /	XR
335	A00NK121	39° 08' 46.6"	70° 34' 54.2"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Andesitic tuff	Chlorite / / Hematite	XR
336	A00NK122	39° 08' 46.6"	70° 34' 54.2"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Rhyolitic tuff	Silicification, argillization / /	XR
337	A00NK123	39° 10' 08.2"	70° 34' 17.0"	La Voluntad	La Voluntad North (ZA032)	PTR, Fm. Choiyoi	Undefined	Argillization / / Limonite	XR, GC
338	A00NK124	38° 52' 31.0"	70° 47' 33.8"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolitic tuff	Silicification, argillization / /	XR, GC
339	A00NK125	38° 52' 24.4"	70° 47' 33.2"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolitic tuff	Silicification, argillization / /	XR
340	A00NK126	38° 52' 09.1"	70° 47' 46.0"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolitic tuff, quartz vein	Silicification / /	GC
341	A00NK127	38° 52' 08.4"	70° 47' 50.7"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolitic lapili tuff	Silicification / / Limonite	XR, GC
342	A00NK128	38° 52' 28.5"	70° 47' 58.4"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolitic tuff breccia	Silicification / / Limonite	XR, GC
343	A00NK129	38° 52' 31.5"	70° 48' 06.9"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Rhyolite	Silicification / / Limonite	XR, GC
344	A00NK130	38° 49' 21.7"	70° 39' 12.0"	Palau Mahuida	Palau Mahuida	PC2, Fm. Colohuincul eq.	Biotite-Garnet gneiss, quartz vein	/ /	GC
345	A00NK131	38° 47' 06.9"	70° 40' 06.0"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Tuff	Argillization / /	XR, GC
346	A00NK132	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	Silicification, kaolin / / Pyrite dissemination	PT, XR, GC
347	A00NK133	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Andesite	Argillization / / Limonite	XR
348	A00NK134	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Quartz-pyrite vein	/ / Pyrite	GC
349	A00NK135	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	Kaolin ? / /	XR
350	A00NK136	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	/ / Limonite	GC
351	A00NK137	38° 46' 42.7"	70° 40' 29.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Andesite porphyry	/ /	TS
352	A00NK138	38° 46' 35.1"	70° 40' 26.0"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Andesite porphyry	Silicification, argillization / /	GC
353	A00NK139	38° 46' 35.1"	70° 40' 25.3"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Hydrothermal breccia	Silicification / / Pyrite	GC
354	A00NK140	38° 46' 27.4"	70° 40' 23.0"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	Alunite ? / /	XR
355	A00NK141	38° 46' 25.2"	70° 40' 22.2"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	Alunite ? / /	XR
356	A00NK142	38° 47' 11.2"	70° 41' 07.9"	Palau Mahuida	Palau Mahuida (ZA007)	Ta2, Fm. Farallones eq.	Undefined	Alunite ? / /	XR
357	A00NK143	38° 47' 55.3"	70° 41' 22.3"	Palau Mahuida	Palau Mahuida	Ta2, Fm. Farallones eq.	Dacite	Jarosite ? / / Hematite	XR
358	A00NK144	38° 47' 55.3"	70° 41' 22.3"	Palau Mahuida	Palau Mahuida	Ta2, Fm. Farallones eq.	Tuff	/ /	TS
359	A00NK145	38° 48' 06.8"	70° 40' 05.0"	Palau Mahuida	Palau Mahuida	Ta2, Fm. Farallones eq.	Undefined	Argillization / / Limonite	XR
360	A00NK146	38° 48' 18.8"	70° 40' 06.5"	Palau Mahuida	Palau Mahuida	Ta2, Fm. Farallones eq.	Bsalt	/ /	
361	A00NK147	38° 41' 31.4"	70° 41' 29.6"	Palau Mahuida	Plau Mahuida North (ZA004)	PRg, Granitoids	Granite	/ /	TS
362	A00NK148	38° 41' 19.2"	70° 41' 34.4"	Palau Mahuida	Plau Mahuida North (ZA004)	PTR, Fm. Choiyoi	Andesite	Silicification / /	TS
363	A00NK149	41° 32' 17.6"	71° 08' 50.4"	Rio Foyel	Cerro Carrera east		Oxide copper	/ /	

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
364	A00NK150	41° 30' 15.9"	71° 12' 08.4"	Rio Foyel	Cerro Carrera east (SB068)	Jg, Granitoids	Quartz vein	/ /	GC
365	A00NK151	41° 30' 18.2"	71° 12' 09.0"	Rio Foyel	Cerro Carrera east (SB068)	Jg, Granitoids	Granitoid	/ /	TS
366	A00NK152	41° 32' 38.7"	71° 09' 40.4"	Rio Foyel	Cerro Carrera east		Quartz vein (float)	/ /	GC
367	A00HH101	43° 18' 53.2"	71° 02' 25.9"	Cerro Gonzalo	Cerro Gonzalo, Sector 2		Massive quartz with limonite	/ /	
368	A00HH102	43° 18' 23.8"	71° 01' 32.7"	Cerro Gonzalo	Cerro Gonzalo, Sector 5	Kg, Cretaceous granitoids	Altered rock, hydrothermal breccia	Argillization / / Quartz-malachite	TS, XR
369	A00HH103	43° 19' 08.3"	71° 00' 43.5"	Cerro Gonzalo	Cerro Gonzalo, Sector 4	Kg, Cretaceous granitoids	Altered rock	Argillization / / Quartz-malachite	XR
370	A00HH104	43° 20' 04.6"	71° 05' 53.3"	Cerro Gonzalo	Cerro Gonzalo, Sector 3	Jßa, Fm. Lago la Plata	Andesite	Argillization / /	XR, GC
371	A00HH105	43° 20' 07.9"	71° 05' 59.6"	Cerro Gonzalo	Cerro Gonzalo, Sector 3	Jßa, Fm. Lago la Plata	Hydrothermal breccia	Tourmaline / /	TS, XR
372	A00HH106	43° 18' 39.8"	71° 04' 59.4"	Cerro Gonzalo	Cerro Gonzalo, Sector 6	Jßa, Fm. Lago la Plata	Altered rock, hydrothermal breccia	Argillization / /	XR
373	A00HH107	43° 18' 41.4"	71° 05' 16.0"	Cerro Gonzalo	Cerro Gonzalo, Sector 6	Jßa, Fm. Lago la Plata	Altered rock	Argillization / / Quartz-limonite	XR
374	A00HH108	43° 16' 53.4"	71° 00' 25.4"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Jßa, Fm. Lago la Plata	Altered rock	Argillization / /	XR
375	A00HH109	43° 17' 05.1"	71° 00' 29.8"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Jßa, Fm. Lago la Plata	Cu oxide ore	Argillization / / Malachite	XR, OA
376	A00HH110	43° 17' 21.7"	70° 59' 36.4"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Altered rock	Argillization / / Black limonite	PT
377	A00HH111	43° 31' 01.8"	71° 05' 33.9"	Arroyo Cascada	Arroyo Cascada		Quartz vein with pyrite-malachite	/ / Pyrite-malachite	OA
378	A00HH112	43° 30' 34.6"	71° 05' 54.5"	Arroyo Cascada	Arroyo Cascada	Kg, Cretaceous granitoids	Altered granite	Silicification / / Pyrite	XR, GC
379	A00HH113	43° 10' 13.3"	71° 01' 14.8"	Laguna Sunica	Laguna Sunica	Tol, Fm. Ventana	Altered rock with clay vein	Argillization / /	XR, GC
380	A00HH114	43° 10' 12.5"	71° 01' 20.3"	Laguna Sunica	Laguna Sunica	Tol, Fm. Ventana	Andesite	/ / Pyrite	XR, GC
381	A00HH115	43° 30' 12.0"	71° 06' 33.1"	Arroyo Cascada	Arroyo Cascada	Jßa, Fm. Lago la Plata	Andesite	Silicification, epidote / / Pyrite	GC
382	A00HH116	43° 30' 54.9"	71° 09' 43.0"	Cerro Cuche	Cerro Cuche		Quartz vein	Black mineral (tourmaline?) / /	PT, GC
383	A00HH117	43° 30' 57.0"	71° 09' 42.6"	Cerro Cuche	Cerro Cuche	Kg, Cretaceous granitoids	Quartz porphyry	/ / Pyrite, limonite	GC
384	A00HH118	43° 30' 57.9"	71° 09' 41.0"	Cerro Cuche	Cerro Cuche	Jßa, Fm. Lago la Plata	Sandstone	Silicification / / Pyrite	GC
385	A00HH119	43° 31' 03.2"	71° 09' 36.5"	Cerro Cuche	Cerro Cuche	Jßa, Fm. Lago la Plata	Sandstone	Mica, clay / / Pyrite	GC
386	A00HH120	43° 32' 15.3"	71° 08' 47.5"	Cerro Cuche	Cerro Cuche	Jßa, Fm. Lago la Plata	Sandstone	Silicification / / Pyrite	
387	A00HH121	43° 32' 15.2"	71° 08' 40.8"	Cerro Cuche	Cerro Cuche		Metallic mineral vein	Clay mineral / / Metallic mineral	PT, XR
388	A00HH122	43° 31' 40.9"	71° 09' 58.5"	Cerro Cuche	Cerro Cuche	Kg, Cretaceous granitoids	Quartz porphyry	Argillization / / Limonite	XR, GC
389	A00HH123	42° 09' 45.0"	71° 24' 01.7"	Condorcanqui	Condorcanqui		Quartz vein	/ /	GC
390	A00HH124	42° 09' 41.8"	71° 23' 58.3"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	/ / Malachite, chalcopyrite, pyrite	OA
391	A00HH125	42° 09' 32.5"	71° 23' 50.1"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	/ / Cu mineral	
392	A00HH126	42° 09' 35.6"	71° 23' 48.0"	Condorcanqui	Condorcanqui	Intrusive	Quartz porphyry	/ / Malachite, chalcopyrite	PT, OA
393	A00HH127	42° 10' 05.3"	71° 24' 04.4"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Epidote / / Malachite, chalcopyrite	OA
394	A00HH128	42° 19' 42.6"	71° 29' 19.8"	Epuyen	Rio Blanco	Kg, Cretaceous granitoids	Quartz porphyry	/ /	TS, XR, GC
395	A00HH129	42° 19' 42.6"	71° 29' 19.8"	Epuyen	Rio Blanco	Kg, Cretaceous granitoids	Altered rock	/ / Malachite, chalcopyrite	OA
396	A00HH130	42° 16' 21.3"	71° 23' 44.5"	Epuyen	Arroyo Pedregoso	Jm, Fm. Piltriquitron	Silicified tuff	White clay / / Malachite	XR, OA

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
397	A00HH131	42° 15' 55.7"	71° 24' 05.8"	Epuyen	Arroyo Pedregoso		Undefined (float)	/ / Pyrite	GC
398	A00HH132	42° 15' 55.7"	71° 24' 05.8"	Epuyen	Arroyo Pedregoso	Intrusive	Aplite or felsite	White clay / / Pyrite	TS, XR, GC
399	A00HH133	42° 21' 14.9"	71° 26' 30.9"	Epuyen	South of SB083		Andesite (float)	/ / Quartz-pyrite	GC
400	A00HH134	42° 21' 14.9"	71° 26' 30.9"	Epuyen	South of SB083		Sandstone (float)	/ / Quartz-pyrite	GC
401	A00HH135	42° 20' 13.0"	71° 25' 18.5"	Epuyen	Southeast of SB082	Jm, Fm. Piltriquitron	Andesite with quartz vein	/ / Quartz-calcite-pyrite	GC
402	A00HH136	42° 20' 13.0"	71° 25' 18.5"	Epuyen	Southeast of SB082		Silicified rock (float)	silicification / / Pyrite	GC
403	A00MZ101	43° 18' 24.2"	71° 01' 32.8"	Cerro Gonzalo	Cerro Gonzalo, Sector 5	Kg, Cretaceous granitoids	Silicified rock	Quartz-sericite / / Black Cu pitch	XR, GC
404	A00MZ102	43° 19' 07.5"	71° 00' 41.0"	Cerro Gonzalo	Cerro Gonzalo, Sector 4	Kg, Cretaceous granitoids	Silicified rock	Quartz-sericite / / Malachite	XE, GC
405	A00MZ103	43° 18' 57.7"	71° 00' 44.6"	Cerro Gonzalo	Cerro Gonzalo, Sector 4	Kg, Cretaceous granitoids	Granodiorite	/ /	TS, WR
406	A00MZ104	43° 20' 05.2"	71° 05' 53.7"	Cerro Gonzalo	Cerro Gonzalo, Sector 3	J8a, Fm. Lago la Plata	Hydrothermal breccia	Silicification / / Limonite	XR, GC
407	A00MZ105	43° 20' 23.6"	71° 06' 22.1"	Cerro Gonzalo	Cerro Gonzalo, Sector 3	Kg, Cretaceous granitoids	Quartz porphyry	Quartz-sericite / / Limonite	XR, GC
408	A00MZ106	43° 18' 43.5"	71° 04' 53.8"	Cerro Gonzalo	Cerro Gonzalo, Sector 6	Kg, Cretaceous granitoids	Silicified rock	Quartz-sericite / / Red limonite	XR, GC
409	A00MZ107	43° 16' 50.8"	71° 00' 02.8"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Leucocratic granitoid	Potassic / /	TS
410	A00MZ108	43° 16' 49.5"	71° 00' 01.5"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Granodiorite	Potassic / / Hypogene chalcopyrite	PT, WR, KA
411	A00MZ109	43° 16' 58.5"	71° 00' 30.9"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Altered granitoid	Quartz-sericite / / Intensive limonite	XR
412	A00MZ110	43° 17' 27.1"	70° 59' 39.4"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Quartz porphyry	Quartz-sericite / / Py-Cp-Mo dissemination	XR, GC
413	A00MZ111	43° 17' 33.9"	71° 00' 29.7"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Quartz porphyry	Quartz-sericite / / Red limonite etc	XR, GC
414	A00MZ112	43° 17' 00.7"	70° 59' 21.0"	Cerro Gonzalo	Cerro Gonzalo, Sector 1	Kg, Cretaceous granitoids	Granite	Quartz-sericite / / Hypogene chalcopyrite	
415	A00MZ113	43° 30' 48.0"	71° 05' 26.8"	Arroyo Cascada	Arroyo Cascada	J8a, Fm. Lago la Plata	Altered volcancs	Silicification / / Limonite	XR, GC
416	A00MZ114	43° 31' 01.9"	71° 05' 33.8"	Arroyo Cascada	Arroyo Cascada	Kg, Cretaceous granitoids	Micro granodiorite	/ /	TS
417	A00MZ115	43° 30' 51.5"	71° 05' 38.6"	Arroyo Cascada	Arroyo Cascada	J8a, Fm. Lago la Plata	Altered volcancs	Silicification / / Limonite	XR, GC
418	A00MZ116	43° 30' 37.1"	71° 05' 50.1"	Arroyo Cascada	Arroyo Cascada	Quartz vein	Quartz vein	/ / Large grain pyrite	GC
419	A00MZ117	43° 10' 10.7"	71° 01' 20.7"	Laguna Sunica	Laguna Sunica	Tα1, Fm. Ventana	Altered volcancs	Silcification, argillization / / Pyrite, limonite	XR, GC
420	A00MZ118	43° 10' 15.6"	71° 01' 14.2"	Laguna Sunica	Laguna Sunica	Zeolite vein	Zeolite vein	/ /	XR
421	A00MZ119	43° 30' 23.6"	71° 06' 25.8"	Arroyo Cascada	Arroyo Cascada	Quartz vein	Quartz vein	/ /	DO, FI
422	A00MZ120	43° 30' 11.9"	71° 06' 33.4"	Arroyo Cascada	Arroyo Cascada	Quartz vein	Quartz vein (float)	/ / Limonite	GC
423	A00MZ121	43° 27' 58.5"	71° 03' 31.4"	Arroyo Cascada	Princess	J8a, Fm. Lago la Plata	Altered volcancs (tailing)	Silicification / / Pyrite dissemination	XR, GC
424	A00MZ122	43° 27' 42.0"	71° 03' 28.7"	Arroyo Cascada	Princess	Quartz vein	Quartz vein (float)	/ /	GC
425	A00MZ123	43° 30' 42.9"	71° 09' 49.7"	Cerro Cuche	Cerro Cuche north	Quartz vein	Quartz vein	/ / Galena dissemination	OA
426	A00MZ124	43° 30' 36.0"	71° 10' 01.8"	Cerro Cuche	Cerro Cuche north	J8a, Fm. Lago la Plata	Silt	Silicification / / Pyrite dissemination	XR, GC
427	A00MZ125	43° 32' 14.4"	71° 08' 42.2"	Cerro Cuche	Cerro Cuche south	Quartz-sulfide vein	Quartz-sulfide vein	/ / Galena-pyrite-limonite	PT, OA
428	A00MZ126	43° 31' 52.2"	71° 09' 43.6"	Cerro Cuche	Cerro Cuche south	Intrusion	Quartz porphyry	Tourmaline / / Pyrite dissemination	XR, GC
429	A00MZ127	43° 32' 22.6"	71° 10' 25.0"	Cerro Cuche	Cerro Cuche south	Gossan	Gossan	/ / Massive limonite	OA

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
430	A00MZ128	42° 09' 43.2"	71° 24' 00.6"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Propylite / / Bornite, malachite	
431	A00MZ129	42° 09' 46.5"	71° 24' 01.5"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Propylite / / Chalcopyrite, quartz-calcite veinlets	XR
432	A00MZ130	42° 09' 46.5"	71° 24' 01.5"	Condorcanqui	Condorcanqui	Dyke	Andesite	Fresh / / Post mineralization	TS, KA
433	A00MZ131	42° 09' 41.9"	71° 23' 58.4"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Silicification / / Chalcopyrite dissemination	DS
434	A00MZ132	42° 09' 32.5"	71° 23' 49.9"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesitic tuff breccia	Silicification / / Chalcocite, malachite	XR, OA
435	A00MZ133	42° 09' 36.6"	71° 23' 46.5"	Condorcanqui	Condorcanqui	Dyke	Dacite porphyry	/ / Chalcopyrite dissemination	
436	A00MZ134	42° 10' 12.4"	71° 24' 05.8"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesitic rock	Silicification / / Malachite	XR, OA
437	A00MZ135	42° 10' 04.0"	71° 24' 04.1"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Amygdale epidote and calcite / / Chalcopyrite in amygdale part	DS
438	A00MZ136	42° 09' 42.5"	71° 24' 07.0"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Epidote / /	DS
439	A00MZ137	42° 12' 08.1"	71° 23' 40.2"	Condorcanqui	North of Epuyen town	Intrusion	Granodiorite	/ /	TS, WR, DS
440	A00MZ138	42° 09' 11.3"	71° 23' 53.9"	Condorcanqui	North of Condorcanqui	Jm, Fm. Piltriquitron	Andesite	Propylite / /	GC
441	A00MZ139	42° 09' 55.4"	71° 23' 19.9"	Condorcanqui	Condorcanqui	Jm, Fm. Piltriquitron	Andesite	/ /	TS, WR, KA
442	A00MZ140	42° 19' 44.0"	71° 29' 20.9"	Epuyen	Rio Blanco	Kg, Cretaceous granitoids	Qz porphyry	Silicification / / Quartz vein and pyrite dissemination	GC
443	A00MZ141	42° 19' 53.6"	71° 29' 08.0"	Epuyen	Rio Blanco	Kg, Cretaceous granitoids	Granitoids (float)	Silicification / / Quartz vein and pyrite dissemination	GC
444	A00MZ142	42° 15' 54.6"	71° 24' 03.8"	Epuyen	Arroyo Pedregoso	Quartz vein	Quartz vein (float)	/ /	GC
445	A00MZ143	42° 21' 14.7"	71° 26' 30.7"	Epuyen	South of SB083	Quartz vein	Quartz vein (float)	Silicification / / Pyrite dissemination	XR, GC
446	A00MZ144	42° 21' 14.7"	71° 26' 30.7"	Epuyen	South of SB083	Jm, Fm. Piltriquitron	Silicified rock	Silicification / / Limonite	GC
447	A00MZ145	42° 20' 14.3"	71° 25' 19.3"	Epuyen	Southeast of SB082	Calcite vein	Calcite vein	/ /	GC
448	A00MZ146	42° 20' 14.3"	71° 25' 19.3"	Epuyen	Southeast of SB082	Jm, Fm. Piltriquitron	Silicified rock	Silicification / /	XR
449	A00MZ147	42° 20' 14.3"	71° 25' 19.3"	Epuyen	Southeast of SB082	Quartz vein	Quartz vein (float)	/ / Pyrite dissemination	GC
450	A00MZ148	42° 13' 19.0"	71° 27' 20.1"	Epuyen	Lago Epuyen	Quartz vein	Quartz vein	/ /	GC, DO, FI
451	A00MZ149	42° 13' 19.0"	71° 27' 20.1"	Epuyen	Lago Epuyen	Jm, Fm. Piltriquitron	Silicified rock	Silicification / /	XR
452	A00MZ150	42° 13' 18.7"	71° 26' 41.6"	Epuyen	Lago Epuyen	Quartz vein	Quartz vein	/ /	GC
453	A00TM101	36° 37' 51.8"	70° 36' 59.6"	Villa Aguas Calientes	Arroyo Ailinco	Tα2, Fm. Cajón Negro	Altered rock	Argillization / Montmorillonite, sericite /	XR, GC
454	A00TM102	36° 42' 18.7"	70° 38' 00.0"	Villa Aguas Calientes	Arroyo la Totora		Quartz vein	/ /	GC
455	A00TM103	36° 39' 12.9"	70° 36' 53.7"	Villa Aguas Calientes	Arroyo Manchana Covunco		Quartz vein	/ /	GC, FI
456	A00TM104	36° 32' 42.9"	70° 37' 15.1"	Villa Aguas Calientes	Alteration zone near ML013	Tα2, Fm. Cajón Negro	Altered rock	Argillization / Montmorillonite / Pyrite dissemination	XR, GC
457	A00TM105	36° 32' 42.9"	70° 37' 15.0"	Villa Aguas Calientes	Alteration zone near ML013	Tα2, Fm. Cajón Negro	Altered rock	Argillization / Montmorillonite / Pyrite dissemination	XR, GC
458	A00TM106	36° 32' 45.5"	70° 37' 12.4"	Villa Aguas Calientes	Alteration zone near ML013	Tα2, Fm. Cajón Negro	Andesite	Propylitic / /	TS
459	A00TM107	36° 52' 06.9"	70° 37' 43.6"	Varvarco	Mina sin nombre	Intrusive	Granodiorite	Argillization / Sericite / Limonite	XR, GC
460	A00TM108	36° 52' 09.2"	70° 37' 43.4"	Varvarco	Mina sin nombre	Intrusive	Granodiorite	Silicification / / Limonite	XR, GC
461	A00TM109	36° 52' 09.3"	70° 37' 43.5"	Varvarco	Mina sin nombre		Quartz vein	/ / Pyrite	GC, FI
462	A00TM110	36° 51' 57.1"	70° 36' 21.5"	Varvarco	Mina Santos	Intrusive	Granodiorite	/ /	TS

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
463	A00TM111	36° 51' 57.4"	70° 36' 21.7"	Varvarco	Mina Santos	Intrusive	Granodiorite	Argillization / Sericite / Pyrite dissemination, limonite	XR, GC
464	A00TM112	36° 51' 57.5"	70° 36' 21.6"	Varvarco	Mina Santos	Ore deposit	Quartz vein	/ / Chalcopyrite, malachite, azurite, pyrite	OA, FI
465	A00TM113	36° 53' 22.7"	70° 38' 23.7"	Varvarco	Alteration zone near Varvarco village	PTR, Fm. Choiyoi	Rhyolitic tuff	Argillization / Sericite / Limonite along crack	XR, GC
466	A00TM114	36° 47' 53.6"	70° 35' 02.9"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Tuff	Argillization / Sericite / Pyrite dissemination	XR, GC
467	A00TM115	36° 47' 54.4"	70° 35' 05.2"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Tuff	Argillization, silicification / Sericite / Pyrite dissemination	XR, GC
468	A00TM116	36° 48' 00.2"	70° 35' 13.9"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Tuff breccia	Silicification / Sericite / Pyrite dissemination	XR, GC
469	A00TM117	36° 47' 57.0"	70° 35' 17.0"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Altered rock	Silicification / / Pyrite dissemination	XR, GC
470	A00TM118	36° 47' 54.7"	70° 35' 28.0"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Tuff breccia	Silicification / / Pyrite dissemination	GC
471	A00TM119	36° 47' 53.5"	70° 35' 35.3"	Varvarco	Alteration zone along Arroyo Auquen		Quartz vein	/ /	GC, FI
472	A00TM120	36° 47' 41.6"	70° 36' 29.5"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Altered rock	Argillization / Pyropylite /	XR
473	A00TM121	36° 47' 41.6"	70° 36' 29.5"	Varvarco	Alteration zone along Arroyo Auquen	PTR, Fm. Choiyoi	Altered rock	Silicification / /	XR, GC
474	A00TM122	36° 55' 31.3"	70° 25' 12.7"	Cerro Collocho	Cerro Collocho	Intrusive	Dacitic andesite	Silicification, argillization / /	XR, GC
475	A00TM123	36° 55' 20.0"	70° 25' 10.1"	Cerro Collocho	Cerro Collocho		Limonite-quartz vein	/ / Pyrite, limonite	GC
476	A00TM124	36° 55' 20.0"	70° 25' 10.1"	Cerro Collocho	Cerro Collocho	Intrusive	Dacitic andesite	Argillization / Sericite / Limonite	XR
477	A00TM125	36° 55' 15.9"	70° 25' 10.9"	Cerro Collocho	Cerro Collocho	Intrusive	Dacitic andesite	/ /	TS, WR, KA
478	A00TM126	36° 55' 05.1"	70° 25' 20.1"	Cerro Collocho	Cerro Collocho	Intrusive	Dacite	Argillization / Sericite /	XR
479	A00TM128	37° 52' 16.4"	70° 27' 06.4"	Cerro de los Bueyes	Cerro los Potreritos	JK, Grupo Mendoza	Shale	Silicification, argillization / Montmorillonite / Pyrite dissemination	XR, GC
480	A00TM129	37° 52' 15.7"	70° 27' 03.9"	Cerro de los Bueyes	Cerro los Potreritos	JK, Grupo Mendoza	Sandstone	Silicification, argillization / Montmorillonite / Pyrite dissemination	XR, GC
481	A00TM130	37° 20' 38.1"	70° 22' 22.1"	Cerro Mayal	Cerro Mayal		Altered rock (gossan)	Silicification / / Pyrite-limonite	GC
482	A00TM131	37° 20' 40.4"	70° 22' 21.3"	Cerro Mayal	Cerro Mayal	JK, Grupo Mendoza	Sandstone	Argillization / /	XR
483	A00TM132	37° 20' 34.0"	70° 22' 26.4"	Cerro Mayal	Cerro Mayal	Intrusive	Andesite	Silicification, argillization / Sericite / Pyrite, limonite, malachite	XR, GC
484	A00TM133	37° 20' 34.0"	70° 22' 26.4"	Cerro Mayal	Cerro Mayal	Intrusive	Andesite	Argillization / Sericite /	PT
485	A00TM134	37° 19' 55.5"	70° 23' 46.4"	Cerro Mayal	Cerro Mayal		Altered rock (gossan)	/ / Limonite, calcite	GC
486	A00TM135	37° 19' 55.5"	70° 23' 46.4"	Cerro Mayal	Cerro Mayal	Intrusive	Andesite	Argillization / Kaolinite, montmorillonite /	XR
487	A00TM136	37° 20' 13.4"	70° 22' 51.9"	Cerro Mayal	Cerro Mayal	JK, Grupo Mendoza	Tuff breccia	Propylitic / Montmorillonite / Limonite	XR, GC
488	A00TM137	37° 20' 17.5"	70° 22' 49.6"	Cerro Mayal	Cerro Mayal	Intrusive	Andesite	Argillization / Sericite /	XR
489	A00TM138	37° 43' 07.4"	70° 25' 11.1"	Cerro de los Bueyes	Cerro de los Bueyes	JK, Grupo Mendoza	Altered rock	Argillization / Montmorillonite, sericite / Marcasite dissemination	PT, XR, GC
490	A00TM139	37° 43' 07.4"	70° 25' 11.1"	Cerro de los Bueyes	Cerro de los Bueyes		Altered rock(gossan)	/ / Limonite	GC
491	A00TM140	37° 43' 07.4"	70° 25' 11.1"	Cerro de los Bueyes	Cerro de los Bueyes	JK, Grupo Mendoza	Sandstone	Silicificaton, argillization / Sericite, montmorillonite /	XR
492	A00TM141	37° 43' 00.2"	70° 24' 13.8"	Cerro de los Bueyes	Cerro de los Bueyes	JK, Grupo Mendoza	Shale	Silicification / / Marcasite dissemination	XR, GC
493	A00TM142	37° 43' 00.2"	70° 24' 13.8"	Cerro de los Bueyes	Cerro de los Bueyes	JK, Grupo Mendoza	Sandstone	Silicification / / Marcasite dissemination and vein	PT, XR, GC
494	A00TM144	37° 59' 29.6"	70° 33' 19.3"	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous shale	Argillization / Sericite /	XR
495	A00TM145	37° 59' 29.6"	70° 33' 19.3"	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous shale	/ / Limonite, Cu oxide mineral	GC

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
496	A00TM146	37° 59' 55.5'	70° 33' 35.7'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Argillization / Montmorillonite / Limonite	XR
497	A00TM147	37° 59' 55.5'	70° 33' 35.7'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
498	A00TM148	37° 59' 56.6'	70° 33' 35.4'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification, hydrothermal breccia / / Limonite	GC
499	A00TM149	37° 59' 48.7'	70° 33' 05.6'	Campana Mahuida	Pino Andino		Barite-Cu oxide vein	/ / Barite, azurite, malachite	OA
500	A00TM151	38° 12' 35.7'	70° 32' 12.4'	Campana Mahuida	Campana Mahuida	Intrusive	Diorite	/ /	TS, KA
501	A00TM154	37° 59' 52.1'	70° 33' 39.4'	Campana Mahuida	Pino Andino	Intrusive	Granodiorite	Argillization / Sericite / Malachite, pyrite dissemination	XR, GC
502	A00TM155	37° 59' 46.0'	70° 33' 07.2'	Campana Mahuida	Pino Andino	Intrusive	Granodiorite	Argillization / Sericite /	XR
503	A00TM156	37° 59' 46.1'	70° 33' 04.9'	Campana Mahuida	Pino Andino		Limonite-quartz-barite vein	/ / Limonite, Cu oxcide mineral	GC
504	A00TM157	37° 59' 28.3'	70° 33' 07.9'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Argillization, silicification / Sericite / Limonite	XR, GC
505	A00TM158	37° 59' 28.3'	70° 33' 07.9'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
506	A00TM159	37° 59' 31.9'	70° 32' 48.9'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Argillization / Sericite /	XR
507	A00TM160	37° 59' 31.9'	70° 32' 48.9'	Campana Mahuida	Pino Andino		Limonite-silicification vein	Silicification / / Limonite	GC
508	A00TM161	37° 59' 28.7'	70° 32' 41.5'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
509	A00TM162	37° 59' 19.1'	70° 32' 14.2'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
510	A00TM163	38° 00' 21.1'	70° 33' 29.6'	Campana Mahuida	Pino Andino	Intrusive	Porphyritic diorite	/ /	TS
511	A00TM164	37° 59' 54.0'	70° 32' 59.2'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
512	A00TM165	37° 59' 46.0'	70° 32' 58.9'	Campana Mahuida	Pino Andino	JK, Grupo Mendoza	Tuffaceous sandstone	Silicification / / Limonite	GC
513	A00TM166	37° 59' 41.7'	70° 32' 58.7'	Campana Mahuida	Pino Andino		Gossan	Silicification / / Limonite	GC
514	A00TM167	37° 59' 45.3'	70° 32' 50.9'	Campana Mahuida	Pino Andino		Gossan	Silicification / / Limonite, barite	GC
515	A00TM168	37° 59' 44.2'	70° 32' 43.7'	Campana Mahuida	Pino Andino		Gossan	Silicification / / Limonite	GC
516	A00TM169	37° 59' 41.4'	70° 32' 35.5'	Campana Mahuida	Pino Andino		Gossan	/ / Limonite	GC
517	A00TM170	37° 59' 41.6'	70° 32' 35.3'	Campana Mahuida	Pino Andino		Gossan	Silicification / / Limonite	GC
518	A00TM171	37° 59' 54.2'	70° 32' 59.0'	Campana Mahuida	Pino Andino		Gossan	Silicification / / Limonite	GC
519	A00TM172	37° 59' 54.6'	70° 33' 41.3'	Campana Mahuida	Pino Andino	Intrusive	Porphyritic granodiorite	Argillization / / Pyrite, limonite	XR, GC
520	A00TM173	37° 59' 51.2'	70° 33' 33.8'	Campana Mahuida	Pino Andino	Intrusive	Porphyritic granodiorite	/ /	TS
521	A00TM174	37° 59' 52.0'	70° 33' 37.9'	Campana Mahuida	Pino Andino	Intrusive	Porphyritic granodiorite	/ / Malachite, limonite	XR, GC
522	A00RM101	39° 01' 49.4'	70° 32' 06.4'	Nireco	Nireco NE	PTR, Fm. Choiyoi	Rhyolite	Argillization, silicification / / Limonite	XR, GC
523	A00RM102	39° 00' 51.7'	70° 31' 27.2'	Nireco	Nireco NE	PTR, Fm. Choiyoi	Rhyolite	Argillization / / Limonite	XR
524	A00RM103	39° 00' 48.8'	70° 31' 25.2'	Nireco	Nireco	PTR, Fm. Choiyoi	Rhyolite	Weak silicification / / Limonite	TS
525	A00RM104	39° 00' 55.2'	70° 31' 07.1'	Nireco	Nireco	PTR, Fm. Choiyoi	Laminated tuff	Silicification, argillization / /	XR
526	A00RM105	39° 01' 00.2'	70° 31' 09.1'	Nireco	Nireco	PTR, Fm. Choiyoi	Conglomerate, crystal tuff	Argillization, silicification / /	
527	A00RM106	39° 01' 20.7'	70° 31' 41.5'	Nireco	Nireco	PTR, Fm. Choiyoi	Rhyolite	Argillization, silicification / / Limonite	XR, GC
528	A00RM107	39° 12' 47.1'	70° 36' 25.5'	La Voluntad	La Voluntad	CPg, La Voluntad complex	Quartz porphyry	Phyllic / / Limonite, malachite	

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
529	A00RM108	39° 12' 39.3"	70° 36' 26.0"	La Voluntad	La Voluntad	CPg, La Voluntad complex	Quartz porphyry	Silicification / /	TS
530	A00RM109	39° 07' 29.5"	70° 37' 46.8"	La Voluntad	La Voluntad North	Intrusive	Aplite, granite	Tourmalinization / /	XR
531	A00RM110	39° 07' 46.8"	70° 38' 10.8"	La Voluntad	La Voluntad North	Intrusive	Aplite	/ / Limonite, pyrite	XR
532	A00RM111	39° 08' 29.4"	70° 34' 46.8"	La Voluntad	La Voluntad North	PTR, Fm. Choiyoi	Tuff	Silicification, argillization / / Limonite network	XR, GC
533	A00RM112	39° 08' 31.6"	70° 34' 39.6"	La Voluntad	La Voluntad North	PTR, Fm. Choiyoi	Tuff	Silicification, argillization / / Limonite	XR
534	A00RM113	39° 08' 33.7"	70° 34' 46.4"	La Voluntad	La Voluntad North	PTR, Fm. Choiyoi	Tuff with quartz vein	Silicification, argillization / / Limonite	XR, GC
535	A00RM114	39° 08' 33.7"	70° 34' 46.4"	La Voluntad	La Voluntad North	PTR, Fm. Choiyoi	Hydrothermal breccia (float)	Silicification, argillization / / Limonite matrix	GC
536	A00RM115	39° 08' 32.4"	70° 34' 49.6"	La Voluntad	La Voluntad North	PTR, Fm. Choiyoi	Brecciated vein (float)	Silicification, argillization / / Limonite	XR, GC
537	A00RM116	38° 52' 08.9"	70° 47' 45.9"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Tuff breccia	Silicification, argillization, leaching / / Limonite	XR, GC
538	A00RM117	38° 52' 09.0"	70° 47' 47.7"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Alt.rock with quartz veinlet	Silicification, argillization / / Limonite	XR, GC
539	A00RM118	38° 52' 32.6"	70° 48' 09.7"	Palau Mahuida	Cerro Cochico	PTR, Fm. Choiyoi	Altered rock	Silicification, argillization / / Limonite	XR
540	A00RM119	38° 48' 31.5"	70° 39' 03.7"	Palau Mahuida	Palau Mahuida	PC2, Fm. Colohuincul eq.	Quartz vein	/ /	GC
541	A00RM120	38° 46' 42.8"	70° 40' 29.1"	Palau Mahuida	Palau Mahuida (ZA007)	PTR, Fm. Choiyoi	Tuff breccia	Argillization, silicification / / Limonite, pyrite	XR
542	A00RM121	38° 46' 42.7"	70° 40' 28.3"	Palau Mahuida	Palau Mahuida (ZA007)	PTR, Fm. Choiyoi	Jarosite network	/ /	XR, GC
543	A00RM122	38° 46' 38.5"	70° 40' 25.3"	Palau Mahuida	Palau Mahuida (ZA007)	PTR, Fm. Choiyoi	Altered rock	Silicification, argillization, leaching / / Limonite, jarosite, pyrite	GC
544	A00RM123	38° 46' 38.2"	70° 40' 26.0"	Palau Mahuida	Palau Mahuida (ZA007)	PTR, Fm. Choiyoi	Altered rock with quartz veinlet	Silicification, argillization, leaching / / Limonite	GC
545	A00RM124	38° 46' 26.6"	70° 40' 22.0"	Palau Mahuida	Palau Mahuida (ZA007)	PTR, Fm. Choiyoi	Altered rock	Silicification, argillization, leaching / / Limonite, jarosite	XR
546	A00RM125	38° 47' 07.8"	70° 40' 44.0"	Palau Mahuida	Palau Mahuida	PTR, Fm. Choiyoi	Altered rock	Argillization, silicification / / Limonite, jarosite	XR
547	A00RM126	38° 47' 07.9"	70° 41' 09.8"	Palau Mahuida	Palau Mahuida	PTR, Fm. Choiyoi	Altered rock with opal vein	Silicification, argillization / /	XR,GC
548	A00RM127	38° 48' 04.2"	70° 40' 07.0"	Palau Mahuida	Palau Mahuida	PTR, Fm. Choiyoi	Altered rock	Silicification, argillization / / Limonite, jarosite	XR
549	A00RM128	41° 32' 17.5"	71° 08' 50.4"	Rio Foyel	Cerro Carrera east		Oxide Cu ore	/ / Chrysocolla, galena, U mineral	PT, OA
550	A00RM129	41° 32' 17.5"	71° 08' 50.4"	Rio Foyel	Cerro Carrera east	Intrusive	Andesitic dyke (wall rock of RM128)	Propylitic (chlorite, calcite) / /	TS
551	A00RM130	41° 31' 55.6"	71° 09' 12.6"	Rio Foyel	Cerro Carrera east	Fluvial	Earthy limonite mass	/ / Limonite	GC
552	A00RM131	41° 31' 39.7"	71° 08' 07.5"	Rio Foyel	Cerro Carrera east		Granitoid (float)	Argillization, silicification / / Limonite	GC
553	A00RM132	41° 31' 38.5"	71° 09' 07.0"	Rio Foyel	Cerro Carrera east	Tm4, Fm. Nirihuau	Oxide Mn ore (sedimentary)	Argillization / / wad	OA
554	A00RM133	41° 30' 17.2"	71° 12' 08.3"	Rio Foyel	Cerro Carrera east	Kg, Fm. Mamil	Qz vein	/ / Limonite	GC
555	A00RM134	41° 30' 17.2"	71° 12' 08.3"	Rio Foyel	Cerro Carrera east	Kg, Fm. Mamil	Granitoid (wall rock of RM133)	Weak alteration / / Limonite	XR
556	A00RM135	41° 30' 17.7"	71° 12' 04.6"	Rio Foyel	Cerro Carrera east	Kg, Fm. Mamil	Brecciated white alt. Rock	Silicification, argillization / / Limonite	XR
557	A00RM136	41° 30' 19.2"	71° 11' 54.7"	Rio Foyel	Cerro Carrera east	Tal, Fm. Ventana	Rhyolite	Argillization, silicification / / Limonite	XR
558	A00RM137	41° 30' 30.4"	71° 11' 50.5"	Rio Foyel	Cerro Carrera east	Tal, Fm. Ventana	Rhyolite	Weak silicification / / Limonite	XR
559	A00RM138	41° 30' 29.9"	71° 11' 51.3"	Rio Foyel	Cerro Carrera east	Kg, Fm. Mamil	Granitoid	Argillization, silicification / / Limonite	XR
560	A00RM139	41° 30' 26.7"	71° 11' 53.9"	Rio Foyel	Cerro Carrera east	Tal, Fm. Ventana	Rhyolite	Silicification, argillization / / Limonite	GC
561	A00RM140	41° 35' 34.9"	71° 21' 10.4"	Rio Foyel	Rio Foyel		Altered volcanic rock (float)	Silicification, argillization / / Limonite	GC

Appendix-2 Samples taken for the survey.

No.	Sample No.	Latitude(S)	Longitude(W)	District	Locality	Geological unit, Stratigraphy	Rock type	Alteration / POSAM / Mineralization	Analysis type
562	A00RM141	41' 34' 21.3'	71' 21' 28.2'	Rio Foyel	Rio Foyel		Altered granitoid (float)	Silicification / / Limonite, pyrite	PT, GC
563	A00RM142	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel		Altered rock (float)	Silicification / / Limonite	GC
564	A00RM143	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel		Altered volcanic rock (float)	Silicification / / Pyrite, limonite	GC
565	A00RM144	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel		Altered volcanic rock (float)	Argillization, silicification / / Limonite	GC
566	A00RM145	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel		Altered volcanic rock (float)	Silicification / / Pyrite, limonite	GC
567	A00RM146	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel		Altered volcanic rock (float)	Silicification, argillization / / Pyrite, limonite	GC
568	A00PNK101	41' 31' 39.7'	71' 08' 07.6'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
569	A00PNK102	41' 31' 38.5'	71' 09' 07.0'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
570	A00PNK103	41' 31' 42.8'	71' 09' 04.2'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
571	A00PNK104	41' 29' 57.0'	71' 11' 23.6'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
572	A00PNK105	41' 30' 15.4'	71' 08' 13.3'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
573	A00PNK106	41' 30' 16.1'	71' 08' 12.4'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
574	A00PNK107	41' 30' 42.5'	71' 08' 38.3'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
575	A00PNK108	41' 31' 30.1'	71' 09' 00.0'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
576	A00PNK109	41' 31' 53.2'	71' 09' 22.0'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
577	A00PNK110	41' 32' 38.7'	71' 09' 40.4'	Rio Foyel	Cerro Carrera east		Panning concentrated sediments		PCC
578	A00PNK111	41' 34' 21.2'	71' 21' 28.5'	Rio Foyel	Rio Foyel West		Panning concentrated sediments		PCC
579	A00PNK112	41' 37' 34.5'	71' 21' 55.4'	Rio Foyel	Rio Foyel West		Panning concentrated sediments		PCC

Abbreviations

Analysis type

TS : Observation results of thin sections → Appendix-3
PT : Observation results of polished thin sections → Appendix-4
XR : Powdery X-ray diffraction results → Appendix-5
GC : Bulk chemical analysis results for the geochemical survey : 27elements+Au (codeT27+494) → Appendix-6
PC : Bulk chemical analysis results including PGM elements for the geochemical survey : 27elements+PGE (codeT27+G15) → Appendix-7
WR : Bulk chemical analysis results for the petrochemical study : whole rock analyses major & trace elements (codeA413+A390) → Appendix-8
PCC : Chemical analysis results for pan concentrated samples → Appendix-9
OA : Ore grade assay results : 24elements+Au (code A22+999) → Appendix-10
FI : Homogenization temperatures and salinities of fluid inclusions → Appendix-11
DS : Measurement results of sulfer isotope composition → Appendix-12
DO : Measurement results of oxygen isotope composition → Appendix-13
KA : K-Ar radiometric measurement results → Appendix-14

Geological unit, Stratigraphy

Fm. : Formation
Gr. : Group

Mineralizations

qz : quartz
py : pyrite
cp : chalcopyrite
gn : galena
sp : sphalerite
bo : bornite
mo : molybdenite
diss. : dissemination

Appendix-3 Observation results of thin sections

No.	Sample No.	Rock Type	primary minerals															secondary minerals											Note
			qz	pl	kf	bt	mu	ho	opx	cpx	ol	ga	sp	zi	ap	op	gl	to	qz	chl	seri	serp	tc	ep	ca	op	saus	cly	amph	smec	(others)
1	A00NK014	Muscovite bearing biotite granite	◎	◎	◎	○	△													△						△	△				Coarse-grained and heterogeneous
2	A00NK018	Aphyric rhyolite?		△													◎		○							△		△			Strongly silicified
3	A00NK025	Biotite hornblende granite(Quartz monzonite or adamellite)	◎	◎	◎	○		○							△	△				△				△			△				
4	A00NK048	Rhyolitic tuff	○	○	△	△										△	◎		○						△	△	△	△			Air fall deposit, lithic of rhyolite(△)
5	A00HH013	Granite porphyry	◎	○	△	△										△			○	△						△					Dyke
6	A00HH060	Aphyric basalt	○	◎	△					◎					△	◎	△			△											Small dyke or sill
7	A00MZ013	Hornblende dacite	◎	◎				◎							△	△			○	○					△	△					Dyke?
8	A00MZ015	Biotite hornblende granodiorite porphyry	◎	◎	△	○		○					△		△	△				○				△							Dyke or small intrusion
9	A00MZ018	Hornblende granodiorite porphyry	◎	◎	△	○		○					△		△	○				○				△							Dyke or small intrusion
10	A00MZ022	Biotite granite(quartz monzonite or adamellite)	◎	◎	◎	○							△	△	△	△			△	◎	△					○	◎				
11	A00MZ032	Biotite hornblende granodiorite	◎	◎	○	○		◎					△	△	△	○			△	○				○			◎				
12	A00MZ044	Olivine augite basalt	○	◎	△					◎	△				△	○	△		△	◎					◎					◎	Dyke or sill
13	A00MZ065	Basaltic lapilli tuff		○													◎		◎	◎	◎					○				○	lithic of basalt (◎)
14	A00TM006	Granophyre	◎	○	◎	△										△										△	△				Dyke
15	A00TM009	Biotite hornblende granodiorite porphyry	◎	◎	○	○		◎					△		△	○				○											Dyke or small intrusion
16	A00TM017	Porphyritic andesite	◎	◎																				◎					◎		Dyke, strong metasomatic replacement
17	A00TM018	Hornblende biotite granite (quartz monzonite or adamellite)	◎	◎	◎	◎		○					△		△	△			○	◎				○		○	◎				
18	A00TM019	Hornblende andesite	◎	◎				○												◎				◎		△			◎		Highly porphyritic,30−40% phenocryst
19	A00TM020	Hyperthene biotite hornblende tonalite(quartz diorite)	◎	◎	○	○			◎					△	△	○				○											
20	A00TM023	Olivine basalt		◎	△					◎	○					◎															
21	A00TM030	Hornblende biotite tonalite(quartz diorite)	◎	◎	△	○		○					△		△	○				◎				△			◎				
22	A00RM013	Hornblende biotite tonalite(quartz diorite)	◎	◎	○	◎		◎					△	△	△	△				◎				○		△	◎				
23	A00RM025	Porphyritic andesite		◎						△						△	○		○	◎						○	◎	◎			
24	A00RM031	Thermally metamorphosed sandstone	◎			◎																									
25	A00RM032	Biotite hornblende dacite	◎	◎	△	○		○								○			◎	◎				◎		◎					Dyke or small intrusion
26	A00RM038	Granite porphyry	◎		◎														◎							△					Dyke, strong silicification
27	A00RM048	Hornblende andesite		◎				◎									○		◎							◎	◎				
28	A00RM049	Aphyric rhyolite?															◎		◎												strong silicification
29	A00RM060	Lapilli tuff	△														◎		○												strong silicification, lithic of silicified rock(○)
30	A00NK104	Conglomerate (-coase sandstone)	◎	◎	△	△										·			○	△								○			Andesite fraguments (◎)
31	A00NK105	Quartz porphyry	◎	△												·			◎		△										Highly altered
32	A00NK109	Biotite granodiorite	◎	◎	○	○							·	·		△				◎				○	△						allanite(·)
33	A00NK110	Muscovite tourmaline aplite	◎	○	◎		△											○													
34	A00NK137	Porphyritic andesite	◎	◎												○	◎		◎	○	○										
35	A00NK144	Dacitic welded tuff	○	○												△	◎														Andesite fraguments (◎)
36	A00NK147	Augite bearing hornblende biotite granodiorite	◎	◎	○	○		○		△					△	○				◎										◎	
37	A00NK148	Hornblende syenite porphyry	◎	△	◎			△		△			△			△			◎												
38	A00NK151	Hornblende biotite quartz monzonite	◎	◎	◎	○		○								○			○	◎	○				○						

Appendix-3 Observation results of thin sections

No.	Sample No.	Rock Type	primary minerals														secondary minerals											Note
			qz	pl	kf	bt	mu	ho	opx	cpx	ol	ga	sp	zi	ap	op	gl	to	qz	chl	seri	serp	tc	ep	ca	op	saus	cly	amph	smec	(others)
39	A00HH102	Altered rock (Granitic plutonic ?)	◎	◎		△										△			◎	○	◎									
40	A00HH105	Tourmaline-quartz-sericite-rock	◎													△		◎			◎									
41	A00HH128	Quartz porphyry	○	◎												△			◎	○	◎									
42	A00HH132	Quartz porphyry	◎	◎												○			◎		◎				◎					
43	A00MZ103	Granodiorite porphyry	◎	◎	○	△										△				◎	○			○						
44	A00MZ107	Muscovite biotite granodiorite porphyry	◎	◎	○	○	△									△			◎	○	◎									
45	A00MZ114	Biotite granodiorite	◎	◎	○	△							△			○			◎	◎				○	○					
46	A00MZ130	Augite bearing basalt (aphyric basalt)		◎						◎						◎	○		○	◎	○			○						
47	A00MZ137	Biotite hornblende quartz gabbro	△	◎	△			◎								○				◎	○			○						
48	A00MZ139	Augite and olivine bearing basalt (aphyric basalt)		◎						◎	△					◎				○					○					
49	A00TM106	Hypersthene bearing hornblende andesite	○	◎	○				△	△						○	◎		○	○									○	
50	A00TM110	Biotite hornblende granophyre	◎	◎	○	△		○							△	○			◎	◎				◎						
51	A00TM125	Biotite bearing hypersthene hornblende dacite	◎	◎		△		◎	○							○	◎		○	○	○			○						
52	A00TM151	Augite biotite hornblende quartz diorite	○	◎	△	△		○	△	○						○														very fresh
53	A00TM163	Hornblende dacite	◎	◎				○								○			◎	○	○				◎					
54	A00TM173	Hornblende dacite	◎	○				○								◎			◎	◎	○				◎					
55	A00RM103	Hornblende rhyolite	◎	○				△								◎			◎	○										
56	A00RM108	Biotite granophyre	◎	○	◎		○																							fresh
57	A00RM129	Olivine basalt		◎							○					△	◎			○					◎			◎		

Legend; ◎,abundant; ○, common; △, minor; ・ rare

qz:quartz, pl:plagioclase, kf:k-feldspar, bt:biotite, mu:muscovite, ho:hornblende, opx:ortho pyroxene, cpx:clino pyroxene, ol:olivine, ga:garnet, sp:sphene, zi:zircon, ap:apatite, op:opaque minerals (mainly iron oxide), gl:glass, to:tourmaline

chl:chlorite, seri:sericite, serp:serpentine, tc:talc, ep:epidote, ca:carbonate mineral (mainly calcite), saus:saussurite, cly:clay minerals, amph:amphibole, smec:smectite

Appendix-4 Observation results of polished-thin sections.

No.	Sample No.	Rock Type	primary minerals															secondary minerals										ore minerals					Note
			qz	pl	kf	bt	mu	ho	opx	cpx	ol	ga	sp	zi	ap	op	gl	to	qz	chl	seri	serp	tc	ep	ca	op	cly	smec	py	cp	sph	gal	mt	(others)
1	A00NK019	Porhyritic andesite(dacite)	◎	◎	△														◎					○		◎			○	△	◎	◎		gal=sph>py>cp
2	A00NK039-1	Silicified rock																	◎							○	△		△				·	py>mt
3	A00NK041	Olivine dolerite		◎	△	△				◎	○					△										○			△	·				py>cp
4	A00HH002	Carbonate mineral-quartz-ore mineral rock																	◎						△	◎			◎	△	○	◎		py>gal>sph>cp
5	A00HH024	Porphyritic andesite(dacite)	◎	◎															◎					○		◎			◎	△	○	◎		py>gal>sph>cp
6	A00HH063	Chlorite-ore minerals-quartz rock																	◎	◎						◎			△		◎	○		sph>gal>py
7	A00MZ016	Carbonate mineral-ore minerals-quartz rock																	○						○	○			◎	△		○		py>gal>cp
8	A00MZ030	Ore minerals-quartz rock																	◎					△		◎			○	△	◎	○		sph>py>gal>cp
9	A00MZ038	Andestic lapilli tuff	△	◎												△			◎	◎				◎	◎	·			·					lithic of andesite(◎)
10	A00MZ042	Ore minerals-quartz rock																	◎							◎			△		◎	○		sph>gal>py
11	A00RM029	Nearly aphyric andesite	◎	◎															◎					○		◎			△		◎	◎		sph=gal>py
12	A00RM033	Biotite hornblende dacite	◎	◎		△		○								△				○	△			◎		◎			○	△				Dyke or small intrusion, similar to A00RM032
13	A00RM040	Ore minerals-quartz rock																	◎					△	△	◎			·	○	△			cp>sph
14	A00RM042	Pebble conglomerate																	◎	◎	◎					·							·	intensely altered, clast of tonalite(◎)
		Tonalite	◎	◎	△	△							△						○	◎	◎													Pebble in conglomerate
15	A00RM057	Olivine dolerite		◎	△	△				○	○					△					○	○				○		○		·			△	sill
16	A00RM058	Inverted pigeonite/augite dolerite	△	◎	△	△				◎										△						△							△	sill
17	A00NK132	Hornblende dacite (?)		△				△											◎								◎		○						
18	A00HH110	Quartz porphyry (?)	△	△	△	△	△												◎		◎												·	
19	A00HH116	Opaque mineral-tourmaline-quartz-rock																◎	◎										·				△	
20	A00HH121	Opaque mineral-quartz-rock (Quartz vein)																	◎		○								◎	△			·	
21	A00HH126	Andesite	△	△															◎					◎					△				·	
22	A00MZ108	Biotite granodiorite porphyry	◎	◎	○	○														◎	△				○							△		
23	A00MZ125	Quartz-opaque mineral-rock																	◎					△					○					
24	A00TM133	Hornblende andesite	△	◎				○									◎		◎	◎	◎				◎				·					
25	A00TM138	Tuffaceous sandstone ? (altered rock)	◎	△													◎		◎		△						◎						·	
26	A00TM142	Fine sandstone	◎	△																							◎		○	·				
27	A00RM128	Andesite	△	○													◎		◎	○				◎										Bornite(◎), Chalcocite(◎)
28	A00RM141	Biotite granitic rock	◎	◎	○	○													◎	○	◎								○	·				

Legend; ◎,abundant; ○, common; △, minor; ·rare

qz:quartz, pl:plagioclase, kf:k-feldspar, bt:biotite, mu:muscovite, ho:hornblende, ol:olivine, opx:ortho pyroxene, cpx:clino pyroxene, ga:garnet, sp:sphene, zi:zircon, ap:apatite, op:opaque mineral, gl:glass, to:tourmaline
chl:chlorite, seri:sericite, serp:serpentine, tc:talc, ep:epidote, ca:carbonate mineral (mainly calcite), cly:clay minerals, smec:smectite
py:pyrite, cp:chalcopyrite, sph:sphalerite, gal:galena, mt:magnetite

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
1	A00NK004	Granite	29				33				0.7				0.7														
2	A00NK005	Granite	15					4.7	1		0.7				1.7														
3	A00NK006	Rhyolite	33									16																	
4	A00NK012	Sandstone	48								13																		
5	A00NK026	Pegmatite	38					7			7.3					1.7													
6	A00NK030	Schist	25								6.3																		
7	A00NK031	Rhyolite	50								3.3																		
8	A00NK033	Qz vein	28				19	5			1																		
9	A00NK034	Granodiorite porphyry	22				23	3			5.7					2													
10	A00NK037	Granodiorite	33								20																		
11	A00NK039	Andesite	26					4.7			2																		
12	A00NK044	Rhyolite?	37													2	13												
13	A00NK046	Porphyritic andesite	13				19				< 1				1.3														
14	A00NK047	Andesite	64					0.7																					Anatase 4
15	A00NK049	Dacite	29					5.7			2																		
16	A00HH004	Altered rock	32								5																		
17	A00HH007	Altered rock	9.5			17																							? 1
18	A00HH013	Dacite	27				30	6.3					1.3																
19	A00HH019	Silicified rock	24					10								0.7													
20	A00HH022	Granite	26				26	15			0.7		3.3																
21	A00HH023	Altered rock	37					3.3																					Ser/Mon 2
22	A00HH027	Altered rock	9.5				31		1		1.7		1.3																
23	A00HH028	Altered granite	31				2.3						< 1					6											Prehnite 6
24	A00HH034	Andesite	2.9				14						5																
25	A00HH043	Andesite	34								2.3										1								
26	A00HH044	Altered rock	76								0.7										1.3								
27	A00HH050	Altered rock	4.8				12				2.3							3.3											
28	A00HH054	Altered rock	30								6																		
29	A00HH057	Altered rock	43													17													
30	A00HH062	Andesite	10					7.7					5																

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
31	A00MZ003	Dacite	23								8.3		2.7						4.7		1.3								
32	A00MZ004	Pebble dyke	18				10	14																					
33	A00MZ024	Volcanic rock	28					10																					
34	A00MZ058	Silicified rock	36								5.3																		
35	A00TM003	White altered rock	28									12																	
36	A00TM008	Shale	29					3.7								1.7								2.3					
37	A00TM011	Shale	25								1					13													
38	A00TM015	Granite?	24				6.7				1.3					2.3					1								
39	A00TM016	Granite?	33				6																						
40	A00TM027	Lapilli tuff	45				6	3																					
41	A00TM032	Tonalite	28				24						1.7																
42	A00TM033	Argillic vein	21				0.7				1.7		1.3					5	16										
43	A00TM037	Rhyolite	50					2.3			6.3					2													
44	A00TM043	Granodiorite	60								3.7																		
45	A00TM046	Andesite	27					1.3																					Ser/Mon 3
46	A00TM047	Andesite	12					3.3					1.7																
47	A00TM050	Andesite?	15					5.7			1.3																		
48	A00TM055	Altered rock	40													17													
49	A00TM057	Altered rock	53													5	1												Anatase 1
50	A00TM058	Altered rock	49													10													
51	A00TM060	Altered rock	42					4.3					0.7																
52	A00TM062	Altered rock	29				14				2																		
53	A00TM067	Altered rock	49								3.3					0.7													
54	A00RM005	Volcaniclastic rock	14				22	6.3																					
55	A00RM007	Volcanic rock	31					4			3.3					0.7													
56	A00RM022	Volcaniclastic rock	20					2.7			1.3																		
57	A00RM023	Volcaniclastic rock	32					6			0.7																		
58	A00RM024	Volcaniclastic rock	20				35	5								1													
59	A00RM028	Andesite?	21				16	3.7					1.3																
60	A00RM030	Tonalite	10			12			2.7				2.7																

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
61	A00RM033	Andesitic dyke	25			12							4																
62	A00RM034	Rhyolite	32				3.3	4.3			2.3					1.7													
63	A00RM035	Rhyolite	31					6.3			4					1													
64	A00RM040	Granodiorite/Porphyry	43								15					1.3													
65	A00RM041	Breccia pipe	82																										
66	A00RM059	Sed. Rock	22													19													
67	A00RM062	Sed. Rock (Float)	2.9													40													
68	A00RM063	Sed. Rock	8.6													68													
69	A00RM065	white altered rock	26				16				1.3																		
70	A00RM067	white altered rock	58																										
71	A00RM068	white altered rock with qz pheno.	32								2.3		5.3																
72	A00NK102	Rhyolite	49				14	6								< 1													
73	A00NK107	Quartz porphyry	30				10				9																		
74	A00NK108	Grnitoid	34				8	1			12		1																
75	A00NK111	Granitoid	40				39									1													
76	A00NK112	Granitoid	22				6	1			< 1																		
77	A00NK114	Rhyolitic tuff	40				7	6											1										
78	A00NK115	Rhyolitic lapili tuff	47				1	7								2													
79	A00NK116	Andesite	30				8	3			< 1		1																
80	A00NK118	Andesitic tuff breccia	32				13	4			1		2						2										
81	A00NK120	Rhyolitic tuff	50				4	6			< 1								1										
82	A00NK121	Andesitic tuff	29			6		4			< 1																		
83	A00NK122	Rhyolitic tuff	36				10	8					< 1						1										
84	A00NK123	Undefined	22				11								1			4	1										
85	A00NK124	Rhyolitic tuff	42					7																					
86	A00NK125	Rhyolitic tuff	30					12																					
87	A00NK127	Rhyolitic lapili tuff	37				3	7			1																		
88	A00NK128	Rhyolitic tuff breccia	35				12	5			< 1								< 1										
89	A00NK129	Rhyolite	28					13																					
90	A00NK131	Tuff	34				7	5							1														

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
91	A00NK132	Undefined	58																		1								
92	A00NK133	Andesite	11			7		2					2		1														
93	A00NK135	Undefined	79													8													
94	A00NK140	Undefined	8			14		5							1						< 1								
95	A00NK141	Undefined	21			6		6							1				2		1								
96	A00NK142	Undefined	87																										
97	A00NK143	Dacite		16												5													
98	A00NK145	Undefined	31			27		7																					
99	A00HH102	Altered rock, hydrothermal breccia	33				8				5		8																
100	A00HH103	Altered rock	25				2	13			2					2													
101	A00HH104	Andesite	31								11															1			
102	A00HH105	Hydrothermal breccia	42								11																		
103	A00HH106	Altered rock, hydrothermal breccia	59								9																		
104	A00HH107	Altered rock	66								3																		
105	A00HH108	Altered rock	35				28				7																		
106	A00HH109	Cu oxide ore	34								18		< 1																
107	A00HH112	Altered granite	30			14							4																
108	A00HH113	Altered rock with clay vein	4										2					30	5										
109	A00HH114	Andesite	22				6				1		6								1								
110	A00HH121	Quartz-sulfide vein	25								4																		
111	A00HH122	Quartz porphyry	55								7																		
112	A00HH128	Quartz porphyry	35				22				6					1			1										
113	A00HH130	Silicified tuff	36				14				4					1													
114	A00HH132	Acidic tuff	29				20	4			1					1			1										
115	A00MZ101	Silicified rock	44				5				6		2																
116	A00MZ102	Silicified rock	30					11			2		1																
117	A00MZ104	Hydrothermal breccia	54								9																		
118	A00MZ105	Quartz porphyry	49				4				16																		
119	A00MZ106	Silicified rock	48				< 1	8			1																		
120	A00MZ109	Altered granitoid	42								19																		

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
121	A00MZ110	Quartz porphyry	34				9				8		< 1																
122	A00MZ111	Quartz porphyry	31				2				11																		
123	A00MZ113	Altered volcancs	26				6				2				1														
124	A00MZ115	Altered volcancs	16				25				< 1		3																
125	A00MZ117	Altered volcancs					7				1		< 1		1						< 1								
126	A00MZ118	Zeolite vein	34										1					11	2										
127	A00MZ121	Altered volcancs (tailing)	12				13	1					3								1								
128	A00MZ124	Silt	30			4		3			2		1																
129	A00MZ126	Quartz porphyry	26			18		10			1		< 1																
130	A00MZ129	Andesite	15				16	2					4						16										
131	A00MZ132	Andesitic tuff breccia	35				1																						
132	A00MZ134	Andesitic rock	26				11	2					3																
133	A00MZ143	Quartz vein (float)	76				8						1																
134	A00MZ146	Silicified rock	1			6		3	1				< 1																
135	A00MZ149	Silicified rock	38				4				3		2																
136	A00TM101	Altered rock	33			12		4			< 1				1														
137	A00TM104	Altered rock	24				22				1		< 1								2								
138	A00TM105	Altered rock	31				13				1				1											1			
139	A00TM107	Granodiorite	36								4		2																
140	A00TM108	Granodiorite	35					14			< 1		< 1																
141	A00TM111	Granodiorite	40								6		1																
142	A00TM113	Rhyolitic tuff	49								4																		
143	A00TM114	Tuff	55								4																		
144	A00TM115	Tuff	52								3																		
145	A00TM116	Tuff breccia	61								3.7																		
146	A00TM117	Altered rock	20				10	3.7					2																
147	A00TM120	Altered rock	31									23																	
148	A00TM121	Altered rock	77					3			1.3															< 1			
149	A00TM122	Dacitic andesite	18				24																			2.3			
150	A00TM124	Dacitic andesite	38								3.3																		

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
151	A00TM126	Dacite	40				2.3				2.7					1.3													
152	A00TM128	Shale	52				5	1.7																					
153	A00TM129	Sandstone	43			9		5.3																					
154	A00TM131	Sandstone	0.7			< 1													37										
155	A00TM132	Andesite	10				39				< 1		0.7						10										
156	A00TM135	Andesite	6.3				33																						
157	A00TM136	Tuff breccia	1.7				19				< 1															2			
158	A00TM137	Andesite	43								7.3																		
159	A00TM138	Altered rock	28				18				1																		
160	A00TM140	Sandstone	42				35	6.3																					
161	A00TM141	Shale	15				10						5.7						11										
162	A00TM142	Sandstone	9				3.7														14								
163	A00TM144	Tuffaceous shale	30								2.3				1.7	1.7													
164	A00TM146	Tuffaceous sandstone	47								2.7		0.7																
165	A00TM154	Granodiorite	26								5					1.3													
166	A00TM155	Granodiorite	36								3.7																		
167	A00TM157	Tuffaceous sandstone	48								2.3					2.3													
168	A00TM159	Tuffaceous sandstone	43					1.3			8																		
169	A00TM172	Porphyritic granodiorite	42								9.3																		
170	A00TM174	Porphyritic granodiorite	27			7.3					2		2.3																
171	A00RM101	Rhyolite	36					11								< 1			1										
172	A00RM102	Rhyolite	33				14	5.7								< 1													
173	A00RM104	Laminated tuff	31				12	4.3											< 1										
174	A00RM106	Rhyolite	43				12	4.5											< 1										
175	A00RM109	Aplite, granite	34				22	21			1								1.7										
176	A00RM110	Aplite	50				20	18			1								0.7										
177	A00RM111	Tuff	37				11	4											< 1										
178	A00RM112	Tuff	44				6.3	6											0.7										
179	A00RM113	Tuff with quartz vein	19				4.3	5.3			< 1					1.3													
180	A00RM115	Brecciated vein (float)	35				4.7	2.3			< 1																		

Appendix-5 Powdery X-ray diffraction results.

No.	Sample	Rock	Silicas			Silicates													Carbonates		Sulfides			Sulfates			Others		Note
			Quartz	Cristobalite	Tridymite	Plagioclase	Albite	K-feldspar	Hornblende	Biotite	Sericite	Pyrophylite	Chlorite	Chlorite/Montmorironite	Montmorironite	Kaoline	Alunite	Laumontite	Calcite	Dolomite	Pyrite	Galena	Sphalerite	Gypsum	Barite	Jarosite	Diaspore		
181	A00RM116	Tuff breccia	33				12	4.3			< 1								< 1										
182	A00RM117	Alt.rock with quartz veinlet	41				13	2																					
183	A00RM118	Altered rock	33					12																					
184	A00RM120	Tuff breccia	58					3.3								1													
185	A00RM121	Jarosite network																								11			
186	A00RM124	Altered rock	18			8.3		7.7			< 1															< 1			
187	A00RM125	Altered rock	31				6.7	5							1.3											< 1			
188	A00RM126	Altered rock with opal vein	66																										
189	A00RM127	Altered rock	10				27	11			< 1				0.7											< 1			
190	A00RM134	Granitoid (wall rock of RM133)	40				3.3				3.3		4																
191	A00RM135	Brecciated white alt. Rock	37				10				1																		
192	A00RM136	Rhyolite	37				11	5.3			1																		
193	A00RM137	Rhyolite	34				11	4.3			0.7																		
194	A00RM138	Granitoid	35				22	12			2																		

numerical data is quartz index which is relative strength against the standard quartz sample.

Appendix-6 Bulk chemical analysis results for the geochemical survey.

No.	Sample	Rock	Au (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
1	A00NK001	Andesite	0.035	6	4.4	50	<0.2	8.9	630	0.5	<2	0.08	<0.5	3	22	270	4.47	3.19	0.38	20	8	0.4	6	120	14	32	0.08	106	30	50
2	A00NK002	Qz vein	<0.005	<1	0.2	<10	<0.2	0.54	130	<0.5	<2	0.03	<0.5	1	13	6	0.25	0.09	0.04	665	1	0.03	1	50	2	11	0.01	9	<10	18
3	A00NK003	Silicified rock	<0.005	<1	0.2	<10	<0.2	0.54	70	<0.5	<2	0.01	<0.5	<1	33	1	0.06	0.15	0.01	10	8	0.03	<1	10	2	6	0.08	3	<10	8
4	A00NK007	Iron ore	<0.005	27	0.8	60	<0.2	1.51	200	<0.5	<2	0.37	15	26	11	77	>25.0	0.26	0.44	3350	1	0.23	25	460	26	27	0.04	51	<10	1670
5	A00NK010	Iron ore	0.01	42	0.4	30	<0.2	0.79	50	<0.5	<2	0.19	<0.5	<1	9	20	>25.0	0.08	0.09	150	15	0.05	7	760	6	21	0.01	88	<10	94
6	A00NK015	Qz vein	<0.005	6	0.2	10	0.2	0.27	10	<0.5	<2	0.02	<0.5	<1	18	11	0.27	0.12	0.01	15	<1	0.03	<1	40	2	7	<0.01	3	<10	12
7	A00NK016	Dacite	<0.005	12	1.4	<10	<0.2	1.45	70	<0.5	2	0.03	<0.5	<1	16	18	0.96	0.64	0.04	60	48	0.04	<1	80	6	15	0.02	7	<10	14
8	A00NK017	Dacite	<0.005	10	0.2	<10	<0.2	5.27	640	0.5	<2	0.03	<0.5	1	9	5	0.26	6	0.01	15	<1	0.18	<1	80	8	54	0.04	3	<10	8
9	A00NK020	Qz Vein	0.075	<1	<0.2	10	1.4	0.82	70	<0.5	<2	0.28	2.5	5	17	83	0.4	0.26	0.12	1495	<1	0.04	3	50	508	31	0.01	16	<10	224
10	A00NK021	Granite	<0.005	13	0.6	<10	0.2	7.53	70	0.5	<2	4.52	<0.5	19	13	3	4.63	0.42	1.48	540	1	2.21	6	850	16	364	0.36	150	<10	40
11	A00NK023	Tourmaline breccia	<0.005	5	0.2	<10	0.2	8.32	210	1.5	<2	1.35	<0.5	4	9	21	1.3	0.98	0.38	280	<1	3.93	<1	570	20	246	0.16	13	<10	44
12	A00NK027	Qz vein	<0.005	8	0.8	<10	<0.2	0.15	130	0.5	<2	0.04	<0.5	1	18	5	0.36	0.07	0.01	55	709	0.04	<1	30	2	21	<0.01	8	<10	8
13	A00NK028	Qz vein	<0.005	2	<0.2	<10	<0.2	0.44	30	0.5	<2	0.04	<0.5	<1	20	<1	0.2	0.18	0.03	40	138	0.03	3	60	2	9	<0.01	9	<10	8
14	A00NK029	Rhyolite	<0.005	<1	<0.2	<10	<0.2	<0.01	550	1.5	<2	4.89	2	8	15	364	9.59	3.51	0.8	<5	3	<0.01	9	730	<2	679	0.36	153	10	32
15	A00NK032	Flaky qz	<0.005	22	1.2	<10	<0.2	2	50	1.5	<2	0.04	<0.5	2	12	37	2.99	0.77	0.16	145	54	0.06	<1	250	2	47	0.01	50	<10	8
16	A00NK033	Qz vein	<0.005	<1	<0.2	<10	<0.2	0.61	10	0.5	<2	0.02	<0.5	<1	15	<1	0.06	0.17	0.03	15	194	0.19	<1	<10	<2	15	<0.01	1	<10	4
17	A00NK034	Granodiorite porphyry	0.015	<1	0.2	<10	0.8	8.02	490	1.5	<2	0.66	<0.5	8	15	1635	1.46	2.86	0.34	300	13	2.32	10	560	16	187	0.09	46	<10	28
18	A00NK035	Qz vein	<0.005	1	<0.2	<10	2	0.17	30	<0.5	<2	0.01	<0.5	<1	10	15	0.09	0.1	<0.01	5	1	0.03	<1	10	<2	9	<0.01	1	<10	2
19	A00NK036	Qz vein	<0.005	18	0.2	<10	1.2	0.15	10	<0.5	<2	0.01	<0.5	1	18	115	2.86	0.04	<0.01	10	41	0.03	<1	80	2	15	<0.01	24	10	2
20	A00NK040	Andesite? (Float)	<0.005	4	<0.2	<10	0.2	9.36	150	<0.5	<2	0.44	<0.5	19	124	149	6.91	0.67	3.45	805	4	4.54	32	620	10	72	0.13	220	<10	74
21	A00NK045	Andesite	<0.005	<1	<0.2	30	<0.2	0.09	3490	<0.5	<2	<0.01	<0.5	1	41	4	0.06	0.03	0.01	5	<1	<0.01	<1	30	<2	19	0.48	14	<10	2
22	A00NK047	Andesite	<0.005	3	<0.2	20	<0.2	0.24	70	<0.5	<2	0.01	<0.5	1	22	5	0.05	0.04	0.01	<5	<1	<0.01	<1	10	2	14	0.71	3	<10	2
23	A00HH004	Altered rock	0.01	13	<0.2	10	0.2	5.87	450	1	<2	0.01	<0.5	3	10	38	2.7	2.68	0.3	150	56	0.23	<1	90	10	26	0.09	17	10	22
24	A00HH013	Dacite	0.015	3	0.2	40	0.2	7.02	320	1.5	<2	0.27	<0.5	6	10	239	0.9	2.38	0.39	110	3	3.84	1	130	10	76	0.09	29	<10	16
25	A00HH016	Silicified rock	<0.005	13	0.6	<10	<0.2	6.84	340	0.5	<2	0.49	<0.5	5	15	1	0.46	1.7	0.16	130	<1	2.94	<1	320	16	91	0.15	50	<10	74
26	A00HH019	Silicified rock	<0.005	203	3.4	<10	0.2	6.49	810	0.5	<2	0.03	<0.5	2	8	3	1.51	6.73	0.02	35	<1	0.17	<1	160	10	68	0.15	17	<10	10
27	A00HH028	Altered granite	<0.005	6	<0.2	<10	<0.2	7.68	10	2	<2	4.4	<0.5	3	17	1	0.63	0.29	0.49	215	<1	3.38	1	530	8	101	0.31	58	<10	22
28	A00HH034	Andesite	<0.005	10	<0.2	<10	<0.2	8.34	480	0.5	<2	2.71	<0.5	23	28	1175	5.36	1.33	2.48	1075	<1	3.69	5	1100	2	261	0.67	235	<10	86
29	A00HH037	Granite with py (float)	0.005	7	<0.2	<10	0.2	8.53	440	0.5	<2	3.14	<0.5	20	7	355	2.77	1.09	1.05	285	<1	2.88	<1	890	2	351	0.27	76	<10	22
30	A00HH039	Pyroclastics with py (float)	<0.005	13	<0.2	<10	0.2	9.33	150	1.5	<2	2.56	<0.5	9	20	41	3.25	0.63	0.19	250	<1	5.03	3	670	18	426	0.49	128	<10	38
31	A00HH044	Altered rock	0.59	9	<0.2	<10	2.6	3.49	70	<0.5	8	0.07	<0.5	28	11	594	5.85	1.44	0.18	150	13	0.07	2	320	78	16	0.13	67	70	26
32	A00HH047	Altered rock	<0.005	20	3	340	<0.2	7.8	670	<0.5	<2	0.28	<0.5	6	16	13	2.87	0.63	0.14	95	<1	1.61	<1	990	10	488	0.52	128	<10	16
33	A00HH060	Andesite	<0.005	19	0.8	<10	<0.2	8.02	340	0.5	2	4.93	<0.5	23	3	35	6.44	1.06	2.17	1195	<1	2.67	<1	2830	6	786	0.96	319	<10	82
34	A00MZ001	Rhyolite	0.02	23	1	190	0.2	6.56	450	0.5	<2	0.34	<0.5	2	9	74	3.48	2.87	0.49	35	1	0.18	<1	360	4	31	0.12	88	20	2
35	A00MZ002	Volcanic rock	0.01	35	0.4	120	<0.2	10.2	900	1	<2	0.22	<0.5	3	3	117	4.17	3.4	0.34	30	<1	0.39	<1	310	14	160	0.2	182	10	2
36	A00MZ003	Dacite	0.52	82	<0.2	<10	0.8	8.06	360	0.5	<2	3.21	<0.5	5	1	1	1.5	3.4	0.65	4190	<1	0.22	<1	510	52	56	0.13	42	<10	30
37	A00MZ004	Pebble dyke	<0.005	18	0.2	10	0.2	6.68	890	2	<2	0.48	<0.5	4	7	83	1.91	4.33	0.07	235	<1	1.8	<1	150	20	56	0.14	34	<10	30
38	A00MZ005	Volcanic rock	<0.005	119	1.2	30	0.4	6.23	370	0.5	2	3.35	<0.5	7	6	110	4.05	2.16	0.07	630	<1	2.73	<1	1550	10	32	0.95	105	<10	28
39	A00MZ006	Volcanic rock	<0.005	9	<0.2	<10	0.4	7.71	930	1.5	<2	0.04	<0.5	2	3	29	0.82	4.98	0.43	125	<1	0.34	<1	220	32	20	0.05	12	<10	20
40	A00MZ007	Volcanic rock	0.165	44	4.4	4480	71.8	4.25	480	0.5	<2	0.01	<0.5	2	6	23	3.53	2.56	0.15	20	1	0.12	<1	20	88	20	0.03	3	<10	6
41	A00MZ008	Mudstone	<0.005	3	<0.2	<10	0.8	7.03	70	1	6	1.82	<0.5	18	26	362	5.21	0.48	0.49	85	1	3.2	35	1030	8	294	0.31	76	<10	14
42	A00MZ009	Granite	<0.005	8	0.2	10	0.4	10.9	120	1	<2	2.56	1.5	5	5	41	0.56	1.99	0.18	235	<1	3.76	<1	620	32	307	0.07	41	<10	100
43	A00MZ022	Granite	<0.005	30	0.2	<10	1.8	7.24	310	3.5	<2	0.5	<0.5	6	10	210	1.96	3.16	0.38	500	<1	2.32	1	580	52	158	0.23	28	<10	128
44	A00MZ023	Volcanic rock	<0.005	26	0.2	10	0.4	7.05	470	0.5	<2	0.15	<0.5	3	10	7	1.72	3.15	0.33	70	<1	1.46	<1	370	36	41	0.34	53	<10	12
45	A00MZ024	Volcanic rock	<0.005	1030	0.8	<10	<0.2	7.04	1460	1	<2	0.03	<0.5	1	5	<1	0.22	6.63	0.03	5	<1	0.7	<1	180	34	56	0.07	9	<10	2
46	A00MZ025	Volcanic rock	<0.005	3	<0.2	<10	0.2	7.8	690	0.5	<2	0.08	<0.5	2	4	<1	0.18	4.62	<0.01	75	<1	2.12	<1	310	12	40	0.08	17	<10	2
47	A00MZ026	Vein ore	<0.005	55	8.6	<10	7.6	5.77	100	1.5	<2	0.07	2	4	7	4	1.66	2.26	0.25	4250	<1	0.12	<1	220	1795	4	0.16	20	<10	652
48	A00MZ027	Vein ore	<0.005	<1	<0.2	<10	0.2	7.41	580	1.5	<2	0.16	<0.5	4	2	<1	1.12	3.04	0.24	2010	1	2.54	<1	330	52	67	0.15	14	<10	52
49	A00MZ031	Granite (Float)	<0.005	14	<0.2	<10	0.2	10	110	1	<2	3.9	<0.5	13	11	1	2.75	0.62	1.84	325	<1	4.13	9	1060	16	434	0.49	153	<10	18
50	A00MZ033	Granodiorite (Float)	<0.005	4	<0.2	<10	1	8.05	270	1	<2	1.8	<0.5	35	27	2620	1.69	1.4	1.08	810	<1	3.55	6	530	162	122	0.29	80	<10	142
51	A00MZ034	Andesitic tuff	0.015	16	0.2	<10	1	6.85	10	<0.5	<2	9.5	<0.5	75	38	1125	7.69	0.13	0.82	1010	<1	0.18	22	530	14	1115	0.39	197	<10	28
52	A00MZ035	Zeolite	<0.005	<1	<0.2	<10	<0.2	9.2	180	0.5	<2	9.87	<0.5	9	21	11	1.76	1.33	0.7	345	<1	0.48	3	180	10	221	0.13	59	<10	30
53	A00MZ039	Andesite (Float)	0.01	48	3.2	<10	0.4	8.4	610	0.5	<2	3.4	<0.5	21	73	54	4.85	2.02	1.49	1005	1	1.67	19	590	32	254	0.41	128	<10	118
54	A00MZ040	Sil., breccia (Float)	0.005	2	0.8	<10	<0.2	8.38	2700	7	<2	4.64	8.5	62	58	2490	7.89	3.45	3.69	1200	<1	2.75	38	3290	10	1410	0.38	613	30	182
55	A00MZ047	Qz veinlet (Float)	<0.005	6	0.2	<10	0.2	2.17	160	<0.5	<2	0.07	<0.5	1	13	5	0.41	0.67	0.06	50	1	0.71	1	50	4	28	0.06	11	<10	8
56	A00MZ052	Qz vein	0.17	6	<0.2	<10	0.8	1.35	190	<0.5	6	0.03	<0.5	120	10	76	2.99	0.58	0.05	15	<1	0.04	5	10	10	7	0.03	21	<10	2
57	A00MZ053	Andesite	0.43	6	<0.2	<10	5.6	6.41	390	0.5	Intf*	0.85	<0.5	15	9	16800	5.46	2.2	0.65	720	<1	0.64	6	Intf*	74	51	0.23	78	<10	14
58	A00MZ054	Qz porphyry	<0.005	5	<0.2	<10	<0.2	7.31	1260	1	<2	1.41	<0.5	4	5	92	1.29	2.56	0.29	210	1	2.49	<1	240	8	168	0.13	28	<10	10

Appendix-6 Bulk chemical analysis results for the geochemical survey.

No.	Sample	Rock	Au (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
59	A00MZ056	Qz vein (Float)	0.02	84	1.6	<10	0.2	4.18	170	<0.5	<2	1.64	<0.5	5	10	7	1.54	1.56	0.19	630	<1	0.29	1	290	12	22	0.14	44	<10	26
60	A00MZ057	Qz vein	4.07	6640	6.4	10	0.8	1.22	60	<0.5	14	0.02	<0.5	21	23	34	7.6	0.42	0.03	15	<1	0.04	3	160	10	6	0.02	5	<10	2
61	A00MZ059	Silicified rock	13.87	>10000	25	30	5.8	2.69	90	<0.5	20	0.02	0.5	10	15	1525	8.94	0.95	0.05	15	<1	0.08	2	130	10	9	0.09	36	<10	6
62	A00MZ061	Soft silky rock	0.045	77	0.8	280	1.6	9.53	410	<0.5	<2	0.06	<0.5	3	25	14	0.88	0.05	<0.01	5	19	0.13	2	1110	20	1040	0.16	141	<10	8
63	A00MZ062	Silicified rock	0.015	27	0.2	40	0.2	8.01	510	<0.5	<2	0.09	<0.5	2	41	6	0.2	1.62	<0.01	<5	<1	0.82	<1	1130	56	617	0.41	174	<10	<2
64	A00MZ063	Silicified rock	0.01	23	<0.2	20	<0.2	8.63	810	1	<2	0.98	<0.5	6	4	5	2.09	2.54	0.68	370	<1	3.92	<1	590	6	341	0.46	76	<10	14
65	A00MZ064	Silicified rock	<0.005	5	<0.2	10	<0.2	4.72	430	<0.5	<2	0.09	<0.5	1	35	<1	0.07	1.32	<0.01	10	<1	0.23	<1	1090	16	569	0.32	88	<10	<2
66	A00MZ065	Andesite	0.045	17	0.4	30	1	7.46	2160	<0.5	<2	0.21	<0.5	8	5	4	8.66	4.73	0.89	2500	<1	0.09	<1	1250	62	37	0.42	110	20	186
67	A00TM001	Dacite	0.005	13	0.6	10	<0.2	4.86	320	<0.5	<2	0.02	<0.5	1	8	12	0.81	2.14	0.13	60	2	0.13	<1	120	4	7	0.05	20	20	6
68	A00TM002	Black shale	1.18	356	3.8	270	19.6	0.69	70	<0.5	<2	19.35	14.5	13	3	137	4.63	0.32	3	>10000	<1	<0.01	9	130	736	223	0.04	16	<10	1870
69	A00TM003	White altered rock	0.02	11	<0.2	<10	0.2	2.52	130	<0.5	<2	0.3	<0.5	<1	5	4	0.24	0.04	0.03	185	1	0.03	<1	110	8	34	0.08	6	<10	12
70	A00TM004	Rhyolitic tuff	0.005	7	<0.2	<10	0.2	6.45	1410	<0.5	<2	0.17	<0.5	1	7	1	0.47	8.1	0.01	65	1	0.14	<1	30	4	26	0.07	4	<10	10
71	A00TM005	Tonalite	<0.005	5	<0.2	20	0.6	4.25	230	1	<2	0.47	<0.5	2	8	4	0.95	0.64	0.04	390	1	2.44	<1	70	2	68	0.07	3	<10	10
72	A00TM007	Qz vein	<0.005	14	0.2	10	<0.2	2.09	5030	<0.5	<2	0.08	<0.5	3	6	8	0.55	1.77	0.02	25	<1	0.06	3	300	<2	636	0.07	17	<10	6
73	A00TM008	Shale	0.01	62	1.8	30	0.8	7.16	690	0.5	<2	0.59	<0.5	4	24	17	3.06	3.12	0.69	55	4	1.54	1	700	4	154	0.28	72	<10	2
74	A00TM010	Shale	0.545	>10000	320	20600	46	1.43	590	<0.5	30	0.08	118	15	13	1010	12.75	0.31	0.05	90	71	0.05	5	840	71400	46	0.02	30	<10	3170
75	A00TM012	Qz vein	0.005	273	21	7270	9.8	0.09	1860	<0.5	<2	0.04	20.5	<1	11	32	0.86	0.01	0.01	90	2	0.03	1	30	916	34	<0.01	5	<10	1430
76	A00TM014	Granite?	0.11	50	1.6	240	3.8	5.42	110	0.5	Intf*	0.22	2	40	19	32400	1.27	0.38	0.1	240	14	3.2	6	Intf*	40	112	0.06	50	<10	150
77	A00TM016	Granite?	0.035	51	2.2	81200	22.2	7.86	160	0.5	Intf*	0.15	<0.5	3	8	25400	0.21	0.33	0.07	15	<1	1.09	2	Intf*	176	59	0.04	25	<10	168
78	A00TM017	Tonalite	<0.005	11	0.2	540	0.2	10.3	1630	1	<2	5	<0.5	10	9	262	4.38	5.75	1.19	1590	<1	1.34	3	630	36	261	0.48	174	<10	116
79	A00TM021	Qz vein in granitoid	1.95	48	1.2	6820	15.2	1	60	2	Intf*	0.05	<0.5	<1	7	24400	11.85	0.43	0.03	55	60	0.03	1	Intf*	28	15	0.02	33	50	30
80	A00TM022	Lapilli tuff	0.01	<1	<0.2	30	<0.2	4.7	600	0.5	<2	0.05	<0.5	1	13	95	0.12	4.53	0.04	10	<1	0.45	<1	190	8	26	0.07	21	<10	2
81	A00TM026	Tuff	<0.005	<1	<0.2	<10	<0.2	7.55	1020	2	<2	0.09	<0.5	3	2	7	0.93	4.13	0.48	25	<1	1.76	<1	80	6	219	0.05	6	<10	18
82	A00TM027	Lapilli tuff	<0.005	1	<0.2	<10	<0.2	5.01	1560	0.5	<2	0.04	<0.5	1	7	10	0.61	3.63	0.02	20	<1	1.16	<1	130	8	145	0.03	3	<10	18
83	A00TM028	Tuff	0.005	1	0.2	<10	13.4	2.26	550	<0.5	<2	0.16	0.5	<1	9	333	1.22	1.88	0.09	440	<1	0.19	<1	140	6420	67	0.06	12	<10	120
84	A00TM029	Porphyritic Tonalite	<0.005	7	<0.2	<10	<0.2	7.32	50	1.5	<2	8.47	<0.5	11	36	80	2.85	0.27	0.55	660	<1	0.43	9	620	52	335	0.39	103	<10	64
85	A00TM031	Tonalite	0.005	16	0.2	<10	0.2	7.08	40	0.5	<2	1.37	<0.5	15	45	6	4.63	0.22	1.29	440	2	3.41	12	610	20	165	0.42	118	<10	42
86	A00TM032	Tonalite	<0.005	5	<0.2	<10	<0.2	7.75	40	0.5	<2	1.5	<0.5	12	46	5	3.7	0.26	1.58	585	<1	3.62	12	610	16	191	0.42	123	<10	50
87	A00TM033	Argillic vein	<0.005	6	<0.2	<10	0.2	7.74	190	1	<2	9.28	<0.5	7	13	40	1.29	2.1	0.63	440	<1	0.56	4	230	14	128	0.15	42	<10	32
88	A00TM034	Qz vein (Float)	<0.005	<1	<0.2	<10	0.4	11	<10	3	<2	14.8	<0.5	3	9	13	0.61	0.05	0.16	515	<1	0.13	<1	40	10	31	0.06	78	<10	10
89	A00TM035	Granodiorite	<0.005	32	0.6	<10	0.4	8.34	200	0.5	<2	4.25	<0.5	17	48	235	3.55	0.53	1.92	690	<1	3.18	15	890	24	275	0.58	169	<10	52
90	A00TM038	Qz vein	0.01	11	0.6	<10	<0.2	0.36	80	0.5	2	0.05	<0.5	3	12	3	0.68	0.13	0.02	25	209	0.03	3	80	2	14	<0.01	9	30	12
91	A00TM039	Qz vein	0.01	9	0.2	<10	0.4	0.06	230	<0.5	8	0.01	<0.5	2	24	7	0.75	0.03	<0.01	40	562	0.04	<1	10	2	8	<0.01	6	<10	18
92	A00TM040	Granodiorite	0.005	<1	<0.2	<10	<0.2	7.3	560	1.5	<2	0.13	<0.5	3	8	83	1.13	3.9	0.1	50	20	2.3	<1	160	14	99	0.08	20	<10	10
93	A00TM041	Granodiorite	<0.005	<1	<0.2	<10	0.4	8.24	330	1.5	<2	0.24	<0.5	9	14	340	1.41	2.4	0.24	280	1	2.21	6	600	14	116	0.1	51	<10	24
94	A00TM044	Hydrothermal breccia	<0.005	4	<0.2	<10	0.6	7.87	290	1	Intf*	0.18	<0.5	12	16	15400	2.48	2.63	0.91	525	1	1.59	10	Intf*	6	66	0.19	61	<10	168
95	A00TM053	Granite (Float)	<0.005	<1	<0.2	<10	0.2	7.14	160	1	<2	0.03	<0.5	5	5	57	2.08	2.26	1.08	595	9	0.22	<1	270	36	36	0.06	26	<10	110
96	A00TM054	Granite? (Float)	<0.005	6	<0.2	<10	0.2	9.07	770	1	<2	4.22	<0.5	6	5	21	1.59	1.6	0.65	490	1	2.83	<1	990	16	470	0.3	32	<10	40
97	A00TM055	Altered rock	<0.005	<1	<0.2	<10	<0.2	8.48	1100	<0.5	<2	0.04	<0.5	2	9	8	0.04	0.07	<0.01	<5	<1	0.13	<1	420	8	525	0.15	44	<10	<2
98	A00TM056	Altered rock	0.075	5	1.6	30	<0.2	5.5	980	1.5	<2	0.1	<0.5	6	23	147	6.01	0.08	0.03	15	5	0.05	7	2340	18	540	0.27	243	<10	138
99	A00TM058	Altered rock	<0.005	12	46	110	0.2	12.1	390	<0.5	<2	0.04	<0.5	3	36	8	0.21	0.07	0.01	5	21	0.17	<1	600	26	997	0.45	260	30	18
100	A00TM059	Qz vein	0.01	8	0.6	<10	0.2	1.14	70	<0.5	<2	0.04	<0.5	1	11	3	0.14	0.56	0.08	105	<1	0.03	<1	40	8	21	<0.01	6	<10	12
101	A00TM060	Altered rock	0.005	292	3.6	<10	0.2	4.6	650	0.5	<2	0.22	<0.5	3	14	4	1.72	3.29	0.74	700	1	0.51	1	520	8	61	0.21	31	<10	30
102	A00TM061	Hydrothermal breccia	0.06	204	1	<10	3.8	1.58	200	<0.5	<2	0.04	<0.5	1	16	33	0.43	1.38	0.13	195	<1	0.11	<1	80	98	23	0.04	8	<10	28
103	A00TM062	Altered rock	0.01	116	0.6	<10	<0.2	7.5	280	1.5	<2	0.07	<0.5	1	2	<1	1.47	1.39	0.06	260	<1	3.42	<1	70	14	97	0.1	2	<10	38
104	A00TM065	Qz vein	1.575	3660	76	2670	26	0.86	90	<0.5	46	0.03	20	4	16	243	2.66	0.16	0.02	35	6	0.03	1	250	1485	23	0.01	12	<10	596
105	A00TM066	Qz vein	0.795	5710	64	950	40	1.58	140	<0.5	16	0.04	1.5	2	14	244	2.51	0.49	0.04	35	1	0.04	<1	140	1230	27	0.06	22	<10	50
106	A00TM068	Qz vein	0.02	185	16.5	130	3.8	1.4	80	<0.5	2	0.08	<0.5	6	28	115	4.89	0.26	0.12	55	1	0.35	4	370	1685	26	0.12	84	<10	344
107	A00RM009	Volcanic rock	0.02	61	1.8	80	2.4	6.47	870	0.5	<2	0.12	<0.5	1	10	6	0.31	6.05	0.08	140	<1	0.23	<1	40	42	84	0.04	1	<10	16
108	A00RM011	Dacite porphyry	<0.005	10	0.2	<10	<0.2	12.1	250	1	<2	0.33	<0.5	8	4	35	1.55	1.27	1.75	530	<1	5.93	<1	570	26	214	0.11	43	<10	144
109	A00RM012	Dacite porphyry	<0.005	8	0.4	<10	1	9.19	680	0.5	<2	2.83	<0.5	11	9	9	3.15	1.51	1.92	945	<1	3.12	2	600	14	404	0.3	110	<10	46
110	A00RM016	Sed. Rock	<0.005	6	<0.2	<10	<0.2	7.7	520	2	<2	0.13	<0.5	2	18	31	0.55	2.53	0.51	20	1	1.31	<1	310	10	62	0.11	60	<10	8
111	A00RM017	Sed. Rock	0.025	23	1.6	<10	0.6	4.73	160	0.5	<2	0.07	<0.5	1	20	64	4.52	1.89	0.27	15	20	0.23	<1	420	56	30	0.09	288	<10	2
112	A00RM020	Qz. vein in Granodiorite	0.025	37	0.8	150	0.8	3.89	180	1.5	10	0.11	<0.5	3	9	68	2.29	1.7	0.1	145	22	0.09	<1	580	8	10	0.07	12	10	50
113	A00RM021	Granodiorite	0.01	9	0.4	2830	1.2	6.68	200	3	4	0.18	<0.5	8	9	3090	2.73	2.21	0.33	530	13	1.23	2	770	10	69	0.16	26	<10	152
114	A00RM023	Volcaniclastic rock	<0.005	35	3	10	<0.2	5.85	920	0.5	<2	0.04	<0.5	1	6	12	0.3	6.29	0.07	15	<1	0.15	<1	40	8	60	0.07	11	<10	4
115	A00RM028	Andesite?	<0.005	7	<0.2	<10	0.2	7.83	600	1.5	<2	1.53	4.5	6	1	18	1.48	1.8	0.5	990	<1	3.8	1	300	36	297	0.2	33	<10	1410
116	A00RM030	Tonalite	<0.005	42	0.2	<10	<0.2	8.57	400	0.5	<2	3.3	<0.5	14	68	44	3.85	0.78	2.61	755	<1	2.72	18	410	10	310	0.43	166	<10	58

Appendix-6 Bulk chemical analysis results for the geochemical survey.

No.	Sample	Rock	Au (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
117	A00RM033	Andesitic dyke	<0.005	34	0.2	<10	0.6	8.12	300	1	<2	3.07	<0.5	10	10	43	2.19	0.3	0.77	315	<1	2.85	1	370	24	403	0.24	54	<10	40
118	A00RM036	Rhyolite	<0.005	4	<0.2	<10	2.2	7.26	80	3.5	<2	0.03	<0.5	1	2	<1	0.53	3.56	0.39	40	<1	0.21	<1	80	2	13	0.04	16	110	4
119	A00RM037	Qz vein	<0.005	28	1.4	<10	0.4	0.36	110	0.5	8	0.05	<0.5	1	17	30	1.86	0.14	0.03	100	164	0.05	2	100	10	33	<0.01	19	70	32
120	A00RM040	Granodiorite/Porphyry	0.02	6	<0.2	<10	1.8	5.52	460	0.5	<2	0.44	<0.5	8	13	1655	1.6	2.38	0.44	485	11	0.48	5	400	2	27	0.06	29	<10	32
121	A00RM041	Breccia pipe	0.01	57	1	<10	9.2	0.65	90	<0.5	Intf*	0.01	<0.5	4	10	17200	1.98	0.24	0.02	10	14	0.03	5	Intf*	8	7	<0.01	21	90	<2
122	A00RM042	Hydrothermal breccia	<0.005	<1	<0.2	<10	1.2	8.42	330	1	<2	0.22	<0.5	15	28	666	3.51	2.8	1.05	640	25	1.83	12	710	6	75	0.27	72	10	142
123	A00RM043	Altered rock	0.29	18	0.2	130	2	2.26	160	0.5	Intf*	0.04	<0.5	20	26	25700	10.9	0.62	0.09	80	28	0.05	12	Intf*	88	17	0.05	127	10	30
124	A00RM045	Granodiorite	0.005	1	0.8	<10	0.6	9.37	550	0.5	<2	0.04	<0.5	2	8	75	1.91	4.01	0.36	30	44	0.52	<1	120	50	46	0.12	124	<10	6
125	A00RM064	Brecciated qz vein	0.015	43	0.2	<10	0.8	0.67	70	<0.5	<2	0.01	<0.5	1	14	86	0.15	0.49	0.04	165	<1	0.05	<1	20	56	10	0.01	3	<10	8
126	A00RM066	Brecciated qz vein (Float)	0.135	3880	18	520	39.2	0.66	30	<0.5	42	0.04	43.5	216	13	775	20.3	0.09	0.03	30	18	0.02	10	780	2770	16	0.01	18	<10	2170
127	A00RM069	Qz vein (Float)	0.17	2150	19	670	56.2	0.66	60	<0.5	52	0.03	0.5	1	17	102	0.94	0.14	0.01	85	5	0.03	<1	70	1740	15	0.01	10	<10	74
128	A00RM070	Laminated Sed. Rock	0.03	192	9	460	8.8	0.27	70	<0.5	<2	0.12	0.5	2	33	9	0.68	0.04	<0.01	650	9	0.02	1	60	158	15	0.01	6	<10	164
129	A00NK101	Quartz	<0.005	25	0.6	<10	0.2	1.67	380	1	<2	0.05	<0.5	<1	7	10	0.24	0.64	0.02	50	<1	0.33	<1	30	10	55	0.02	3	<10	14
130	A00NK102	Rhyolite	<0.005	6	<0.2	10	<0.2	5.86	720	1.5	<2	0.07	<0.5	<1	7	6	0.41	3.43	0.04	35	<1	1.59	<1	50	14	76	0.05	20	<10	14
131	A00NK103	Quartz vein (float)	<0.005	<1	<0.2	<10	<0.2	0.31	60	<0.5	<2	0.03	<0.5	<1	18	6	0.06	0.06	<0.01	20	<1	0.04	<1	<10	2	16	<0.01	1	<10	6
132	A00NK113	Ryolite dike	<0.005	<1	<0.2	10	0.2	6.89	890	1.5	<2	0.12	<0.5	5	9	7	0.7	2.92	0.08	55	<1	3.08	<1	160	8	66	0.1	16	<10	8
133	A00NK114	Rhyolitic tuff	<0.005	3	<0.2	<10	<0.2	6.07	810	2	<2	0.07	<0.5	1	10	10	3.49	3.3	0.03	250	<1	1.88	<1	60	40	79	0.06	5	<10	54
134	A00NK117	Rhyolitic tuff	<0.005	28	<0.2	90	<0.2	0.93	180	3	<2	0.04	<0.5	3	9	5	1.34	0.12	0.18	9300	<1	0.06	<1	40	6	17	0.01	20	<10	32
135	A00NK119	Quartz vein & tuff	<0.005	<1	<0.2	<10	<0.2	1.42	140	0.5	<2	0.05	<0.5	1	12	14	0.44	1.02	0.12	75	<1	0.18	<1	190	6	21	0.03	6	<10	10
136	A00NK123	Undefined	<0.005	10	<0.2	120	0.6	7.86	400	1	<2	0.99	<0.5	1	38	11	2.31	1.94	0.4	75	10	2.76	<1	540	16	246	0.32	174	<10	14
137	A00NK124	Rhyolitic tuff	<0.005	<1	<0.2	30	0.4	9.57	530	1.5	<2	0.06	<0.5	1	5	22	0.15	2.22	0.01	40	<1	5.96	<1	80	16	26	0.04	1	<10	28
138	A00NK126	Rhyolitic tuff, quartz vein	<0.005	4	0.2	<10	<0.2	4.18	320	1.5	<2	0.06	<0.5	<1	23	6	0.4	0.79	0.03	105	<1	2.57	<1	20	16	41	0.05	5	<10	50
139	A00NK127	Rhyolitic lapili tuff	<0.005	<1	<0.2	<10	0.2	5.95	850	5.5	<2	0.03	<0.5	<1	6	3	0.71	3.86	0.11	55	<1	0.97	<1	<10	66	29	0.04	2	<10	86
140	A00NK128	Rhyolitic tuff breccia	<0.005	<1	<0.2	<10	<0.2	6.99	640	2	<2	0.05	<0.5	<1	10	1	1.42	3.12	0.1	160	<1	3.1	<1	20	12	25	0.05	4	<10	52
141	A00NK129	Rhyolite	<0.005	25	0.6	<10	0.6	6.75	3470	0.5	<2	0.01	<0.5	<1	7	5	0.48	7.96	<0.01	40	9	0.25	<1	20	40	16	0.06	4	<10	42
142	A00NK130	Biotite-Garnet gneiss, quartz vein	<0.005	<1	<0.2	<10	<0.2	0.2	10	<0.5	<2	0.05	<0.5	<1	18	4	0.06	0.05	<0.01	15	<1	0.11	<1	190	4	5	<0.01	1	<10	6
143	A00NK131	Tuff	<0.005	8	0.2	<10	<0.2	6.24	370	4.5	<2	0.41	<0.5	3	24	10	0.8	2.86	0.23	610	8	1.81	20	290	44	100	0.16	28	<10	64
144	A00NK132	Undefined	<0.005	27	1	<10	0.2	1.06	130	0.5	<2	0.45	<0.5	<1	42	4	1.21	0.21	0.04	15	1	<0.01	<1	160	8	42	0.98	131	<10	6
145	A00NK134	Quartz-pyrite vein	<0.005	76	4	<10	<0.2	2.71	20	0.5	8	0.25	<0.5	68	6	57	17.35	0.63	0.69	35	2	0.28	50	910	12	93	0.23	78	<10	4
146	A00NK136	Undefined	<0.005	71	1.2	<10	<0.2	1.24	30	<0.5	<2	0.01	0.5	<1	<1	35	>25.0	1.03	0.04	<5	<1	0.22	<1	4500	12	144	0.08	78	<10	<2
147	A00NK138	Andesite porphyry	<0.005	<1	0.2	<10	<0.2	0.6	100	0.5	<2	0.03	<0.5	<1	9	4	0.19	0.04	<0.01	15	5	<0.01	<1	340	2	146	0.52	11	<10	6
148	A00NK139	Hydrothermal breccia	<0.005	26	4.6	220	<0.2	0.81	100	2	<2	0.03	<0.5	7	16	10	2.65	0.22	0.01	20	3	0.01	<1	190	10	39	0.35	15	<10	4
149	A00NK150	Quartz vein	<0.005	<1	<0.2	<10	<0.2	1.31	50	<0.5	<2	0.06	<0.5	1	10	3	0.78	0.47	0.19	250	<1	0.02	<1	70	6	6	0.05	16	<10	18
150	A00NK152	Quartz vein (float)	0.085	<1	<0.2	<10	1	0.74	10	<0.5	<2	0.03	<0.5	<1	22	28	0.32	0.2	0.01	25	<1	0.01	3	10	16	9	0.01	14	<10	14
151	A00HH104	Andesite	0.02	<1	1.6	<10	<0.2	6.88	130	1.5	<2	0.07	<0.5	<1	23	7	5.29	3.04	0.51	250	<1	0.12	<1	40	24	11	0.77	293	10	22
152	A00HH112	Altered granite	0.045	7	<0.2	<10	<0.2	9.14	70	<0.5	<2	2.07	<0.5	12	22	377	3.23	0.3	1.66	215	43	3.38	2	450	8	263	0.3	121	<10	24
153	A00HH113	Altered rock with zeolite vein	<0.005	1	<0.2	<10	<0.2	10.8	90	<0.5	<2	6.8	<0.5	2	2	10	2.39	0.2	0.66	465	<1	0.21	<1	210	14	277	0.36	96	<10	32
154	A00HH114	Andesite	0.01	10	<0.2	10	<0.2	8.63	400	0.5	<2	1.29	<0.5	16	21	25	4.93	1.8	2.42	1280	<1	1.89	6	760	22	258	0.53	205	<10	94
155	A00HH115	Andesite	<0.005	<1	0.2	<10	<0.2	9.53	130	0.5	<2	3.76	<0.5	11	13	21	4.5	0.43	1.57	660	<1	3.59	3	840	10	336	0.43	92	<10	30
156	A00HH116	Quartz vein	0.025	188	2.8	30	6.2	2.91	80	0.5	8	0.03	<0.5	1	6	32	3.32	1.19	0.07	155	21	0.1	<1	300	478	11	0.06	12	<10	92
157	A00HH117	Quartz porphyry	0.015	1295	5	30	6.4	3.64	430	<0.5	<2	0.15	<0.5	1	9	166	1.71	2	0.13	405	192	0.29	<1	330	1895	25	0.07	16	<10	46
158	A00HH118	Sandstone	0.01	334	1.2	<10	1	3.24	210	0.5	<2	0.56	<0.5	1	<1	147	1.05	1.11	0.26	995	21	0.97	<1	360	94	118	0.1	13	<10	24
159	A00HH119	Quartz porphyry	<0.005	37	1	<10	1.2	7.39	700	2	<2	0.41	<0.5	5	7	171	2.05	3.72	0.29	430	33	2.12	<1	740	62	209	0.19	23	<10	22
160	A00HH122	Quartz porphyry	<0.005	21	1.4	<10	0.2	7.68	410	1	2	0.05	<0.5	<1	5	15	1.92	3.08	0.38	85	1	0.29	<1	340	16	17	0.11	43	10	18
161	A00HH123	Quartz vein	<0.005	<1	<0.2	<10	<0.2	0.32	10	<0.5	<2	0.02	<0.5	<1	11	55	0.16	0.07	0.05	50	<1	0.05	<1	<10	2	4	0.01	9	<10	6
162	A00HH128	Quartz porphyry	<0.005	<1	0.2	<10	0.4	6.82	210	0.5	<2	0.97	<0.5	4	17	6	1.47	1.13	0.24	325	<1	3.2	2	450	8	78	0.29	55	<10	22
163	A00HH131	Undefined (float)	0.015	17	<0.2	<10	<0.2	9.39	610	2.5	<2	1.99	<0.5	21	105	97	5.08	2.43	1.44	1260	<1	1.11	56	770	24	111	0.52	202	<10	96
164	A00HH132	Acidic tuff	0.005	47	0.4	<10	<0.2	5.89	1180	1.5	<2	2.69	<0.5	<1	7	3	0.8	2.77	0.09	335	<1	2.37	<1	30	12	65	0.03	5	<10	12
165	A00HH133	Andesite (float)	0.035	6	0.2	<10	0.2	7.48	230	0.5	<2	4.65	<0.5	18	21	78	5.43	1.08	2.01	945	<1	1.64	9	910	10	260	0.8	257	<10	84
166	A00HH134	Sandstone (float)	<0.005	12	<0.2	<10	<0.2	6.31	250	1.5	<2	0.41	<0.5	16	74	32	4.86	1.76	1.07	340	<1	1.05	34	770	20	88	0.48	92	<10	88
167	A00HH135	Andesite with quartz vein	<0.005	101	1.6	<10	<0.2	2.39	40	<0.5	8	23.5	<0.5	12	21	13	3.68	0.86	2.21	1705	<1	0.02	8	90	10	339	0.1	52	<10	24
168	A00HH136	Silicified rock (float)	0.43	23	1.8	<10	<0.2	9.22	490	0.5	<2	4.92	<0.5	26	45	147	5.06	3.73	0.67	1020	<1	0.74	13	460	16	161	0.56	268	<10	42
169	A00MZ101	Silicified rock	<0.005	<1	<0.2	<10	1	9.51	520	1.5	<2	0.17	<0.5	23	23	808	3.51	3.55	0.99	1105	4	1.21	12	300	6	70	0.16	67	<10	168
170	A00MZ102	Silicified rock	<0.005	4	0.4	<10	1.8	8.56	1130	1	Intf*	0.14	0.5	50	12	14400	1.51	7.26	0.92	595	20	0.9	27	Intf*	14	167	0.15	67	<10	278
171	A00MZ104	Hydrothermal breccia	<0.005	3	1	<10	2.2	5.16	320	<0.5	<2	0.05	<0.5	2	18	72	3.59	2.39	0.35	70	16	0.15	<1	310	6	11	0.18	89	30	10
172	A00MZ105	Quartz porphyry	0.005	44	2.4	<10	0.2	5.56	130	0.5	6	0.04	<0.5	27	8	322	12.65	2.54	0.28	280	<1	0.12	14	790	22	10	0.07	39	<10	146
173	A00MZ106	Silicified rock	0.02	54	1.4	<10	0.2	5.16	490	0.5	44	0.07	<0.5	3	7	35	4.53	3.49	0.16	55	1	0.21	<1	280	32	37	0.05	28	<10	14
174	A00MZ110	Quartz porphyry	<0.005	1	0.2	<10	<0.2	7.71	340	1.5	<2	0.47	<0.5	5	12	93	1.85	2.97	0.59	140	167	1.31	6	500	18	57	0.11	43	<10	24

Appendix-6 Bulk chemical analysis results for the geochemical survey.

No.	Sample	Rock	Au (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
175	A00MZ111	Quartz porphyry	0.02	2	0.4	<10	<0.2	7.58	690	1.5	6	0.06	<0.5	16	14	28	5.91	3.32	0.27	60	10	0.27	2	350	50	41	0.15	153	<10	14
176	A00MZ113	Altered volcancs	0.1	<1	<0.2	<10	<0.2	7.88	360	<0.5	<2	0.11	<0.5	3	14	207	9.49	2.33	0.7	275	<1	0.89	<1	980	12	53	0.38	129	<10	10
177	A00MZ115	Altered volcancs	0.02	<1	<0.2	<10	<0.2	9.96	40	0.5	<2	0.49	<0.5	3	17	27	3.48	0.36	1.87	120	73	5.26	4	600	12	255	0.24	131	<10	22
178	A00MZ116	Quartz vein	0.48	240	0.2	<10	0.2	1.72	70	<0.5	<2	0.04	<0.5	4	12	6	7.7	0.51	0.14	5	1	0.22	<1	10	10	17	0.05	34	<10	<2
179	A00MZ117	Altered volcancs	<0.005	11	0.2	100	<0.2	9.57	180	<0.5	<2	0.83	<0.5	6	2	28	5.11	1.27	0.48	270	<1	3.93	<1	460	18	298	0.65	229	<10	18
180	A00MZ120	Quartz vein (float)	0.19	278	2.6	20	0.4	2.26	110	<0.5	10	0.04	<0.5	4	8	17	6.18	0.74	0.05	55	4	0.08	<1	430	12	14	0.01	15	<10	14
181	A00MZ121	Altered volcancs (tailing)	0.015	21	<0.2	<10	<0.2	8.05	130	0.5	<2	2.49	<0.5	17	102	8	3.43	0.53	2.54	405	<1	3.22	22	940	8	239	0.5	202	<10	34
182	A00MZ122	Quartz vein (float)	0.55	18	1	<10	0.2	0.43	70	0.5	<2	0.02	<0.5	<1	12	2	0.2	0.07	0.01	5	<1	0.04	<1	<10	4	15	<0.01	4	<10	12
183	A00MZ124	Silt	<0.005	38	3	10	0.2	8.53	900	2	<2	1.18	4	10	32	165	2.31	4.15	1.05	1255	200	0.85	11	680	64	110	0.34	81	<10	694
184	A00MZ126	Quartz porphyry	<0.005	14	0.6	<10	0.2	7.77	910	1.5	<2	0.55	<0.5	3	11	80	1.37	3.77	0.22	255	7	2.34	<1	430	32	248	0.11	14	<10	18
185	A00MZ138	Andesite	<0.005	4	0.6	<10	<0.2	7.7	370	0.5	<2	3.83	<0.5	35	309	24	7.17	2.65	3.42	930	<1	2.27	145	1020	14	147	0.81	235	<10	132
186	A00MZ140	Qz porphyry	9.14	12	2	50	12.4	1.91	160	0.5	<2	3.5	5	45	28	606	4.27	0.84	0.79	2660	6	0.03	17	160	502	73	0.08	85	<10	284
187	A00MZ141	Granitoids (float)	0.03	23	0.2	10	2.4	4.5	140	<0.5	30	0.2	<0.5	44	8	44	4.8	1.33	0.55	110	<1	0.8	3	300	72	31	0.07	55	<10	18
188	A00MZ142	Quartz vein (float)	0.08	1	0.2	<10	<0.2	2.24	100	<0.5	<2	3.14	<0.5	9	41	21	1.67	0.43	0.73	650	1	0.18	15	140	8	66	0.09	53	<10	38
189	A00MZ143	Quartz vein (float)	<0.005	<1	0.2	<10	0.2	1.63	30	0.5	<2	2.61	<0.5	<1	13	247	0.32	0.1	0.08	140	1	0.3	1	30	46	32	0.04	17	<10	6
190	A00MZ144	Silicified rock	<0.005	11	0.6	<10	0.6	5.38	250	1	<2	6.79	<0.5	13	68	74	4.49	1.55	1.16	1785	<1	0.67	28	490	172	146	0.27	95	<10	86
191	A00MZ145	Calcite vein	<0.005	919	12	<10	<0.2	1.43	30	<0.5	2	>25.0	<0.5	6	8	11	1.4	0.5	0.29	2850	<1	<0.01	1	<10	18	206	0.05	26	<10	38
192	A00MZ147	Quartz vein (float)	0.02	5	5.6	<10	<0.2	10	20	0.5	<2	11.45	<0.5	10	11	6	2.8	0.58	0.97	940	<1	0.42	1	390	36	17	0.24	82	<10	40
193	A00MZ148	Quartz vein	0.025	1050	0.8	<10	0.2	1.41	30	<0.5	<2	0.08	<0.5	1	9	7	0.61	0.19	0.12	75	<1	0.58	<1	50	452	15	0.02	9	<10	10
194	A00MZ150	Quartz vein	0.01	37	0.2	<10	<0.2	0.82	<10	<0.5	<2	0.24	<0.5	3	41	4	1	0.03	0.3	175	<1	0.05	3	10	4	7	0.03	17	<10	22
195	A00TM101	Altered rock	<0.005	1	0.4	<10	<0.2	8.01	540	1.5	<2	1.02	<0.5	<1	3	1	0.89	2.12	0.21	130	<1	3.31	<1	450	20	210	0.08	1	<10	46
196	A00TM102	Quartz vein	<0.005	1	0.8	<10	0.2	7.12	1050	1	<2	0.69	<0.5	1	10	3	0.79	5.8	0.08	60	<1	1.71	<1	40	22	97	0.03	15	<10	10
197	A00TM103	Quartz vein	<0.005	2	0.4	<10	<0.2	0.75	80	0.5	<2	0.04	<0.5	<1	11	5	0.23	0.28	0.07	40	<1	0.17	<1	20	10	11	0.01	6	<10	50
198	A00TM104	Altered rock	<0.005	10	0.4	<10	<0.2	9.53	350	1.5	2	0.31	<0.5	9	7	6	3.49	1.13	0.94	115	<1	3.77	<1	950	12	304	0.23	44	<10	20
199	A00TM105	Altered rock	<0.005	10	0.4	<10	<0.2	9.8	460	1	<2	0.22	<0.5	1	8	4	1.12	1.32	0.22	90	<1	3.45	<1	250	16	414	0.33	49	<10	10
200	A00TM107	Granodiorite	0.055	<1	0.4	20	0.2	8.06	70	2	12	0.3	<0.5	<1	1	7	1.3	3.41	0.44	1995	<1	0.19	<1	460	74	20	0.25	19	10	64
201	A00TM108	Granodiorite	<0.005	3	1.6	<10	<0.2	6.46	1990	0.5	<2	0.04	<0.5	<1	8	8	0.54	7.74	0.04	55	<1	0.23	<1	80	8	26	0.08	6	<10	16
202	A00TM109	Quartz vein	15.27	99	0.6	50	37	0.49	10	0.5	76	0.01	<0.5	7	6	15	15.85	0.25	0.05	35	<1	0.02	<1	360	176	10	0.01	32	<10	14
203	A00TM111	Granodiorite	0.17	<1	1.4	50	1.8	7.23	520	2	14	0.09	<0.5	3	3	33	1.89	3.26	0.27	370	<1	0.24	<1	250	368	10	0.31	20	<10	212
204	A00TM113	Rhyolitic tuff	0.01	<1	0.6	80	<0.2	7.76	320	1	<2	0.04	<0.5	1	5	26	3.07	3.28	0.32	45	<1	0.31	<1	120	8	7	0.13	19	<10	18
205	A00TM114	Tuff	0.04	7	0.6	<10	0.2	6.89	640	1.5	<2	0.02	<0.5	<1	1	12	0.85	2.41	0.23	125	<1	0.22	<1	80	62	29	0.03	1	<10	22
206	A00TM115	Tuff	0.015	9	0.6	<10	<0.2	7.32	620	1	<2	0.03	<0.5	<1	4	28	1.26	2.82	0.22	80	<1	0.33	<1	240	40	27	0.06	6	<10	52
207	A00TM116	Tuff breccia	0.03	5	2	230	<0.2	6.55	520	1.5	2	0.01	<0.5	<1	3	13	0.58	2.44	0.15	60	<1	0.26	<1	110	18	8	0.04	2	<10	10
208	A00TM117	Altered rock	<0.005	5	1	<10	0.2	6.24	630	0.5	<2	0.83	<0.5	5	5	1	2.84	2.88	0.61	1915	<1	2.32	<1	1770	20	51	0.57	63	<10	236
209	A00TM118	Tuff breccia	<0.005	7	1	<10	<0.2	6.18	500	2.5	2	3.4	2.5	3	3	38	2.33	2.34	0.3	1325	<1	0.16	<1	<10	150	250	0.06	1	<10	72
210	A00TM119	Quartz vein	0.01	9	0.8	<10	2	1.67	360	<0.5	4	0.27	<0.5	6	7	13	1.57	0.85	0.23	310	1	0.05	1	10	6	32	0.01	5	<10	28
211	A00TM121	Altered rock	<0.005	<1	<0.2	<10	<0.2	3.04	160	<0.5	2	0.03	<0.5	<1	16	4	0.16	0.84	<0.01	10	<1	0.19	<1	<10	6	29	0.08	16	<10	2
212	A00TM122	Dacitic andesite	0.015	911	0.6	<10	0.2	8.77	670	1	2	5.64	1.5	6	30	34	0.93	1.35	0.38	305	1	3.69	19	1320	10	268	0.25	184	<10	34
213	A00TM123	Limonite-quartz vein	<0.005	13	1.2	<10	0.2	3.32	300	0.5	6	0.1	<0.5	<1	10	10	3.63	0.92	0.25	165	1	0.16	<1	490	204	39	0.1	31	<10	16
214	A00TM128	Shale	0.06	44	0.2	<10	<0.2	3.81	280	0.5	12	0.25	<0.5	3	15	143	10.8	1.05	0.58	70	<1	1.37	<1	640	8	45	0.14	38	<10	8
215	A00TM129	Sandstone	0.005	1	<0.2	<10	<0.2	6.6	2860	0.5	4	0.13	1.5	<1	15	15	1.1	5.11	0.3	45	<1	1.43	1	360	6	166	0.11	49	<10	6
216	A00TM130	Altered rock (gossan)	0.24	115	6.4	<10	0.6	2.06	50	<0.5	6	0.15	<0.5	22	7	146	8.67	0.32	0.12	310	16	0.89	4	430	20	24	0.07	52	<10	116
217	A00TM132	Andesite	0.005	25	0.6	20	<0.2	9.01	70	1.5	44	4.26	<0.5	27	6	4670	2.19	0.75	0.52	920	2	5.68	4	940	6	213	0.15	142	<10	34
218	A00TM134	Altered rock (gossan)	59.14	268	10	<10	3.4	2.68	150	1	60	2.13	9	28	<1	577	>25.0	0.26	0.1	210	14	1.09	38	970	230	91	0.03	70	<10	1485
219	A00TM136	Tuff breccia	0.045	4	0.6	<10	0.2	9.43	300	0.5	12	0.47	<0.5	1	1	14	4.22	1.48	0.15	25	<1	5.46	<1	450	10	324	0.17	114	10	12
220	A00TM138	Altered rock	0.1	5	0.2	<10	<0.2	8.04	110	0.5	<2	0.11	<0.5	<1	24	10	0.28	1.24	0.1	5	<1	3.54	9	160	6	107	0.15	109	<10	12
221	A00TM139	Altered rock(gossan)	<0.005	382	1.6	50	<0.2	2.03	<10	9.5	<2	0.07	27	<1	<1	5700	>25.0	0.13	0.02	105	<1	0.2	28	450	6	21	<0.01	9	<10	2140
222	A00TM141	Shale	0.025	1	0.2	<10	<0.2	6.13	190	1	4	8.15	<0.5	10	25	62	3.22	0.81	1.9	1270	<1	2.29	6	850	8	114	0.29	84	<10	36
223	A00TM142	Sandstone	<0.005	<1	0.2	<10	0.6	3.05	190	<0.5	<2	0.05	<0.5	53	<1	281	21.3	1.09	0.07	45	<1	1.58	<1	110	8	39	0.08	14	<10	6
224	A00TM145	Tuffaceous shale	0.035	84	2	20	<0.2	4.64	340	1.5	<2	0.34	0.5	17	44	391	10.65	0.7	0.23	140	4	0.18	18	3060	10	87	0.09	266	<10	40
225	A00TM147	Tuffaceous sandstone	0.005	41	6.8	10	0.2	6.34	420	0.5	4	0.15	<0.5	<1	10	88	2.72	1.56	0.2	30	1	0.56	<1	510	6	398	0.05	55	<10	6
226	A00TM148	Tuffaceous sandstone	2.33	92	23	<10	<0.2	3.81	440	0.5	<2	0.12	<0.5	<1	10	15	0.71	0.74	0.09	30	<1	0.39	<1	1410	28	412	0.06	41	<10	2
227	A00TM154	Granodiorite	0.315	354	5.8	<10	2.4	11.4	400	2	42	0.17	7.5	17	12	38600	7.01	3.79	0.19	6010	21	0.5	8	1590	436	314	0.08	96	<10	1370
228	A00TM156	Limonite-quartz-barite vein	0.485	2310	810	3480	64.2	1.44	330	1.5	<2	0.06	15.5	5	<1	2530	11.1	0.43	0.08	115	171	0.07	<1	1260	1705	793	0.01	25	<10	1180
229	A00TM157	Tuffaceous sandstone	0.01	9	5	10	0.2	9.18	2700	1	2	0.11	1	<1	28	104	1.51	2.86	0.28	15	3	0.64	<1	840	10	132	0.09	174	<10	6
230	A00TM158	Tuffaceous sandstone	0.035	20	6.2	60	0.6	7.14	490	0.5	<2	0.07	<0.5	1	28	29	1.7	2.59	0.2	15	22	0.52	<1	1220	34	224	0.08	123	<10	8
231	A00TM160	Limonite-silicification vein	0.515	397	57	520	18.8	4.24	60	0.5	<2	0.11	<0.5	1	8	84	12.55	2.54	0.11	35	9	0.44	<1	4770	3820	388	0.03	102	<10	16
232	A00TM161	Tuffaceous sandstone	1.765	257	42	18610	20.2	2.11	170	<0.5	22	0.08	<0.5	<1	10	25	2.15	0.9	0.06	25	2	0.13	<1	610	846	242	0.03	31	<10	26

Appendix-6 Bulk chemical analysis results for the geochemical survey.

No.	Sample	Rock	Au (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
233	A00TM162	Tuffaceous sandstone	0.065	782	41	260	4.8	6.36	480	<0.5	<2	0.13	4.5	9	36	120	16.45	0.9	0.07	215	5	0.15	1	1630	834	333	0.22	287	<10	516
234	A00TM164	Tuffaceous sandstone	0.035	16	2.4	840	1	5.1	3850	<0.5	4	0.05	1	<1	22	20	1.83	1.95	0.11	10	1	0.25	<1	240	132	67	0.08	99	<10	6
235	A00TM165	Tuffaceous sandstone	0.89	1720	>1000	12590	559	2.71	40	<0.5	4	0.07	3.5	3	13	1800	12.4	1.78	0.11	30	36	0.25	<1	1780	37300	469	0.01	114	<10	112
236	A00TM166	Gossan	0.185	1500	33	80	1.4	6.91	920	<0.5	4	0.18	14	2	14	3980	18.15	2.37	0.27	100	6	0.21	1	1680	140	44	0.09	281	<10	456
237	A00TM167	Gossan	0.015	27	20	180	3.2	3.22	1290	<0.5	2	0.05	<0.5	2	15	53	7.85	1.17	0.06	10	3	0.14	<1	460	266	321	0.04	92	<10	4
238	A00TM168	Gossan	0.6	99	18.5	1220	8.4	0.68	850	<0.5	2	0.07	<0.5	2	6	132	7.58	0.15	0.03	45	6	0.04	<1	1110	398	642	0.08	30	<10	18
239	A00TM169	Gossan	0.505	943	86	40	4.2	2.31	50	0.5	<2	0.09	2.5	2	<1	82	>25.0	1.64	0.08	175	16	0.13	<1	2230	3100	210	0.04	172	<10	936
240	A00TM170	Gossan	0.965	1335	86	490	29	1.75	50	1	20	0.14	9	11	1	116	22.3	1	0.06	1530	6	0.18	<1	3010	2370	316	0.02	86	<10	552
241	A00TM171	Gossan	0.02	14	3.6	60	3	5.46	850	<0.5	2	0.04	<0.5	<1	14	14	1.95	1.98	0.08	15	7	0.24	<1	260	94	35	0.09	60	<10	6
242	A00TM172	Porphyritic granodiorite	0.08	16	3.4	80	1	9.34	380	1.5	<2	0.09	<0.5	<1	7	32	0.56	3.71	0.27	45	<1	0.32	<1	80	20	59	0.15	62	<10	8
243	A00TM174	Porphyritic granodiorite	0.095	15	6.8	60	2	7.89	320	1.5	8	0.76	<0.5	17	40	3950	2.64	1.62	1.56	1230	5	1.46	16	1320	30	127	0.12	94	<10	244
244	A00RM101	Rhyolite	<0.005	6	0.6	<10	<0.2	6.6	1650	0.5	2	0.04	<0.5	<1	3	23	0.1	6.79	0.01	20	<1	0.33	<1	90	10	57	0.06	7	<10	6
245	A00RM106	Rhyolite	<0.005	9	2	<10	<0.2	5.48	860	1	2	0.06	1	<1	7	43	0.19	2.28	0.02	25	<1	2.68	<1	90	32	77	0.03	3	<10	6
246	A00RM111	Tuff	<0.005	2	0.2	30	<0.2	6.83	1080	2	2	0.06	<0.5	1	<1	8	1.82	5	0.05	735	<1	1.15	<1	30	16	89	0.05	9	<10	34
247	A00RM113	Tuff with quartz vein	<0.005	1	0.2	<10	<0.2	6.58	1060	2.5	6	0.06	<0.5	3	1	15	4.75	4.07	0.1	365	<1	1.48	<1	50	24	81	0.05	9	<10	76
248	A00RM114	Hydrothermal breccia (float)	<0.005	11	0.8	<10	<0.2	4.9	840	1.5	<2	0.05	<0.5	<1	8	5	1.51	2.7	0.03	125	<1	1.28	<1	110	66	120	0.05	5	<10	26
249	A00RM115	Brecciated vein (float)	<0.005	3	0.8	<10	<0.2	5.19	1790	2	<2	0.15	<0.5	<1	18	8	0.8	3.47	0.26	95	<1	1.18	<1	60	18	220	0.07	4	<10	36
250	A00RM116	Tuff breccia	<0.005	1	0.2	<10	<0.2	5.61	980	3.5	2	0.05	0.5	<1	8	5	1.48	4.6	0.07	175	<1	1.1	<1	<10	72	32	0.05	10	<10	156
251	A00RM117	Alt.rock with quartz veinlet	<0.005	2	<0.2	<10	<0.2	5.75	220	2	2	0.03	<0.5	<1	10	6	0.42	1.08	0.03	25	<1	3.63	<1	<10	6	22	0.04	3	<10	30
252	A00RM119	Quartz vein	<0.005	<1	<0.2	<10	<0.2	1.02	50	<0.5	<2	0.08	0.5	<1	9	5	0.09	0.22	0.03	10	<1	0.44	<1	90	2	23	0.01	1	<10	6
253	A00RM121	Jarosite network	<0.005	161	<0.2	<10	<0.2	0.15	10	<0.5	<2	0.06	<0.5	<1	<1	9	>25.0	2.86	<0.01	<5	<1	1.34	<1	10000	4	3490	<0.01	32	<10	<2
254	A00RM122	Altered rock	<0.005	29	0.6	20	<0.2	0.3	40	2	<2	0.01	<0.5	7	12	8	3.09	0.07	<0.01	15	5	<0.01	10	160	6	27	0.31	11	<10	<2
255	A00RM123	Altered rock with quartz veinlet	<0.005	14	0.6	<10	<0.2	2.62	150	2.5	4	0.06	<0.5	<1	8	8	0.84	0.64	0.07	15	3	0.08	<1	520	2	83	0.31	18	<10	<2
256	A00RM126	Altered rock with opal vein	<0.005	7	0.4	10	<0.2	0.15	70	<0.5	8	0.01	<0.5	10	18	16	0.36	0.03	<0.01	5	4	<0.01	5	110	6	72	0.78	9	<10	<2
257	A00RM130	Earthy limonite mass	<0.005	23	<0.2	<10	<0.2	0.39	60	<0.5	<2	0.51	1.5	13	<1	10	>25.0	0.08	0.1	6750	39	0.09	<1	390	2	72	0.03	15	<10	<2
258	A00RM131	Granitoid (float)	<0.005	9	<0.2	<10	<0.2	7.98	660	2.5	<2	0.13	<0.5	2	8	3	1.14	3.69	0.11	140	<1	2.07	2	210	32	97	0.07	18	<10	28
259	A00RM133	Qz vein	<0.005	1	<0.2	<10	0.2	1.28	60	0.5	4	0.2	<0.5	1	15	9	0.68	0.43	0.1	255	<1	0.03	1	30	8	13	0.04	14	<10	14
260	A00RM139	Rhyolite	<0.005	6	<0.2	<10	<0.2	6.9	690	2	<2	0.08	<0.5	<1	5	3	0.61	2.92	0.07	60	<1	2.87	<1	80	12	101	0.08	6	<10	24
261	A00RM140	Altered volcanic rock (float)	<0.005	4	<0.2	10	<0.2	8.57	410	0.5	2	0.07	0.5	3	56	15	2.02	1.35	0.01	5	1	0.59	4	790	16	518	0.33	165	<10	<2
262	A00RM141	Altered granitoid (float)	<0.005	<1	<0.2	<10	<0.2	6.8	710	2	10	0.03	<0.5	2	14	51	3.71	2.97	0.24	55	1	0.25	6	<10	4	19	0.04	21	<10	6
263	A00RM142	Altered rock (float)	<0.005	1	<0.2	<10	<0.2	0.13	30	<0.5	2	0.01	<0.5	<1	13	8	0.3	0.02	<0.01	5	30	<0.01	<1	<10	<2	10	0.11	4	<10	<2
264	A00RM143	Altered volcanic rock (float)	<0.005	7	3.2	20	<0.2	8.92	120	0.5	6	1.92	<0.5	19	28	39	4.47	0.46	2.33	570	<1	2.58	23	920	10	380	0.48	174	<10	102
265	A00RM144	Altered volcanic rock (float)	<0.005	8	0.2	70	0.4	6.07	240	<0.5	6	0.06	<0.5	<1	15	19	2.27	0.06	0.01	45	<1	0.17	<1	730	8	598	0.21	79	<10	2
266	A00RM145	Altered volcanic rock (float)	<0.005	2	<0.2	<10	<0.2	9.39	260	0.5	2	1.52	<0.5	3	76	7	3.82	0.57	2.38	670	1	4.32	21	960	68	399	0.37	165	<10	102
267	A00RM146	Altered volcanic rock (float)	<0.005	5	0.6	40	<0.2	8.36	360	<0.5	4	0.04	<0.5	19	15	38	4.39	0.09	0.01	50	<1	0.23	10	360	22	593	0.21	107	<10	<2

"Intf*" stands for interference. When a sample has high Cu, their is often interference on the Bi and P.
The instrument can't get a good reading of the Bi and P because the Cu "interferes" with the reading.

Appendix-7 Bulk chemical analysis results including PGM elements for the geochemical survey (only Phase I survey).

No.	Sample	Rock	Au (g/t)	Pt (g/t)	Pd (g/t)	Rh (g/t)	As (ppm)	Sb (ppm)	Hg (ppb)	Ag (ppm)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)
1	A00NK041	Gabbro	0.03	<0.07	<0.07	<0.03	2	<0.2	<10	0.2	10.35	80	<0.5	<2	7.18	6.5	43	271
2	A00NK042	Gabbro	<0.03	<0.07	<0.07	<0.03	3	<0.2	<10	<0.2	10.55	60	<0.5	<2	7.25	<0.5	45	278
3	A00NK043	Gabbro	<0.03	<0.07	<0.07	<0.03	2	<0.2	<10	<0.2	8.25	400	1.5	<2	4.22	<0.5	24	21
4	A00RM054	Gabbro	<0.03	<0.07	<0.07	<0.03	6	<0.2	<10	0.2	10.7	70	<0.5	<2	7.38	<0.5	47	239
5	A00RM057	Gabbro	<0.03	<0.07	<0.07	<0.03	7	<0.2	10	<0.2	10.3	80	<0.5	<2	7.27	<0.5	47	215

No.	Sample	Rock	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sr (ppm)	Ti (%)	V (ppm)	W (ppm)	Zn (ppm)
1	A00NK041	Gabbro	79	3.67	0.23	8.26	715	<1	1.05	403	100	318	87	0.12	102	<10	1615
2	A00NK042	Gabbro	40	3.65	0.37	8.57	715	<1	1.09	398	80	54	91	0.11	97	<10	94
3	A00NK043	Gabbro	21	5.69	1.89	1.23	885	<1	2.05	6	640	70	132	0.57	117	<10	102
4	A00RM054	Gabbro	34	3.86	0.39	8.62	760	<1	1.18	417	120	8	94	0.13	101	<10	48
5	A00RM057	Gabbro	39	4.09	0.48	7.99	800	<1	1.16	376	130	6	98	0.16	124	<10	44

Appendix-8 Bulk chemical analysis results for the petrochemical study.

No.	Sample	Rock	Alteration	SiO_2 (%)	TiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	MnO (%)	MgO (%)	CaO (%)	Na_2O (%)	K_2O (%)	P_2O_5 (%)	Cr_2O_3 (%)	LOI (%)	Total (%)
1	A00HH012	Andesitic porphyry	Weak	63.08	0.45	17.69	5.14	0.06	1.87	4.22	3.79	1.29	0.15	<0.01	1.64	99.38
2	A00MZ011	Qz porphyry	Weak	63.22	0.31	16.54	2.89	0.15	1.71	4.11	3.14	1.90	0.15	<0.01	4.61	98.73
3	A00MZ013	Dacite porphyry	Fresh	57.44	0.52	17.16	5.16	0.14	3.32	4.61	3.76	1.62	0.16	<0.01	4.66	98.55
4	A00MZ015	Tonalite	Fresh with green Cu stain	62.62	0.46	17.73	4.01	0.11	2.02	5.44	3.52	1.53	0.12	<0.01	1.46	99.02
5	A00MZ018	Granodiorite	Fresh	61.59	0.62	16.01	4.96	0.10	2.41	4.51	3.30	3.26	0.17	<0.01	1.68	98.61
6	A00MZ032	Granodiorite (Float	Fresh	67.27	0.47	15.27	3.80	0.06	1.46	3.51	3.44	2.73	0.11	<0.01	1.16	99.28
7	A00MZ044	Microdiorite	Propylite	51.44	0.90	17.38	8.58	0.18	3.79	8.03	2.53	1.74	0.25	<0.01	4.19	99.01
8	A00TM009	Tonalite	Fresh	63.71	0.34	18.57	3.23	0.04	1.51	5.09	4.19	1.24	0.22	<0.01	0.98	99.12
9	A00TM018	Tonalite	Weak	62.49	0.69	16.07	4.92	0.14	2.52	4.75	2.69	2.81	0.17	<0.01	1.33	98.58
10	A00TM019	Diorite porphyry	Tourmalinization with qz-epidote vein	52.68	0.92	20.80	6.31	0.21	2.45	5.57	3.33	5.17	0.19	<0.01	1.14	98.77
11	A00TM020	Tonalite	Fresh	61.05	0.55	17.46	5.59	0.14	2.39	6.45	3.17	1.56	0.13	<0.01	0.34	98.83
12	A00TM030	Tonalite	Potassic? with limonite stain	59.18	0.97	15.71	5.96	0.14	4.16	6.35	3.78	1.02	0.19	<0.01	1.77	99.23
13	A00RM013	Granite	Weak, qz vein with py diss.	63.67	0.64	15.43	4.84	0.09	2.78	2.43	2.29	3.87	0.12	<0.01	3.11	99.27
14	A00MZ103	Granodiorite		68.42	0.36	15.55	2.87	0.04	1.37	2.47	3.75	2.41	0.10	<0.01	1.51	98.85
15	A00MZ108	Granodiorite	Potassic	68.45	0.49	15.44	3.42	0.04	1.73	2.35	3.15	2.06	0.13	<0.01	1.77	99.03
16	A00MZ137	Granodiorite		51.21	0.99	19.97	8.37	0.15	3.17	9.10	2.81	0.88	0.12	<0.01	2.15	98.92
17	A00MZ139	Andesite		56.06	1.79	15.82	8.95	0.14	2.32	6.18	4.11	1.18	0.40	<0.01	1.93	98.88
18	A00TM125	Dacitic andesite		62.00	0.68	16.87	6.42	0.11	1.98	4.75	3.34	1.36	0.20	<0.01	1.34	99.05

No.	Sample	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Co (ppm)	Ni (ppm)	Ba (ppm)	Rb (ppm)	Sr (ppm)	Sn (ppm)	W (ppm)	U (ppm)	Th (ppm)	Cs (ppm)	Ga (ppm)	Hf (ppm)	Nb (ppm)	Ta (ppm)	Tl (ppm)	V (ppm)	La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)	Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)	Y (ppm)	Zr (ppm)
1	A00HH012	<1	12	75	225	5	<5	250	53.4	392	1	1	1	5	3.7	18	5	5	<0.5	<0.5	75	13	26	3.1	12.5	2.7	0.7	2.6	0.4	2.7	0.6	1.8	0.3	2	0.4	16	191.5
2	A00MZ011	<1	10	80	135	4	<5	727	77.2	432	<1	3	0.5	4	10.6	16	5	5	<0.5	<0.5	50	18	35.5	4.2	16	3.5	0.9	3	0.5	2.7	0.5	1.6	0.2	1.9	0.3	14	174.5
3	A00MZ013	<1	20	10	50	11	<5	735	62.8	414	<1	<1	1	3	19.1	18	4	3	1	<0.5	115	14	30	3.9	15	3	0.9	3	0.5	2.8	0.6	2	0.3	2.1	0.3	16	126.5
4	A00MZ015	<1	485	90	165	6	<5	489	55.8	431	1	3	1.5	4	5.5	18	5	3	<0.5	<0.5	80	15	31.5	3.8	15	2.8	0.9	3	0.5	2.3	0.6	1.9	0.3	1.9	0.3	14.5	171.5
5	A00MZ018	<1	70	10	45	9	5	524	93.6	404	1	<1	5	16	2.2	18	10	6	<0.5	<0.5	95	33.5	71	8.3	33.5	5.7	1.2	5.5	0.8	4.2	0.8	2.4	0.4	2.3	0.4	21.5	324
6	A00MZ032	<1	5	5	25	5.5	<5	528	85.4	193	4	1	2.5	12	3.4	18	8	4	<0.5	<0.5	65	26.5	50	5.5	20.5	3.6	1.1	3.6	0.6	3.8	0.7	2.1	0.3	2	0.4	18.5	277
7	A00MZ044	<1	40	5	65	23.5	10	500	50.2	471	<1	<1	1.5	6	2	18	4	1	<0.5	<0.5	230	17.5	37	4.7	20	4.2	1.3	4.4	0.7	3.9	0.8	2.5	0.3	2.3	0.4	20.5	116
8	A00TM009	<1	10	10	20	3.5	<5	1295	38	737	1	<1	2	10	5.5	20	6	4	0.5	<0.5	45	25.5	48	5.3	17	3.4	1	2.6	0.4	1.8	0.4	1	0.1	1.3	0.2	10.5	199.5
9	A00TM018	<1	5	50	130	11	5	330	148	306	2	1	5.5	18	7	21	8	5	0.5	<0.5	110	25.5	52	6.1	24	4.6	1.2	3.9	0.5	2.7	0.5	1.6	0.2	1.3	0.3	14	260
10	A00TM019	<1	10	25	140	18	10	694	267	165	1	6	0.5	4	10.1	23	5	4	1	1	190	19.5	41	5.4	23.5	5.3	1.6	5.3	0.8	4.7	0.9	2.8	0.4	2.4	0.3	24	172
11	A00TM020	<1	30	15	70	10.5	<5	367	53.2	393	1	1	1.5	4	4.7	19	7	3	<0.5	<0.5	110	14.5	30	3.7	15	3.3	1	3.3	0.6	3.5	0.6	2.1	0.3	1.9	0.3	17.5	229
12	A00TM030	<1	45	15	85	14.5	35	299	32.8	305	4	1	2	8	4.5	18	8	4	<0.5	<0.5	160	23	51	6.2	24.5	6	1.5	6.2	1	6.7	1.4	4	0.5	3.5	0.5	33	276
13	A00RM013	<1	40	15	65	13	15	545	181	196	4	6	6	22	6.3	18	9	6	0.5	0.5	115	33	66	7.7	30.5	5.9	1.2	5.7	0.9	4.9	1.1	3.1	0.4	2.3	0.4	26.5	307
14	A00MZ103	1	70	55	80	4	15	394	76.4	357	1	3	1	4	3	17	7	2	0.5	<0.5	35	16.5	32.5	3.9	14	3	0.9	2.7	0.5	2.3	0.5	1.4	0.2	1.4	0.2	12.5	286
15	A00MZ108	1	1295	35	35	7	15	1440	95	367	<1	3	2.5	16	3.1	17	9	4	<0.5	0.5	65	25	46	5.3	17.5	2.9	0.9	2.8	0.4	2.1	0.4	1.2	0.1	1.3	0.1	10.5	359
16	A00MZ137	<1	60	5	85	20	10	212	26.4	331	<1	1	0.5	11	2.3	20	3	2	1.5	<0.5	230	26	62	7.8	30	5.8	1.7	5.2	0.7	3.5	0.7	2	0.3	1.7	0.2	17	108.5
17	A00MZ139	<1	20	<5	95	18.5	5	267	37.4	304	1	1	0.5	4	0.8	19	6	6	<0.5	<0.5	185	16	38	5.1	22	4.9	1.7	5.4	0.9	5.4	1.1	3.2	0.5	3.1	0.5	29	261
18	A00TM125	<1	5	<5	55	7.5	5	583	51	474	<1	1	1.5	5	0.9	14	5	4	7	<0.5	65	15	31	3.8	15	3.2	1.1	3.3	0.5	2.6	0.5	1.5	0.2	1.5	0.2	14	204

Appendix-9 Chemical analysis results for pan concentrated samples (only Phase II survey).

No.	Sample No.	Pt (g/t)	Pd (g/t)	Au (ppb)	Sb (ppm)	As (ppm)	Ba (ppm)	Br (ppm)	Ce (ppm)	Cr (ppm)	Co (ppm)	La (ppm)
1	A00PNK101	<0.14	<0.14	<5	<1	3	240	<1	29	170	56	21
2	A00PNK102	<0.35	<0.35	18	<1	7	230	1	47	290	39	22
3	A00PNK103	<0.35	<0.35	<5	<1	5	230	1	54	190	37	28
4	A00PNK104	<0.14	<0.14	<5	<1	7	390	<1	65	110	25	29
5	A00PNK105	<0.35	<0.35	<5	<1	5	140	1	31	210	50	23
6	A00PNK106	<0.07	<0.07	<5	<1	4	330	<1	35	80	28	19
7	A00PNK107	not/ss	not/ss	<5	<1	3	280	2	36	210	24	25
8	A00PNK108	<0.21	<0.21	<5	<1	5	260	<1	85	93	28	44
9	A00PNK109	<0.35	<0.35	<5	<1	9	360	<1	110	180	31	59
10	A00PNK110	<0.35	<0.35	<5	<1	3	270	1	18	170	36	13
11	A00PNK111	<0.35	<0.35	<5	<1	2	590	1	53	140	11	28
12	A00PNK112	<0.35	<0.35	<5	<1	4	360	<1	73	200	27	41

No.	Sample No.	Mo (ppm)	Sc (ppm)	Ag (ppm)	Ta (ppm)	Th (ppm)	W (ppm)	U (ppm)	Cu (%)	Pb (%)	Zn (%)
1	A00PNK101	<2	47	<5	<1	4	<2	1	<0.01	<0.01	<0.01
2	A00PNK102	<2	31	<5	<1	5	<2	1	<0.01	<0.01	<0.01
3	A00PNK103	<2	36	<5	3	6	<2	2	<0.01	<0.01	0.01
4	A00PNK104	<2	19	<5	1	8	<2	2	<0.01	<0.01	<0.01
5	A00PNK105	<2	44	<5	4	4	<2	2	<0.01	<0.01	0.01
6	A00PNK106	<2	25	<5	2	4	<2	1	<0.01	<0.01	<0.01
7	A00PNK107	<2	20	<5	4	5	<2	2	<0.01	<0.01	<0.01
8	A00PNK108	3	21	<5	4	7	<2	4	<0.01	0.01	0.01
9	A00PNK109	3	22	<5	3	14	7	3	<0.01	<0.01	0.01
10	A00PNK110	<2	31	<5	<1	4	<2	1	<0.01	<0.01	<0.01
11	A00PNK111	<2	9	<5	1	11	<2	2	<0.01	<0.01	<0.01
12	A00PNK112	<2	19	<5	1	28	<2	7	<0.01	<0.01	<0.01

Appendix-10 Ore grade assey result.

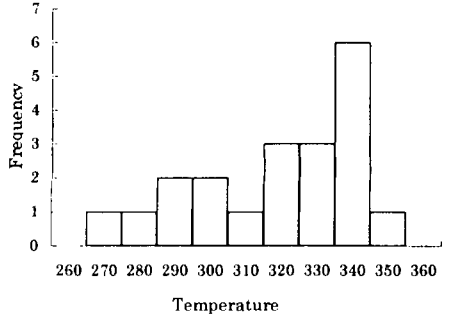
No.	Sample	Mineralization	Au (g/t)	Ag (g/t)	Al (%)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)	Fe (%)	K (%)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	Pb (%)	Sr (ppm)	Ti (%)	V (ppm)	Zn (ppm)
1	A00NK019	gn-cp-py vein	0.24	118	0.9	100	<10	<20	0.25	880	30	<10	8080	5.55	0.4	0.05	670	<10	0.15	<10	4.29	50	<0.05	<10	148500
2	A00HH002	qz-py-gn vein	1.71	18	0.45	<100	<10	20	3.05	10	30	<10	150	7.55	0.1	0.15	1720	<10	<0.05	<10	0.7	20	<0.05	10	1900
3	A00HH024	qz-py-cp-malachite-gn vein	0.24	123	2.5	400	<10	<20	0.45	750	30	<10	15720	6.7	1.6	0.2	1840	<10	0.35	<10	5.91	90	<0.05	10	142000
4	A00MZ010	massive pyrite-limonite	<0.03	11	0.05	<100	<10	40	0.35	<10	10	<10	1420	>30.0	<0.1	<0.05	80	<10	<0.05	<10	0.044	20	<0.05	<10	1240
5	A00MZ012	qz-cal-py-gn vein	152.9	91	1.1	<100	<10	<20	2.35	10	10	<10	1660	13.4	0.5	0.8	750	<10	<0.05	<10	2.18	50	0.05	40	3900
6	A00MZ016	qz-cal-py-gn vein	5.49	14	1.8	<100	<10	<20	5.6	70	10	10	320	6.95	0.7	1.75	5200	<10	<0.05	<10	1.15	80	0.05	40	9120
7	A00MZ019	barite-Fe oxides vein	0.03	31	1.05	7400	<10	<20	0.65	100	10	<10	220	8.55	0.4	0.05	36400	10	<0.05	<10	2.01	2480	<0.05	750	7200
8	A00MZ020	barite-galena-Fe oxides vein	<0.03	912	<0.05	2100	<10	<20	<0.05	30	<10	<10	700	0.2	<0.1	<0.05	1710	<10	<0.05	<10	15.1	910	<0.05	1440	540
9	A00MZ021	qz-malachite veinlet	0.45	15	5	2000	<10	80	0.15	<10	<10	<10	9000	4.2	2.5	0.15	230	140	0.6	<10	0.054	80	0.1	40	100
10	A00MZ028	qz-py-gn-bornite vein	0.18	321	0.9	200	<10	<20	<0.05	90	<10	10	50	15.35	0.3	<0.05	360	<10	<0.05	<10	9.92	10	<0.05	<10	24300
11	A00MZ030	gn-py-cp vein	0.09	74	1.35	400	<10	<20	0.15	1650	50	<10	7270	5.4	1.3	0.05	1360	<10	<0.05	<10	15.4	80	<0.05	<10	263000
12	A00MZ036	cp veinlets and cp diss. in andesite	<0.03	13	8.4	500	<10	20	4.4	<10	50	50	36900	6.3	1.3	2.9	1070	<10	2	60	0.059	290	0.65	270	640
13	A00MZ037	malachite with brecciated andesite	<0.03	22	8.6	100	<10	<20	9.95	<10	20	50	47200	6.95	0.2	1.25	1040	<10	1.1	20	0.021	620	0.7	330	120
14	A00MZ041	qz-py-gn vein	0.12	3	0.9	300	<10	<20	24.2	30	<10	<10	310	1.55	0.1	0.15	25900	<10	<0.05	<10	0.398	120	<0.05	40	6500
15	A00MZ042	galena vein	3.09	17	0.85	300	<10	<20	0.05	930	<10	<10	7390	2.65	0.1	0.3	1470	<10	<0.05	<10	3.82	50	<0.05	20	199500
16	A00MZ046	qz-cp-py-gn vein	4.11	6	1.25	200	<10	20	0.55	<10	<10	<10	4070	3.9	0.4	0.2	750	10	<0.05	<10	0.059	40	0.05	30	1060
17	A00MZ048	white and massive qz vein	2.94	5	0.4	200	<10	<20	0.05	<10	<10	20	30	0.05	<0.1	<0.05	40	<10	<0.05	<10	0.012	30	<0.05	<10	120
18	A00MZ049	black and white banding qz vein	14.4	3	0.5	<100	<10	<20	0.05	<10	<10	20	40	0.05	0.1	<0.05	20	<10	<0.05	<10	0.003	50	<0.05	<10	60
19	A00MZ055	qz-cp-gn-malachite vein	0.54	18	1.75	<100	<10	<20	<0.05	160	<10	<10	6330	0.5	0.7	0.05	70	200	<0.05	<10	10.9	40	<0.05	10	12940
20	A00MZ068	gn-sp-py vein	0.93	14	0.65	<100	<10	20	<0.05	1310	<10	<10	1150	3.65	<0.1	0.25	370	10	<0.05	<10	3.56	<10	<0.05	<10	134000
21	A00TM049	black qz vein	0.12	<1	3.3	100	<10	<20	0.35	<10	<10	10	10	0.85	2.6	0.05	80	<10	<0.05	<10	0.014	50	0.2	70	280
22	A00TM051	black and white qz vein	0.12	<1	0.45	<100	<10	<20	0.05	<10	<10	10	<10	0.35	0.1	<0.05	10	<10	<0.05	<10	0.004	20	<0.05	<10	60
23	A00RM029	gn-py-cp-green Cu vein	0.06	27	0.6	100	<10	<20	0.05	880	40	<10	3510	6.75	0.4	0.05	1000	<10	<0.05	<10	6.3	30	<0.05	<10	130000
24	A00RM046	white chalcedonic qz vein	42.72	41	0.55	<100	<10	<20	0.05	<10	<10	20	10	0.05	0.1	<0.05	30	<10	<0.05	<10	0.023	20	<0.05	<10	300
25	A00HH109	Malachite	0.12	6	5.7	900	<10	60	0.05	<10	10	<10	132500	5.65	2.5	0.25	20	<10	0.05	<10	0.001	<10	0.05	40	<20
26	A00HH111	Pyrite-malachite	0.18	4	0.3	<100	<10	<20	<0.05	<10	10	10	3440	3.55	<0.1	<0.05	70	<10	<0.05	<10	<0.001	50	<0.05	60	40
27	A00HH124	Malachite, chalcopyrite, pyrite	<0.03	6	8.55	100	<10	<20	4.6	<10	50	80	14250	7.4	0.7	3.45	1440	<10	2.25	50	0.003	330	0.7	290	180
28	A00HH126	Malachite, chalcopyrite	<0.03	4	7.15	100	<10	<20	5.75	<10	50	150	10720	3.35	0.5	1.6	740	<10	2.7	60	0.003	240	0.7	230	80
29	A00HH127	Malachite, chalcopyrite	<0.03	3	7.45	<100	<10	<20	10.35	<10	10	120	13640	7.1	<0.1	0.25	870	40	<0.05	10	0.004	780	0.55	290	20
30	A00HH129	Malachite, chalcopyrite	<0.03	3	4.35	400	<10	<20	4.55	<10	150	<10	990	3.05	2.1	1.1	1910	<10	<0.05	10	<0.001	120	0.1	90	100
31	A00HH130	Malachite	<0.03	2	7.2	300	<10	<20	0.05	<10	10	<10	2100	1.5	2.1	0.2	430	<10	2	40	0.001	50	<0.05	10	60
32	A00MZ123	Galena dissemination	0.87	4	0.5	<100	<10	<20	<0.05	<10	<10	10	80	0.55	0.2	<0.05	30	10	<0.05	<10	0.184	50	<0.05	<10	20
33	A00MZ125	Galena-pyrite-limonite	0.42	6	1.1	<100	<10	1120	<0.05	10	60	<10	340	9.1	0.4	<0.05	10	<10	<0.05	<10	0.011	100	<0.05	<10	<20
34	A00MZ127	Massive limonite	<0.03	1	0.6	<100	<10	40	0.15	<10	60	<10	<10	>30.0	<0.1	<0.05	4540	<10	<0.05	<10	0.007	90	<0.05	<10	560
35	A00MZ132	Chalcocite, malachite	0.06	32	5.65	<100	<10	<20	7.2	<10	<10	40	43900	4.65	<0.1	0.05	780	<10	<0.05	<10	0.007	690	0.3	240	<20
36	A00MZ134	Malachite	<0.03	4	8.3	500	<10	<20	0.3	<10	30	30	8720	3.25	2.1	1.5	1540	<10	2.85	10	0.004	140	0.35	140	220
37	A00TM112	Chalcopyrite, malachite, azurite, pyri	14.04	524	3.65	100	<10	220	0.05	20	<10	<10	27500	0.85	1.7	0.1	40	340	0.05	<10	2.69	30	0.15	20	800
38	A00TM149	Barite, azurite, malachite	<0.03	45	0.15	11100	<10	20	0.05	30	<10	<10	17400	0.3	<0.1	<0.05	20	70	<0.05	<10	0.604	770	<0.05	280	2140
39	A00RM128	Oxide Cu	0.42	1585	6.4	300	<10	80	6.45	<10	<10	50	254000	6.05	<0.1	0.45	530	<10	0.6	<10	0.012	1640	0.1	200	<20
40	A00RM132	Wad	<0.03	2	2	700	<10	60	0.75	<10	40	<10	130	>30.0	0.2	0.3	54200	<10	0.15	<10	0.007	100	0.05	10	60

Appendix-11

Homogenization temperature and salinity of fluid inclusions of quartz samples (1/19)

Sample A00NK013

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	37.5	17	tu	341	183.0	30.9
2	Quartz	12.5	15	po	347	192.0	31.4
3	Quartz	10.0	15	po	296	234.0	33.5
4	Quartz	10.0	15	po	288	211.0	32.4
5	Quartz	17.5	13	po	306	243.0	34.1
6	Quartz	30.0	13	po	352	225.0	32.9
7	Quartz	17.5	13	po	279	195.0	31.4
8	Quartz	22.5	15	tu	337	201.0	31.9
9	Quartz	15.0	15	po	327	214.0	32.4
10	Quartz	7.5	13	po	343	222.0	32.9
11	Quartz	7.5	13	po	313	225.0	32.9
12	Quartz	22.5	17	tu	325	194.0	31.4
13	Quartz	17.5	17	wg	344	199.0	31.4
14	Quartz	5.0	15	po	335	228.0	32.9
15	Quartz	10.0	15	po	341	204.0	31.9
16	Quartz	7.5	13	po	327	221.0	32.9
17	Quartz	17.5	17	po	338	235.0	33.5
18	Quartz	17.5	15	tu	343	195.0	31.4
19	Quartz	10.0	13	po	303	223.0	32.9
20	Quartz	7.5	13	po	295	201.0	31.9

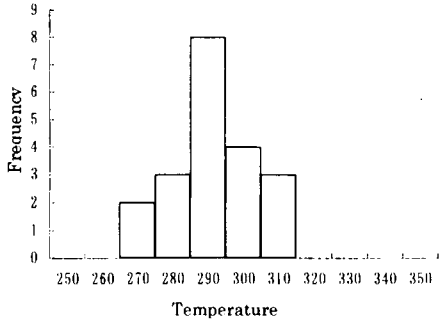


Mineral	Quartz
Inclusions	20
Maximum	352 ℃
Minimum	279 ℃
Average	324.0 ℃
deviation	21.6

Homogenization temperature and salinity of fluid inclusions of quartz samples (2/19)

Sample A00NK038

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	7.5	15	wg	291	-0.4	0.71
2	Quartz	5.0	15	po	305	-0.4	0.71
3	Quartz	2.5	13	po	282	-	-
4	Quartz	< 2.5	12	po	273	-	-
5	Quartz	< 2.5	10	eg	275	-	-
6	Quartz	10.0	17	po	311	-0.3	0.53
7	Quartz	5.0	15	po	302	-0.4	0.71
8	Quartz	5.0	17	sq	295	-0.2	0.35
9	Quartz	5.0	17	sq	297	-0.2	0.35
10	Quartz	5.0	15	po	303	-0.4	0.71
11	Quartz	2.5	12	po	292	-	-
12	Quartz	< 2.5	10	po	296	-	-
13	Quartz	< 2.5	10	eg	280	-	-
14	Quartz	< 2.5	10	eg	291	-	-
15	Quartz	7.5	15	po	303	-0.2	0.35
16	Quartz	7.5	13	po	312	-0.5	0.88
17	Quartz	5.0	12	po	292	-0.4	0.71
18	Quartz	5.0	15	sq	310	-0.2	0.35
19	Quartz	< 2.5	12	eg	295	-	-
20	Quartz	< 2.5	10	eg	287	-	-



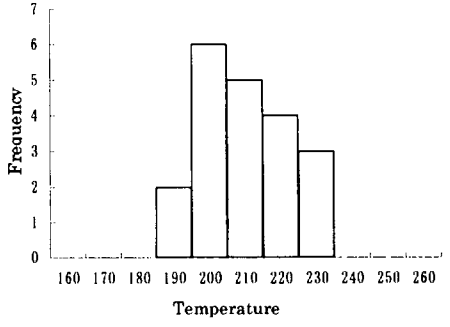
Mineral	Quartz
Inclusions	20.0
Maximum	312.0 ℃
Minimum	273.0 ℃
Average	294.6 ℃
deviation	11.0

Appendix-11

Homogenization temperature and salinity of fluid inclusions of quartz samples (3/19)

Sample A00MZ012

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	25.0	15	irr	225	-2.1	3.55
2	Quartz	10.0	13	irr	193	-2.1	3.55
3	Quartz	7.5	13	irr	206	-1.9	3.23
4	Quartz	22.5	15	irr	219	-2.4	4.03
5	Quartz	20.0	17	po	223	-2.1	3.55
6	Quartz	10.0	13	irr	208	-2.2	3.71
7	Quartz	15.0	13	irr	214	-2.1	3.55
8	Quartz	17.5	15	irr	231	-2.4	4.03
9	Quartz	5.0	13	po	223	-	-
10	Quartz	5.0	12	po	214	-	-
11	Quartz	22.5	15	irr	204	-2.2	3.71
12	Quartz	17.5	15	irr	197	-2.1	3.55
13	Quartz	17.5	13	irr	202	-2.1	3.55
14	Quartz	10.0	12	po	201	-2.1	3.55
15	Quartz	7.5	15	po	235	-	-
16	Quartz	5.0	13	po	215	-	-
17	Quartz	5.0	13	po	223	-	-
18	Quartz	12.5	15	wg	232	-2.2	3.71
19	Quartz	5.0	13	po	219	-	-
20	Quartz	5.0	12	po	205	-	-

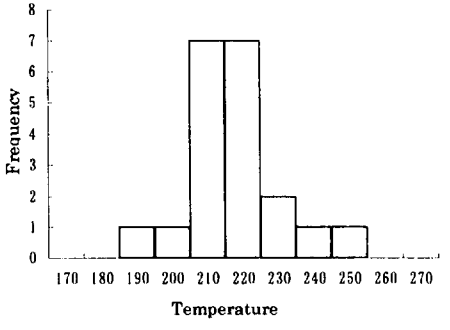


Mineral	Quartz
Inclusions	20
Maximum	235 ℃
Minimum	193 ℃
Average	214.5 ℃
deviation	11.8

Homogenization temperature and salinity of fluid inclusions of quartz samples (4/19)

Sample A00MZ016

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	27.5	15	irr	223	-3.1	5.11
2	Quartz	10.0	10	po	215	-3.2	5.26
3	Quartz	17.5	10	po	213	-2.7	4.49
4	Quartz	7.5	10	po	216	-3.2	5.26
5	Quartz	7.5	12	po	227	-3.3	5.41
6	Quartz	20.0	13	po	233	-2.6	4.34
7	Quartz	25.0	20	po	253	-3.0	4.96
8	Quartz	12.5	12	irr	221	-2.2	3.71
9	Quartz	10.0	10	irr	208	-1.8	3.06
10	Quartz	7.5	10	po	220	-	-
11	Quartz	7.5	17	po	245	-	-
12	Quartz	17.5	13	irr	226	-2.2	3.71
13	Quartz	25.0	12	irr	228	-3.4	5.56
14	Quartz	10.0	10	tu	198	-2.5	4.18
15	Quartz	7.5	10	po	213	-	-
16	Quartz	7.5	10	po	212	-	-
17	Quartz	10.0	12	po	228	-2.8	4.65
18	Quartz	32.5	13	irr	215	-3.3	5.41
19	Quartz	17.5	15	po	237	-3.2	5.26
20	Quartz	12.5	13	po	213	-2.7	4.49



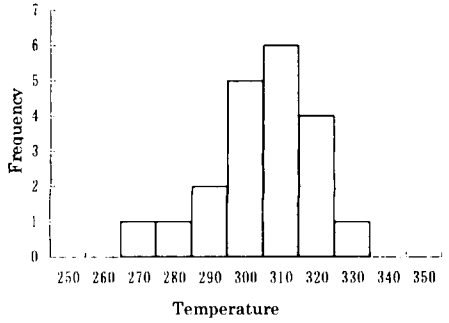
Mineral	Quartz
Inclusions	20.0
Maximum	253.0 ℃
Minimum	198.0 ℃
Average	222.2 ℃
deviation	12.7

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (5/19)

Sample A00MZ017

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	37.5	15	po	313	-3.0	4.96
2	Quartz	55.0	13	irr	272	-2.1	3.55
3	Quartz	7.5	15	po	308	-0.3	5.26
4	Quartz	7.5	13	po	295	-2.6	4.34
5	Quartz	7.5	13	po	331	-2.6	4.34
6	Quartz	12.5	17	po	311	-3.0	4.96
7	Quartz	2.5	17	po	283	-	-
8	Quartz	12.5	13	po	315	-1.9	3.23
9	Quartz	5.0	13	po	326	-	-
10	Quartz	5.0	13	po	314	-	-
11	Quartz	15.0	15	irr	301	-2.0	3.39
12	Quartz	12.5	17	sq	328	-2.5	4.18
13	Quartz	7.5	15	sq	304	-2.8	4.65
14	Quartz	5.0	13	po	313	-	-
15	Quartz	32.5	13	irr	320	-3.1	5.11
16	Quartz	20.0	13	irr	321	-1.8	3.06
17	Quartz	12.5	13	po	295	-2.5	4.18
18	Quartz	10.0	12	po	304	-2.7	4.49
19	Quartz	7.5	12	po	307	-	-
20	Quartz	10.0	13	po	313	-2.8	4.65

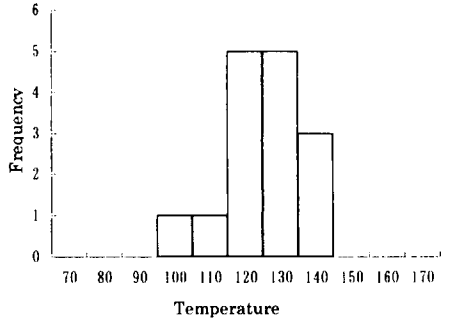


Mineral	Quartz
Inclusions	20
Maximum	331 ℃
Minimum	272 ℃
Average	308.7 ℃
deviation	14.3

Homogenization temperatura and salinity of fluid inclusions of quartz samples (6/19)

Sample A00MZ043

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	12.5	10	irr	128	-0.9	1.57
2	Quartz	5.0	10	irr	109	-1.0	1.74
3	Quartz	< 2.5	7	po	127	-	-
4	Quartz	< 2.5	7	eg	134	-	-
5	Quartz	< 2.5	10	eg	141	-	-
6	Quartz	7.5	12	po	144	-1.2	2.07
7	Quartz	5.0	10	po	136	-1.3	2.24
8	Quartz	5.0	10	irr	122	-0.9	1.57
9	Quartz	2.5	7	po	121	-	-
10	Quartz	< 2.5	7	po	133	-	-
11	Quartz	5.0	10	irr	140	-0.8	1.40
12	Quartz	5.0	7	irr	133	-1.4	2.41
13	Quartz	5.0	7	irr	136	-0.9	1.57
14	Quartz	< 2.5	7	po	129	-	-
15	Quartz	< 2.5	5	eg	117	-	-



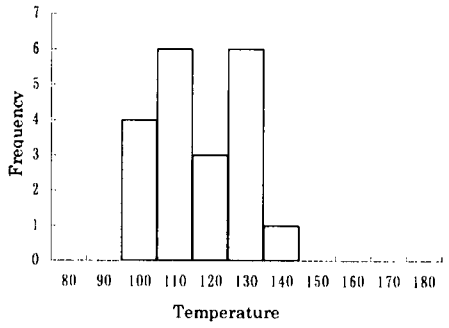
Mineral	Quartz
Inclusions	15.0
Maximum	144.0 ℃
Minimum	109.0 ℃
Average	130.0 ℃
deviation	9.3

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (7/19)

Sample A00MZ046

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	12.5	10	po	106	-1.6	2.74
2	Quartz	10.0	12	po	112	-1.8	3.06
3	Quartz	5.0	10	po	130	-	-
4	Quartz	5.0	7	po	105	-	-
5	Quartz	7.5	12	po	141	-1.2	2.07
6	Quartz	10.0	12	wg	136	-0.7	1.23
7	Quartz	12.5	12	wg	132	-1.4	2.41
8	Quartz	5.0	10	po	124	-	-
9	Quartz	5.0	10	po	117	-	-
10	Quartz	7.5	12	po	132	-1.5	2.57
11	Quartz	10.0	10	wg	135	-1.2	2.07
12	Quartz	7.5	7	po	109	-1.2	2.07
13	Quartz	17.5	10	irr	115	-1.0	1.74
14	Quartz	12.5	12	irr	121	-0.8	1.40
15	Quartz	5.0	10	po	114	-	-
16	Quartz	5.0	7	po	113	-	-
17	Quartz	10.0	12	po	138	-1.3	2.24
18	Quartz	7.5	10	po	122	-1.7	2.90
19	Quartz	5.0	10	po	112	-1.4	2.41
20	Quartz	5.0	7	po	107	-	-

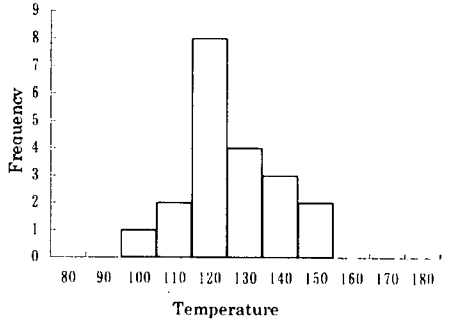


Mineral	Quartz
Inclusions	20
Maximum	141 ℃
Minimum	105 ℃
Average	121.1 ℃
deviation	11.4

Homogenization temperatura and salinity of fluid inclusions of quartz samples (8/19)

Sample A00MZ048

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	10.0	12	po	135	-0.8	1.40
2	Quartz	5.0	10	po	127	-1.1	1.91
3	Quartz	5.0	13	sq	145	-0.2	0.35
4	Quartz	2.5	10	po	119	-	-
5	Quartz	< 2.5	10	po	123	-	-
6	Quartz	< 2.5	7	eg	108	-	-
7	Quartz	12.5	12	po	137	-0.9	1.57
8	Quartz	7.5	12	po	152	-0.8	1.40
9	Quartz	7.5	10	po	137	-0.6	1.05
10	Quartz	5.0	10	sq	142	-0.8	1.40
11	Quartz	2.5	7	po	125	-	-
12	Quartz	< 2.5	10	eg	153	-	-
13	Quartz	< 2.5	7	eg	129	-	-
14	Quartz	12.5	15	irr	117	-0.8	1.40
15	Quartz	10.0	10	sq	143	-1.0	1.74
16	Quartz	5.0	12	po	125	-0.8	1.40
17	Quartz	5.0	10	po	121	-	-
18	Quartz	5.0	10	po	123	-0.8	1.40
19	Quartz	< 2.5	10	po	135	-	-
20	Quartz	< 2.5	7	eg	122	-	-



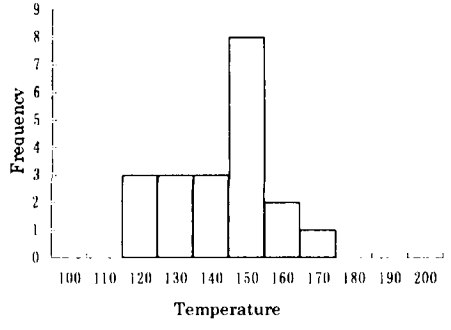
Mineral	Quartz
Inclusions	20.0
Maximum	153.0 ℃
Minimum	108.0 ℃
Average	130.9 ℃
deviation	11.7

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (9/19)

Sample A00MZ051

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	12.5	12	irr	142	-0.4	0.71
2	Quartz	10.0	10	irr	121	-0.1	0.18
3	Quartz	5.0	13	po	155	-0.6	1.05
4	Quartz	5.0	12	po	132	-	-
5	Quartz	5.0	10	po	124	-	-
6	Quartz	7.5	12	irr	127	-0.6	1.05
7	Quartz	5.0	12	po	157	-0.5	0.88
8	Quartz	< 2.5	10	po	143	-	-
9	Quartz	5.0	15	sq	167	-0.3	0.53
10	Quartz	5.0	13	po	157	-0.2	0.35
11	Quartz	5.0	12	po	138	-0.2	0.35
12	Quartz	10.0	12	wg	155	-0.3	0.53
13	Quartz	7.5	13	po	152	-0.6	1.05
14	Quartz	5.0	12	po	145	-0.8	1.40
15	Quartz	5.0	12	po	161	-0.3	0.53
16	Quartz	5.0	17	sq	173	-0.2	0.35
17	Quartz	5.0	12	po	155	-	-
18	Quartz	2.5	10	po	132	-	-
19	Quartz	< 2.5	7	eg	150	-	-
20	Quartz	5.0	12	po	158	-0.3	0.53

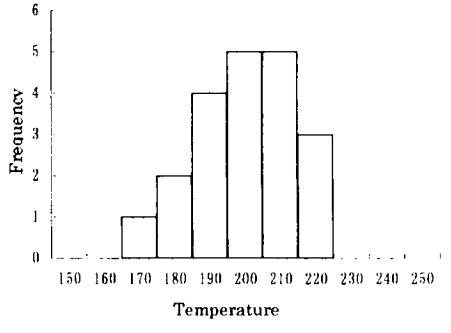


Mineral	Quartz
Inclusions	20
Maximum	173 ℃
Minimum	121 ℃
Average	147.2 ℃
deviation	14.1

Homogenization temperatura and salinity of fluid inclusions of quartz samples (10/19)

Sample A00MZ066

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	10.0	15	po	195	-1.4	2.41
2	Quartz	7.5	15	po	203	-1.6	2.74
3	Quartz	7.5	13	po	211	-1.3	2.24
4	Quartz	5.0	12	sq	209	-1.3	2.24
5	Quartz	5.0	13	sq	223	-	-
6	Quartz	10.0	15	irr	180	-1.5	2.57
7	Quartz	5.0	15	po	203	-1.7	2.90
8	Quartz	2.5	10	po	191	-	-
9	Quartz	< 2.5	10	po	194	-	-
10	Quartz	< 2.5	7	eg	177	-	-
11	Quartz	12.5	13	po	221	-1.3	2.24
12	Quartz	10.0	12	po	215	-1.2	2.07
13	Quartz	5.0	10	sq	201	-	-
14	Quartz	5.0	13	sq	215	-	-
15	Quartz	7.5	12	po	213	-1.5	2.57
16	Quartz	12.5	12	po	195	-1.9	3.23
17	Quartz	10.0	13	sq	222	-1.4	2.41
18	Quartz	5.0	12	po	213	-	-
19	Quartz	5.0	12	po	207	-	-
20	Quartz	7.5	10	po	183	-1.2	2.07



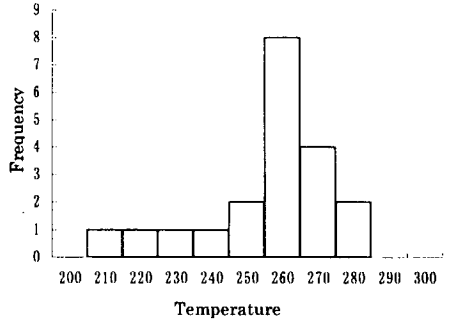
Mineral	Quartz
Inclusions	20.0
Maximum	223.0 ℃
Minimum	177.0 ℃
Average	203.6 ℃
deviation	13.5

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (11/19)

Sample A00TM039

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	12.5	17	po	224	161.0	30.1
2	Quartz	12.5	15	po	265	125.0	28.6
3	Quartz	10.0	20	po	275	166.0	30.1
4	Quartz	10.0	17	po	253	131.0	28.9
5	Quartz	10.0	20	po	277	165.0	30.1
6	Quartz	5.0	20	sq	283	172.0	30.5
7	Quartz	5.0	17	sq	275	177.0	30.5
8	Quartz	7.5	20	po	281	135.0	28.9
9	Quartz	7.5	17	po	263	125.0	28.6
10	Quartz	5.0	13	po	242	117.0	28.3
11	Quartz	12.5	13	irr	215	182.0	30.9
12	Quartz	10.0	17	po	261	131.0	28.9
13	Quartz	7.5	15	irr	237	177.0	30.5
14	Quartz	5.0	15	po	262	-	-
15	Quartz	5.0	13	po	251	125.0	28.6
16	Quartz	10.0	15	po	262	163.0	30.1
17	Quartz	7.5	20	sq	266	152.0	29.7
18	Quartz	10.0	17	wg	263	164.0	30.1
19	Quartz	7.5	17	po	261	162.0	30.1
20	Quartz	7.5	20	po	273	-	-

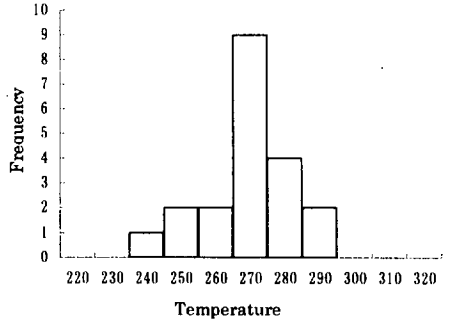


Mineral	Quartz
Inclusions	20
Maximum	283 ℃
Minimum	215 ℃
Average	259.5 ℃
deviation	17.7

Homogenization temperatura and salinity of fluid inclusions of quartz samples (12/19)

Sample A00TM042

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	27.5	13	irr	276	-2.5	4.18
2	Quartz	7.5	13	po	241	-1.2	2.07
3	Quartz	32.5	15	irr	279	-2.0	3.39
4	Quartz	20.0	13	po	251	-3.4	5.56
5	Quartz	22.5	17	irr	270	-3.2	5.26
6	Quartz	17.5	17	irr	271	-2.2	3.71
7	Quartz	12.5	20	po	288	-1.5	2.57
8	Quartz	10.0	17	po	267	-1.7	2.90
9	Quartz	10.0	20	po	282	-2.0	3.39
10	Quartz	5.0	13	po	255	-	-
11	Quartz	17.5	20	irr	289	-2.7	4.49
12	Quartz	10.0	17	po	274	-2.8	4.65
13	Quartz	7.5	20	po	295	-	-
14	Quartz	7.5	17	po	275	-	-
15	Quartz	12.5	17	po	291	-3.0	4.96
16	Quartz	40.0	20	irr	283	-1.3	2.24
17	Quartz	22.5	17	irr	275	-1.5	2.57
18	Quartz	10.0	17	po	279	-2.2	3.71
19	Quartz	5.0	15	po	260	-	-
20	Quartz	12.5	17	po	271	-2.1	3.55



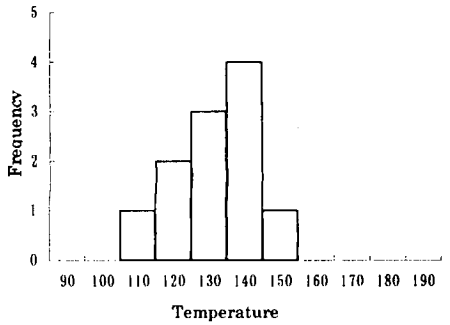
Mineral	Quartz
Inclusions	20.0
Maximum	295.0 ℃
Minimum	241.0
Average	273.6 ℃
deviation	13.4

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (13/19)

Sample A00TM059

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	5.0	13	po	145	-0.8	1.40
2	Quartz	5.0	12	po	132	-0.9	1.57
3	Quartz	2.5	10	po	147	-	-
4	Quartz	< 2.5	7	po	124	-	-
5	Quartz	< 2.5	10	eg	143	-	-
6	Quartz	< 2.5	7	eg	121	-	-
7	Quartz	< 2.5	7	eg	119	-	-
8	Quartz	5.0	12	po	135	-0.4	0.71
9	Quartz	< 2.5	10	eg	151	-	-
10	Quartz	< 2.5	7	eg	144	-	-
11	Quartz	< 2.5	7	eg	132	-	-

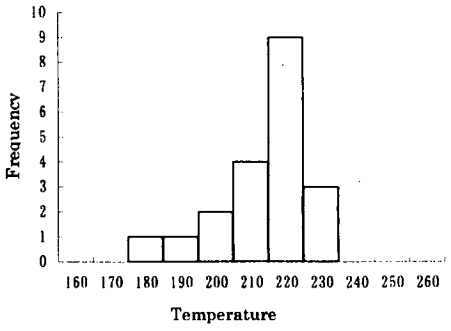


Mineral	Quartz
Inclusions	11
Maximum	151 ℃
Minimum	119 ℃
Average	135.7 ℃
deviation	10.6

Homogenization temperature and salinity of fluid inclusions of quartz samples (14/19)

Sample A00MZ119

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	7.5	10	po	227	-0.3	0.53
2	Quartz	5.0	12	po	231	-0.8	1.40
3	Quartz	5.0	10	po	217	-1.3	2.24
4	Quartz	2.5	10	po	221	-	-
5	Quartz	2.5	7	po	189	-	-
6	Quartz	5.0	10	po	222	-1.0	1.74
7	Quartz	10.0	12	wg	235	-1.5	2.57
8	Quartz	5.0	10	po	228	-0.1	0.18
9	Quartz	7.5	12	po	225	-1.7	2.90
10	Quartz	5.0	10	po	210	-0.3	0.53
11	Quartz	2.5	10	eg	221	-	-
12	Quartz	2.5	7	po	194	-	-
13	Quartz	< 2.5	10	eg	207	-	-
14	Quartz	< 2.5	10	eg	225	-	-
15	Quartz	5.0	13	sq	238	-0.6	1.05
16	Quartz	7.5	12	po	224	-0.5	0.88
17	Quartz	7.5	10	po	208	0.0	0.00
18	Quartz	5.0	10	po	212	-1.4	2.41
19	Quartz	2.5	10	po	226	-	-
20	Quartz	< 2.5	7	po	215	-	-



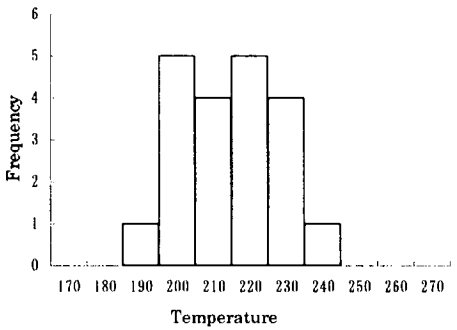
Mineral	Quartz
Inclusions	20.0
Maximum	352.0 ℃
Minimum	279.0 ℃
Average	321.8 ℃
deviation	21.7

Appendix-11

Homogenization temperature and salinity of fluid inclusions of quartz samples (15/19)

Sample A00MZ148

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	17.5	17	irr	235	-0.7	1.23
2	Quartz	10.0	15	po	223	-0.2	0.35
3	Quartz	12.5	15	sq	207	-0.4	0.71
4	Quartz	15.0	15	po	236	-0.3	0.53
5	Quartz	25.0	17	po	221	-0.3	0.53
6	Quartz	27.5	15	irr	202	-0.5	0.88
7	Quartz	25.0	13	irr	206	-0.8	1.40
8	Quartz	12.5	15	po	217	-1.0	1.74
9	Quartz	10.0	20	tr	242	-0.4	0.71
10	Quartz	7.5	17	po	213	-	-
11	Quartz	15.0	17	wg	235	-0.3	0.53
12	Quartz	20.0	13	irr	202	-0.7	1.23
13	Quartz	22.5	15	irr	210	-0.7	1.23
14	Quartz	15.0	17	po	222	-0.8	1.40
15	Quartz	10.0	13	po	195	-0.6	1.05
16	Quartz	10.0	15	irr	212	-0.7	1.23
17	Quartz	7.5	15	po	233	-	-
18	Quartz	12.5	13	irr	203	-0.7	1.23
19	Quartz	10.0	12	po	220	-0.7	1.23
20	Quartz	7.5	13	po	227	-	-

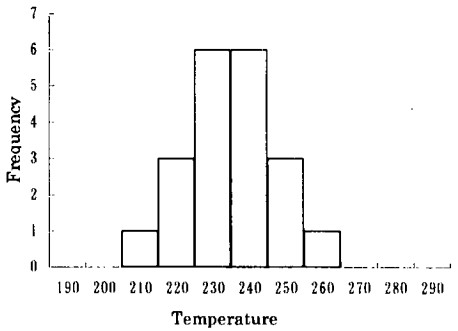


Mineral	Quartz
Inclusions	20
Maximum	242 ℃
Minimum	195 ℃
Average	218.1 ℃
deviation	13.2

Homogenization temperature and salinity of fluid inclusions of quartz samples (16/19)

Sample A00TM103

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	15.0	17	po	246	-8.3	12.05
2	Quartz	12.5	12	po	223	-11.2	15.17
3	Quartz	5.0	13	po	235	-	-
4	Quartz	10.0	13	po	241	-10.5	14.46
5	Quartz	12.5	15	irr	247	-8.6	12.39
6	Quartz	10.0	15	wg	255	-11.3	15.27
7	Quartz	5.0	17	po	239	-	-
8	Quartz	5.0	15	po	214	-	-
9	Quartz	17.5	15	irr	221	-10.6	14.57
10	Quartz	12.5	13	irr	232	-9.8	13.72
11	Quartz	12.5	13	po	238	-10.9	14.87
12	Quartz	5.0	17	sq	252	-	-
13	Quartz	5.0	13	po	241	-	-
14	Quartz	17.5	15	irr	250	-12.3	16.24
15	Quartz	15.0	13	po	244	-11.6	15.57
16	Quartz	7.5	12	po	235	-	-
17	Quartz	7.5	17	sq	262	-8.2	11.93
18	Quartz	10.0	15	irr	232	-10.3	14.25
19	Quartz	5.0	12	po	227	-	-
20	Quartz	12.5	13	irr	245	-10.5	14.46



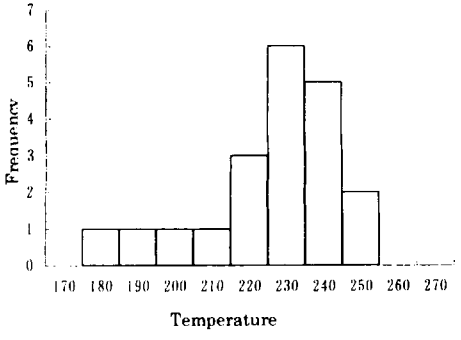
Mineral	Quartz
Inclusions	20.0
Maximum	262.0 ℃
Minimum	214.0 ℃
Average	239.0 ℃
deviation	11.7

Appendix-11

Homogenization temperature and salinity of fluid inclusions of quartz samples (17/19)

Sample A00TM109

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	17.5	15	po	183	-4.2	6.74
2	Quartz	32.5	17	po	256	-4.3	6.88
3	Quartz	30.0	15	irr	247	-5.1	8.00
4	Quartz	10.0	13	po	218	-4.6	7.31
5	Quartz	10.0	15	po	233	-	-
6	Quartz	5.0	12	po	244	-	-
7	Quartz	27.5	15	irr	245	-4.0	6.45
8	Quartz	12.5	13	po	225	-4.5	7.17
9	Quartz	7.5	12	po	198	-	-
10	Quartz	10.0	13	wg	238	-4.6	7.31
11	Quartz	17.5	17	irr	220	-5.5	8.55
12	Quartz	12.5	15	po	235	-4.3	6.88
13	Quartz	7.5	13	po	204	-	-
14	Quartz	30.0	20	irr	233	-4.5	7.17
15	Quartz	15.0	17	irr	248	-4.2	6.74
16	Quartz	7.5	20	sq	255	-	-
17	Quartz	12.5	17	irr	229	-3.8	6.16
18	Quartz	10.0	13	po	235	-4.5	7.17
19	Quartz	7.5	15	po	241	-4.0	6.45
20	Quartz	12.5	15	irr	238	-4.1	6.59

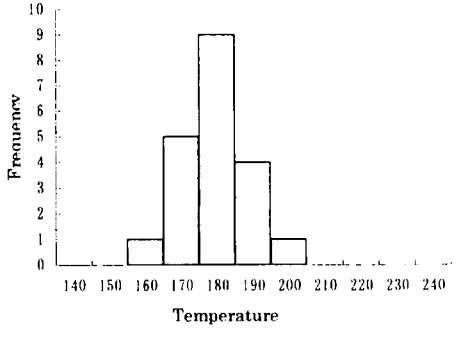


Mineral	Quartz
Inclusions	20
Maximum	256 ℃
Minimum	183 ℃
Average	231.3 ℃
deviation	18.4

Homogenization temperatura and salinity of fluid inclusions of quartz samples (18/19)

Sample A00TM112

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	22.5	12	irr	186	-6.4	9.73
2	Quartz	10.0	12	po	195	-4.5	7.17
3	Quartz	15.0	10	irr	188	-6.8	10.24
4	Quartz	7.5	10	po	190	-	-
5	Quartz	22.5	12	irr	185	-6.5	9.86
6	Quartz	17.5	10	irr	177	-4.2	6.74
7	Quartz	32.5	10	irr	172	-6.2	9.47
8	Quartz	25.0	12	irr	188	-6.6	9.98
9	Quartz	12.5	13	wg	195	-4.7	7.45
10	Quartz	7.5	12	po	203	-	-
11	Quartz	10.0	10	po	173	-4.3	6.88
12	Quartz	10.0	10	irr	181	-5.8	8.95
13	Quartz	20.0	10	irr	188	-4.3	6.88
14	Quartz	22.5	12	irr	188	-4.4	7.02
15	Quartz	15.0	13	po	193	-6.8	10.24
16	Quartz	10.0	10	po	171	-4.6	7.31
17	Quartz	7.5	10	po	185	-	-
18	Quartz	12.5	10	irr	163	-7.1	10.61
19	Quartz	10.0	12	wg	185	-4.2	6.74
20	Quartz	7.5	10	po	172	-	-



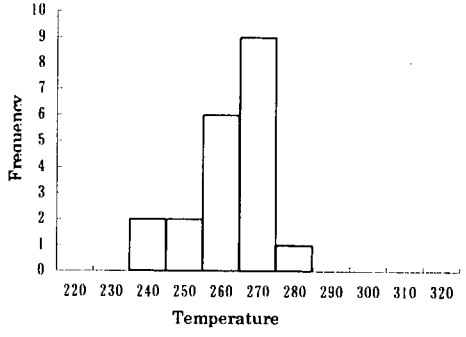
Mineral	Quartz
Inclusions	20.0
Maximum	203.0 ℃
Minimum	163.0 ℃
Average	183.9 ℃
deviation	9.7

Appendix-11

Homogenization temperatura and salinity of fluid inclusions of quartz samples (19/19)

Sample A00TM119

No.	Mineral	Size (mμ)	Volume ratio (%)	Form	Temperature (℃)	Melting Temperature (℃)	NaCl Wt (%)
1	Quartz	25.0	17	irr	273	-3.6	5.86
2	Quartz	12.5	15	po	275	-3.4	5.56
3	Quartz	7.5	13	sq	265	-3.6	5.86
4	Quartz	25.0	15	irr	261	-4.8	7.59
5	Quartz	17.5	15	po	274	-3.6	5.86
6	Quartz	7.5	12	sq	273	-	-
7	Quartz	20.0	13	irr	243	-3.7	6.01
8	Quartz	17.5	13	po	264	-4.0	6.45
9	Quartz	7.5	15	po	278	-	-
10	Quartz	22.5	15	irr	258	-3.5	5.71
11	Quartz	12.5	13	po	257	-3.6	5.86
12	Quartz	10.0	17	wg	282	-3.6	5.86
13	Quartz	10.0	13	po	268	-3.8	6.16
14	Quartz	7.5	12	po	265	-	-
15	Quartz	32.5	15	irr	272	-3.2	5.26
16	Quartz	17.5	13	irr	275	-3.6	5.86
17	Quartz	5.0	12	po	241	-	-
18	Quartz	12.5	15	po	278	-3.8	6.16
19	Quartz	7.5	15	po	275	-4.0	6.45
20	Quartz	12.5	12	irr	266	-3.5	5.71



Mineral	Quartz
Inclusions	20
Maximum	282 ℃
Minimum	241 ℃
Average	267.2 ℃
deviation	10.7

Legend of Form
eg:egg shape; irr:irregular; po:polygon; sq:square; tr:triangle; tu:tube; wg:wedge-shape

Appendix-12 Measurement results of sulfur isotopic composition.

No.	Sample No.	District	Locality	Type	$\delta^{34}S$ (‰)
1	A00MZ012	Andacollo	Mina Sofia, Level1	Pyrite in quartz vein	+3.5
2	A00MZ014	Andacollo	Mina Sofia	Pyrite in black mudstone	-14.9
3	A00MZ029	Mina Maria	Mina Maria	Galena vein	-0.3
4	A00MZ036	Condorcanqui	Condorcanqui	Chalcopyrite in andesite	-26.7
5	A00MZ042	Huemules	Huemules Sur	Galena vein	-1.8
6	A00MZ060	Arroyo Cascada	Arroyo Cascada	Pyrite in quartz vein	+6.6
7	A00MZ066	Ferrocarrilera	Ferrocarrilera	Pyrite in quartz vein	-0.4
8	A00MZ131	Condorcanqui	Condorcanqui	Chalcopyrite dissemination	+1.9
9	A00MZ135	Condorcanqui	Condorcanqui	Chalcopyrite in amygdale part	+4.1
10	A00MZ136	Condorcanqui	Condorcanqui	Andesite	+11.4
11	A00MZ137	Condorcanqui	North of Epuyen town	Granodiorite	+11.1

Appendix-13 Measurement results of oxygen isotopic composition.

No.	Sample	District	Locality	Type	T(℃) Max	T(℃) Min	T(℃) Average	NaCl(%) Average	δ18O (‰) qz	δ18O (‰) qz-water	δ18O (‰) water
1	A00MZ012	Andacollo	Mina Sofia, Level1	Quartz-sulfides vein	235	193	214	3.6	11.2	10.8	0.4
2	A00MZ043	Huemules	Huemules Sur	Quartz-sulfides veinlet	144	109	130	1.8	9.2	17.3	-8.1
3	A00MZ046	Huemules	Huemules Sur	Quartz-sulfides veinlet	141	105	121	2.2	8.5	18.2	-9.7
4	A00MZ048	Joya del Sol	Brancote-Elena Sur	Qz vein	153	108	131	1.4	7.5	17.2	-9.7
5	A00MZ051	Joya del Sol	Brancote-Galadriel	Qz vein	173	121	147	0.7	4.1	15.6	-11.5
6	A00MZ066	Ferrocarrilera	Ferrocarrilera	Quartz-sulfides vein	223	177	204	2.5	10.3	11.4	-1.1
7	A00TM039	Cushamen	Cushamen	Qz vein	283	215	259	29.6	9.7	8.5	1.2
8	A00TM042	Cerro Gonzalo	Cerro Gonzalo	Qz vein	295	241	274	3.7	10.7	7.9	2.8
9	A00TM059	Estrella Gaucha	Estrella Gaucha	Qz vein	151	119	136	1.2	7.3	16.7	-9.4
10	A00MZ119	Arroyo Cascada	Arroyo Cascada	Qz vein	238	189	219	1.4	11.3	10.5	0.8
11	A00MZ148	Epuyen	Epuyen lake side	Qz vein	242	195	218	1	11.7	10.5	1.2

Appendix-14 K-Ar radiometric measurement results.

No.	sample No.	material	Isotopic Age(Ma)	Ar^{40}scc/g×10^{-5}	%Ar^{40}	%K
1	A00NK050	Whole rock	119.0±6.0			
				0.743	84.5	1.58
				0.768	86.2	1.58
2	A00TM009	Plagioclase	53.8±3.0			
				0.145	37.3	0.66
				0.135	36.3	0.66
3	A00TM020	Plagioclase	64.7±3.2			
				0.185	54.2	0.74
				0.194	47.3	0.74
4	A00MZ108	Whole Rock	77.0±3.9			
				0.611	93.3	2.01
				0.619	93.8	2.01
5	A00MZ130	Whole Rock	108±5			
				0.741	94.2	1.71
				0.743	93.5	1.72
6	A00MZ139	Whole Rock	28.1±1.4			
				0.110	71.4	0.98
				0.106	76.5	0.98
7	A00TM125	Hornblende	13.2±0.7			
				0.077	62.4	1.51
				0.079	65.1	1.52
8	A00TM151	Biotite	65.0±3.3			
				0.478	85.9	1.79
				0.446	89.1	1.80

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Appendix – 15

Basic knowledge on stable isotopes and rare earth elements

1. Sulfur isotope

Sulfur isotopic composition concerning $^{34}S/^{32}S$ is defined as following formula, and standard material is troilite of Canyon Diablo meteorite (CDT).

$$\delta\,{}^{34}S(‰) = \left(\frac{Rx}{Rs} - 1\right) \times 1000 \qquad R = {}^{34}S / {}^{32}S,\ x = sample,\ s = s\tan dard.$$

It is known that the sulfur isotopic compositions of igneous rocks are relatively close to 0‰ of the standard and show a narrow variation range. Sasaki and Ishihara (1979) clarified that Japanese granite of the magnetite series range from 0 to +9‰. On the other hand, it is known that the sulfur isotopic compositions in sedimentary rocks show a wide variation range due to the isotopic fractionation effect by bacteria. Based on the knowledge, origin of sulfur for mineralization can be interpreted by measured isotopic compositions. For example, sulfides of the Bingham porphyry Cu deposit in USA indicate –3.11‰ to +3.87‰, and it means that sulfur originated from deep seated source within mantle (Field, 1966). Concerning the Shakanai kuroko deposit in Japan, sulfides indicate +5‰ to +8‰ coincident with magnetite series granitoids, and sulfates indicate +22‰ to +24‰ coincident with Tertiary evaporates (Sakai and Matsuhisa, 1996).

However, sulfur isotopic geochemistry is not simple in case that different sulfur species are coexisting, such as H_2S and SO_4^{2-}. As shown in Fig. 1, isotopic composition is variable, and isotopic fractionation that is difference of isotopic compositions between different sulfur species is depending on the temperature (Rye and Ohomoto, 1974). Therefore, it must be understood that the measured isotopic composition of sulfur compound is not always same as the isotopic composition of ore forming fluid.

For example of the isotopic fractionation, a case study for the Nansatsu high sulfidation Au deposits in Japan (Hedenquist et al., 1994) is quoted as follows.

In these deposits, hypogene alunite samples have values ranging from +24.5‰ to +34‰, and differences between hypogene alunite and sulfides are 28‰ to 25‰. In this case, 200℃ to 240℃ is estimated based on the isotopic fractionation shown in Fig. 1. Moreover, assuming the total Sulfur isotopic composition is +5‰ from fresh magnetite series intrusives, the sulfide/sulfate ratio of the original fluid can be calculated. X as the sulfur isotopic composition of sulfide and Y as that of sulfate, the relation of "aY + (1 - a) X = 5‰" is established. Then 0.25 is calculated for "a" from Y = +26‰ and X = -2‰, and it means that sulfide/sulfate ration is 0.75 : 0.25 (Hedenquist et al., 1994).

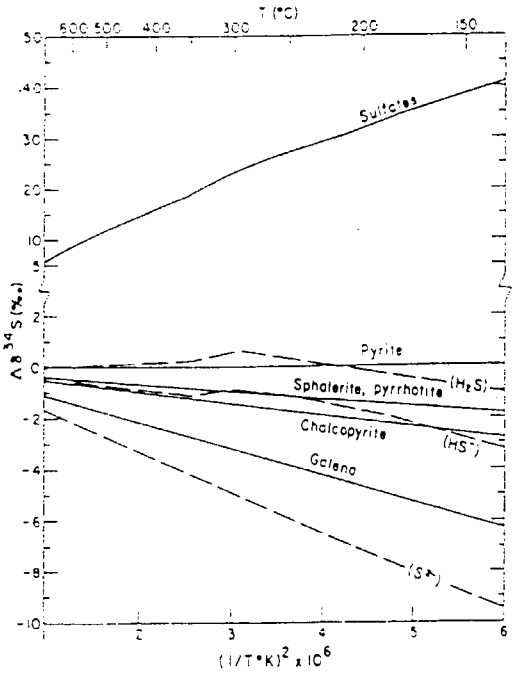

Fig. 1 Sulfur isotopic fractionation among sulfur species and hydrothermal minerals plotted with respect to pyrite. Dashed lines indicate species in solution. Solid lines indicate minerals (Rye and Ohomoto, 1974).

2. Oxygen isotope

Oxygen isotopic composition concerning $^{18}O/^{16}O$ is defined as following formula, and standard material is Standard Mean Oceanic Water (SMOW).

$$\delta\,{}^{18}O(‰) = \left(\frac{Rx}{Rs} - 1\right) \times 1000 \qquad R = {}^{18}O/{}^{16}O,\ x = sample,\ s = s\tan dard.$$

Oxygen isotopic composition of hydrothermal water can be calculated based on the measured oxygen isotopic composition and homogenization temperature of fluid inclusions for the hydrothermal product, such as quartz and calcite, according to the following formulas. The isotopic fractionation factors for other minerals are reported by Kieffer (1982) and Field and Fifarek (1985) etc.

$$10^3 \ln\alpha = \delta\ ^{18}O_{quartz} - \delta\ ^{18}O_{water} = \frac{3.34\times10^6}{T^2} - 3.31 \quad (Matsuhisa\ et\ al.,1979)$$

$10^3 \ln\alpha$ = *isotopic fractionation factor*

T = *abosolute temperature*, *Range* = 250 *to* 500℃

$$10^3 \ln\alpha = \delta\ ^{18}O_{calcite} - \delta\ ^{18}O_{water} = \frac{2.78\times10^6}{T^2} - 2.89 \quad (Friedman\ and\ O'Neil, 1977)$$

$10^3 \ln\alpha$ = *isotopic fractionation factor*

T = *abosolute temperature*, *Range* = 0 *to* 500℃

Nature of the hydrothermal water can be interpreted by the calculated oxygen isotopic composition of hydrothermal water, whether it is magmatic water origin, meteoric water origin, or seawater origin. Because it is known that the oxygen isotopic composition of magmatic water is +6‰ to +9‰ (Taylor, 1974), meteoric water is generally -4‰ to -14‰ with relation of $\delta D = 8\,\delta\,^{18}O + 10$ (Craig, 1963), and oceanic water is generally 0‰.

The oxygen isotopic compositions of hydrothermal water of epithermal Au veins in Japan, meteoric water, volcanogenic geothermal water and magmatic water are shown in Fig. 2 (MITI, 1999). It is understood that the volcanogenic geothermal water is formed by mixing of magmatic water and meteoric water, and hydrothermal water of epithermal Au veins are within a range of the volcanogenic geothermal water. Concerning the hydrothermal water of the Hishikari deposit that is famous for high grades of about 80g/t Au, shows the most wide range meaning the drastic mixing of magmatic water and meteoric water.

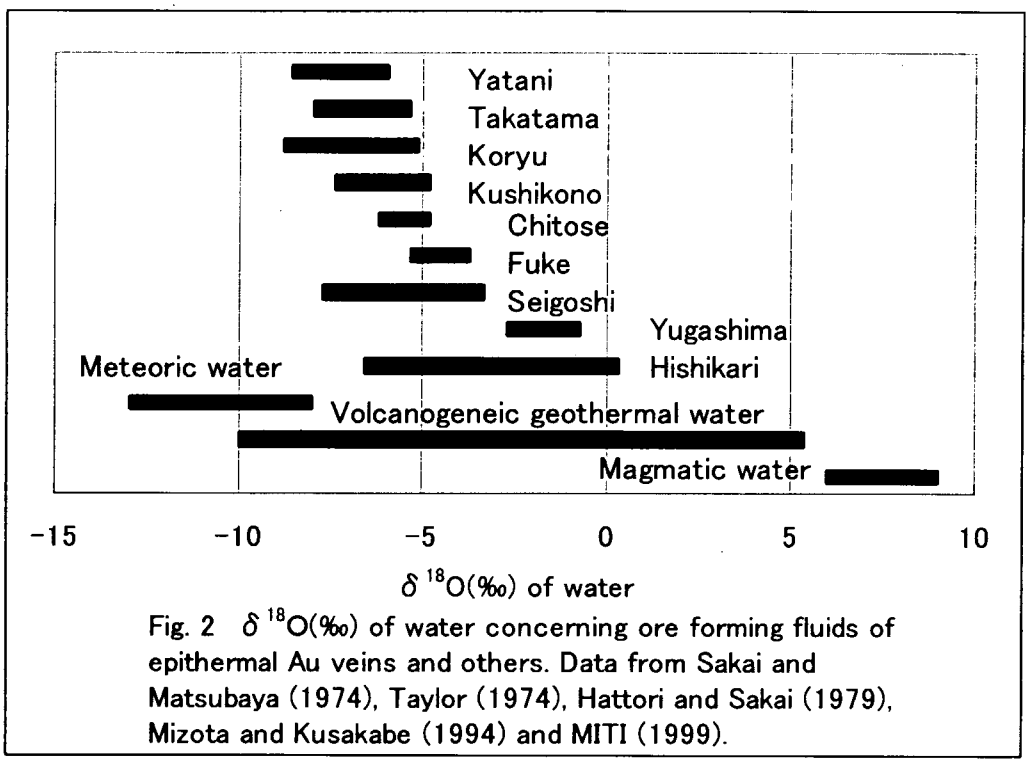

Fig. 2 $\delta^{18}O$(‰) of water concerning ore forming fluids of epithermal Au veins and others. Data from Sakai and Matsubaya (1974), Taylor (1974), Hattori and Sakai (1979), Mizota and Kusakabe (1994) and MITI (1999).

3. Rare earth elements (REE)

The spiderdiagram that is normalized pattern by the chondrite, primitive mantle, or MORB, are utilized to display the REE contents. REE are arranged on abscissa from left to right in increasing order of partition coefficient between ultramafic rock and basaltic magma.

Concerning granitiods, REE chondrite normalized pattern is generally utilized based on the recommended values for chondrite by Boynton (1984). Fig. 3 is a example of REE chondrite normalized patterns for granitoids of the Erdenet porphyry copper deposit area in Mongolia (JICA/MMAJ, 2000). In this case, La to Sm are called LREE (Light rare earth elements) and Gd to Lu are called HREE (Heavy rare earth elements). As shown in Fig. 3, the productive intrusions are depleted in REE than the barren intrusions, and significant depletions in HREE cause the productive intrusions steep right down profiles. Besides, the productive intrusions indicate the less negative or positive Eu anomalies. These characteristics are just concordant with the report of Lang and Titley (1998) concerning the REE chondrite normalized patterns to distinguish between productive and barren intrusions of the porphyry Cu deposits.

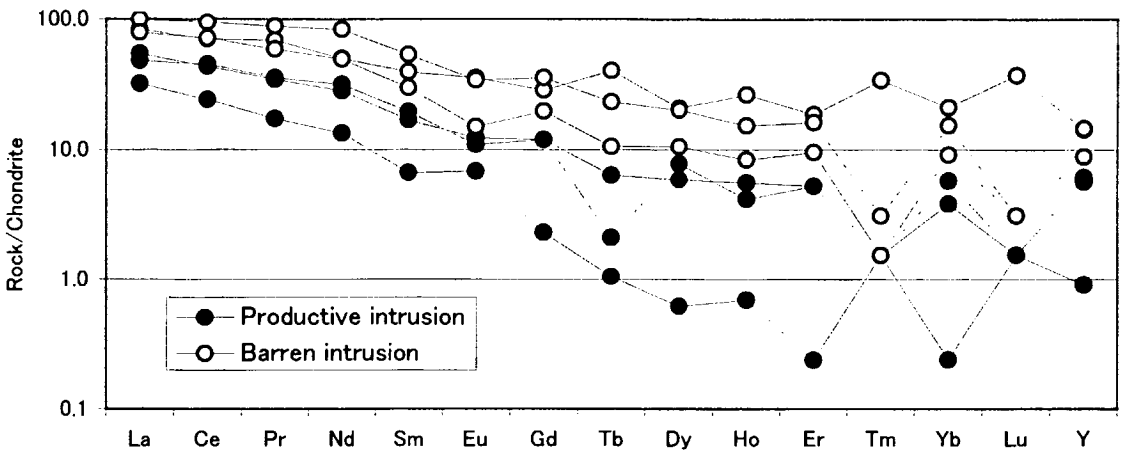

Fig. 3 REE chondrite normalized patterns for granitoids of the Erdenet porphyry Cu deposit area in Mongolia (JICA/MMAJ, 2000).

REE chondrite normalized patterns for minerals forming the granitoids are shown in Fig. 4. It is understood that REE is mainly contained in the minerals of allanite, sphene, zircon, apatite, hornblend and epidote, while plagioclase and K-feldspar lack HREE intensively and contain Eu selectively. Therefore, it is interpreted that early stage undifferentiated intrusion is enriched with REE because of the abundance of minerals

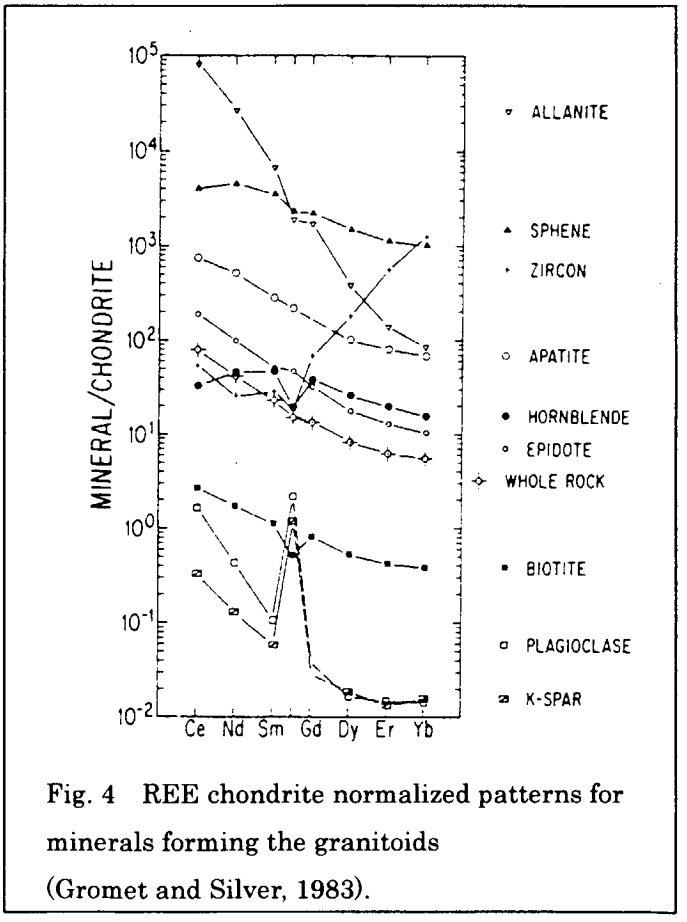

Fig. 4 REE chondrite normalized patterns for minerals forming the granitoids (Gromet and Silver, 1983).

rich in REE, while late stage differentiated intrusion is depleted with REE. Especially, if the differentiated intrusion is feldspathic, it may show intensive depletion of HREE and positive anomaly of Eu, same as the patterns of productive intrusions in the Erdenet area (Fig. 3).

Characteristics of the productive intrusions are simply displayed in chondrite normalized Ce/Yb vs Yb diagram, as Fig. 5 for case of the Erdenet area, because Ce/Yb cn (cn : chondrite normalized) represents the right down inclination of REE pattern in Fig. 3, and Yb cn represents the concentration of HREE. In Fig. 5, values of primitive mantle, MORB, continental crusts, A-type granite and tonalite – trondhjemite trend are also plotted with data of the Erdenet area. The productive intrusions are concordant with the differentiation of the tonalite – trondhjemite trend, and the barren intrusions are concordant with the undifferentiated continental crusts.

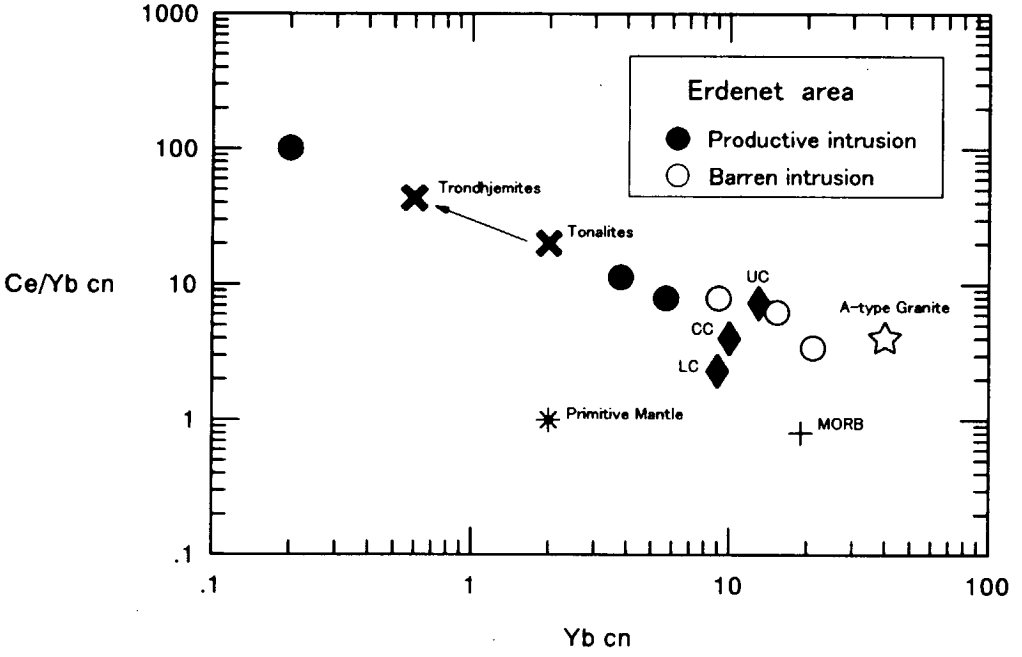

Fig. 5 REE chondrite normalized Ce/Yb – Yb diagram for granitoids of the Erdenet porphyry Cu deposit area in Mongolia.
cn : chondrite normalized, UC : upper continental crust, CC : continental crust, LC : lower continental crust, data except the Erdenet are from Ogasawara (1989).

Meanwhile, Rb - Nb+Y diagram was developed by Pearce et al. (1984) for the tectonic setting discrimination (Fig. 6). Christiansen and Keith (1996) plotted the compositions of selected igneous rocks that are related to mineralization on diagram of Pearce (1984), after change of the field names to emphasize the granitoid types (Fig. 7A), and effect of various processes and source compositions are also shown on the diagram (Fig. 7B). Therefore, potentiality of mineralization can be implied by the plots of compositions on Rb – Nb+Y diagram.

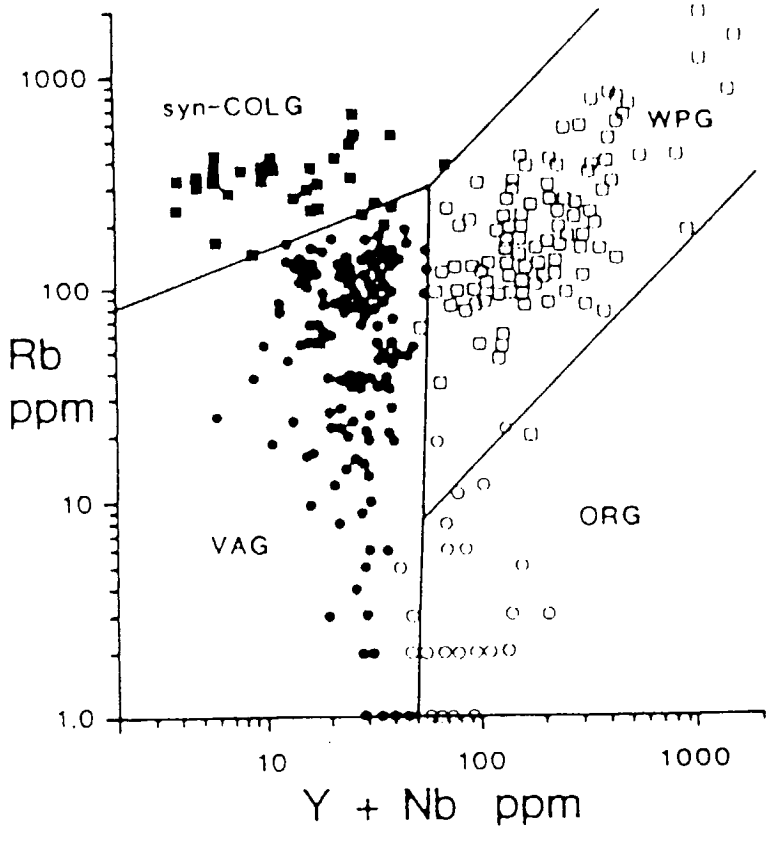

Fig. 6 Rb-(Y+Nb) discrimination diagram for syn-collision (syn-COL), volcanoc arc (VA), within plate (WP) and anomalous ocean ridge (OR) granites. (Pearce et al., 1984)

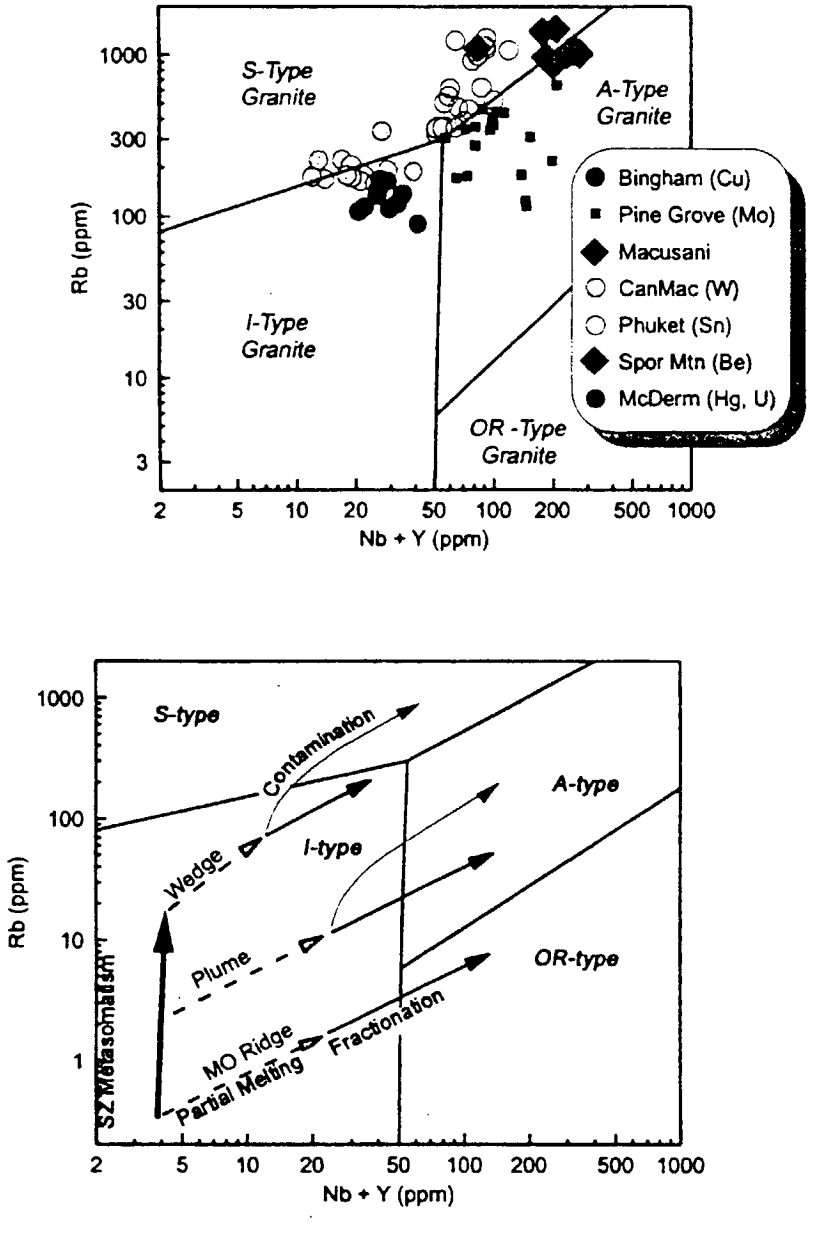

Fig. 7 (A) Upper: compositions of selected igneous rock suites that are related to mineralization plotted on Pearce et al. (1984) tectonic discrimination diagram. The field names have been changed to emphasize compositional, rather than, tectonic characteristics. (B) Lower: the effect processes and source compositions on trace element trends and positions on this diagram.
(Christiansen and Keith, 1996)