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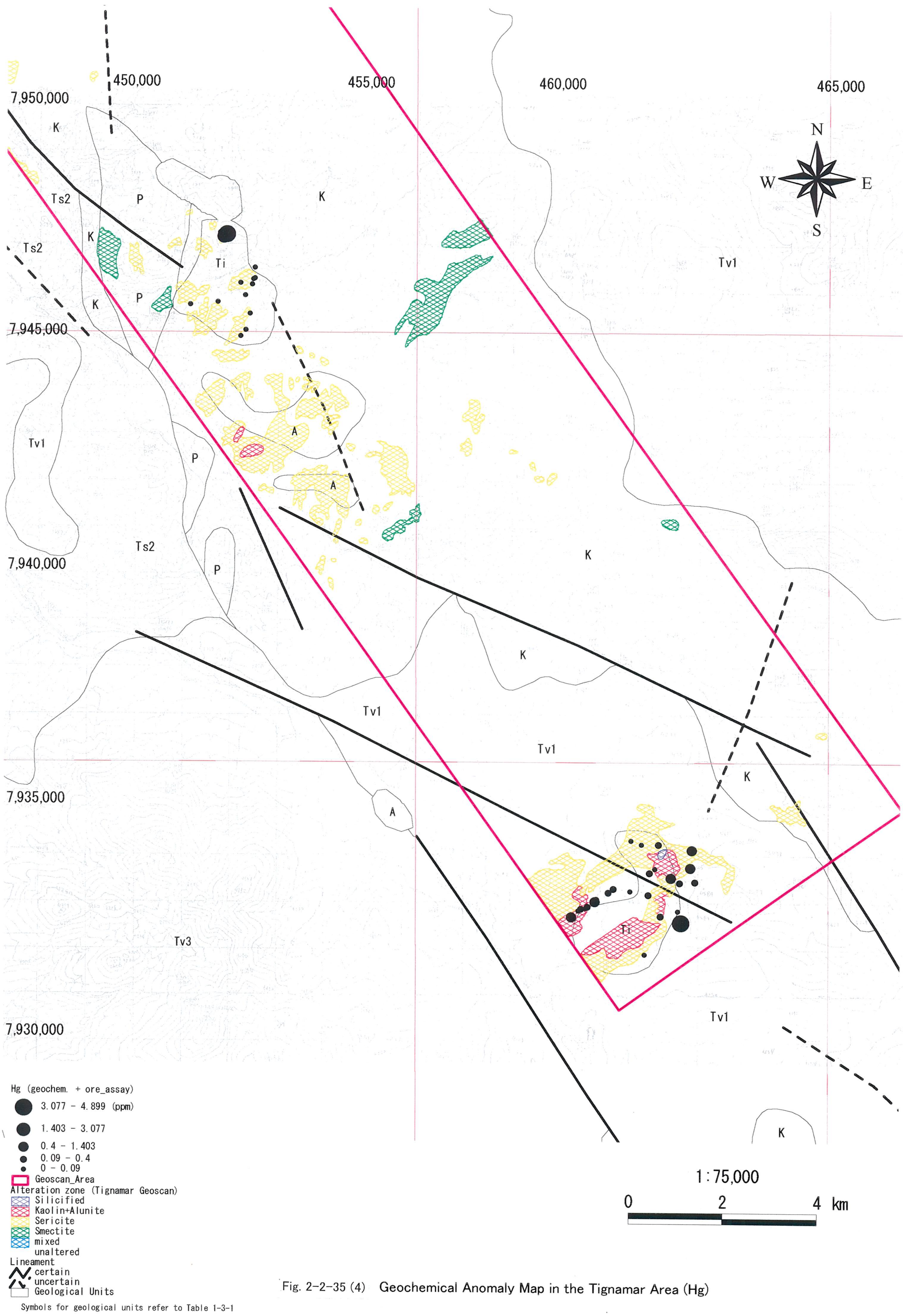


Fig. 2-2-35 (4) Geochemical Anomaly Map in the Tignamar Area (Hg) hematite with some remnants of tourmaline dissemination・veinlets and quartz veinlets. Fluid inclusions in the quartz veins are gas-liquid two-phase inclusions and their gas-liquid ratio differs by each inclusion indicating hydrothermal boiling. Average homogenization temperature is 290.7℃ and the salinity is 0.40 NaCl wt%, values indicating epithermal mineralization. It is inferred from the boxwork structure of the leached zone, that small amount of copper sulfide minerals and a large amount of pyrite were the primary ore minerals of this zone. Drilling has not been carried out for about 500m east of the shaft. Drilling has been done in many localities beyond 100m south of the shaft, but discovery of ores has not been reported. Propylite zone occurs beyond 500m north of the shaft, and vein-type Ag-Pb-Zn deposit (Santa Rosa mine, presently closed) occur 1.2km northwest of the shaft. The alteration zone to the south of the shaft consists mainly of silicification, sericitization, and tourmalinization with strong limonitization, but on the eastern side biotitization and dissemination of green oxidized copper minerals are observed in propylitized zone (Cretaceous).

The southern alteration zone is distributed in dacite~porphyry dome intruded into Upper Tertiary-Quaternary System and the vicinity. Possibility of caldera is considered geologically for this district, and thus the above dome could be the product of post-caldera intrusion. Although this alteration zone is accompanied partly by sericitization, the major part consists of acidic alteration such as silicification, alunitization, and kaolinization and is believed to be formed in the center of volcanic activity. In the alteration zone, chalcedoney~opaline silica and fine-grained pyrite and limonite dissemination is observed. The surface is white from secondary alunitization・kaolinitization caused by oxidation of pyrite.

Notable rock geochemical anomalies of this area are high Zn-As-Hg local anomaly of northern alteration zone and the weak Pb-Zn anomaly and high As-Hg anomaly in the southern alteration zone.

2・8 Camarones district (Semi-detailed Survey)

For this district, geological map are shown in Figure 2-2-36, geological section in Figure 2-2-37, schematic geological column in Figure 2-2-38, location of mineral showings in Figure 2-2-41, and distribution of alteration minerals in Figure 2-2-42.

(1) Outline of geology and ore deposits

The geology of this district is composed of Upper Cretaceous System, Upper

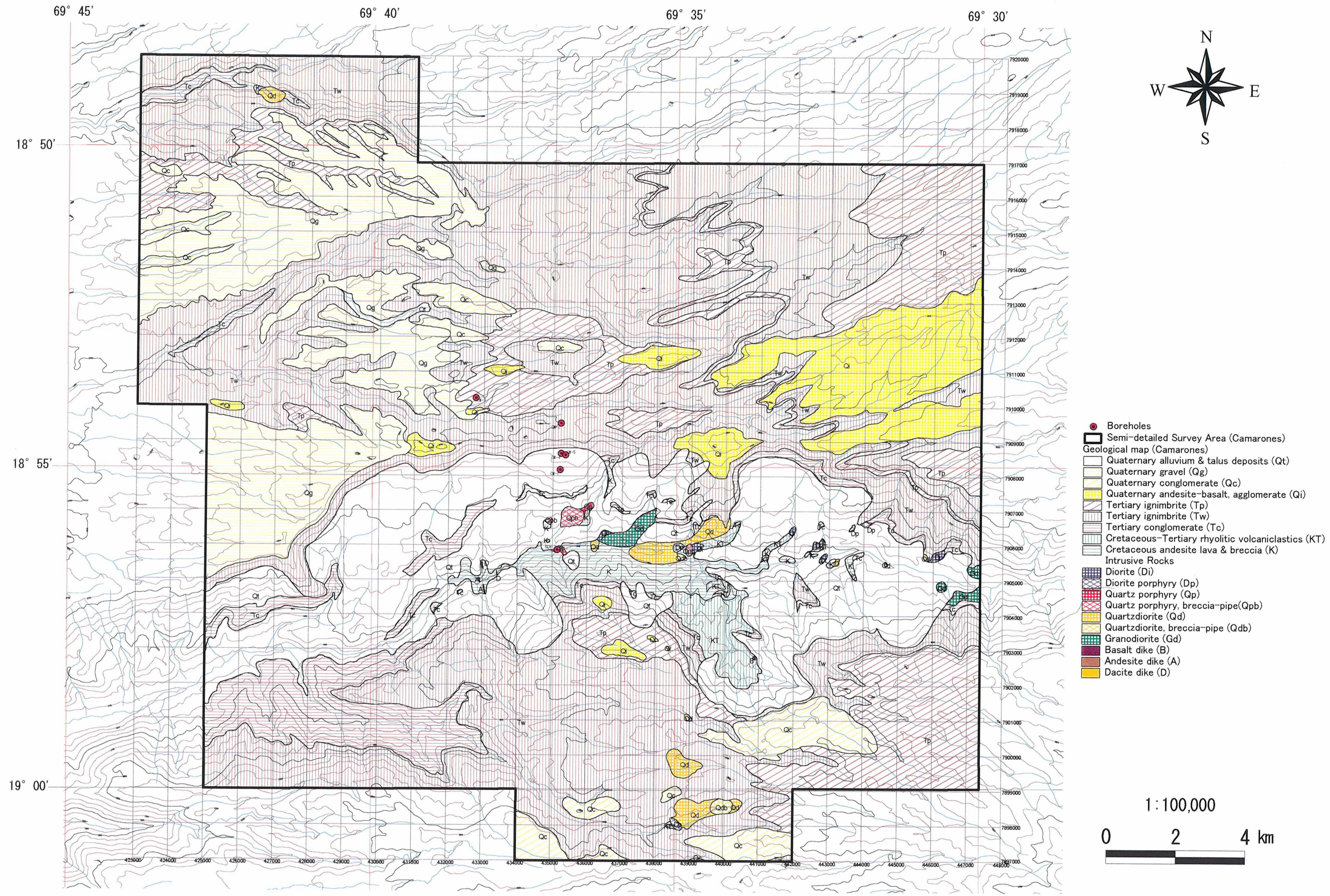


Fig. 2-2-36 Geological Map of the Camarones Area

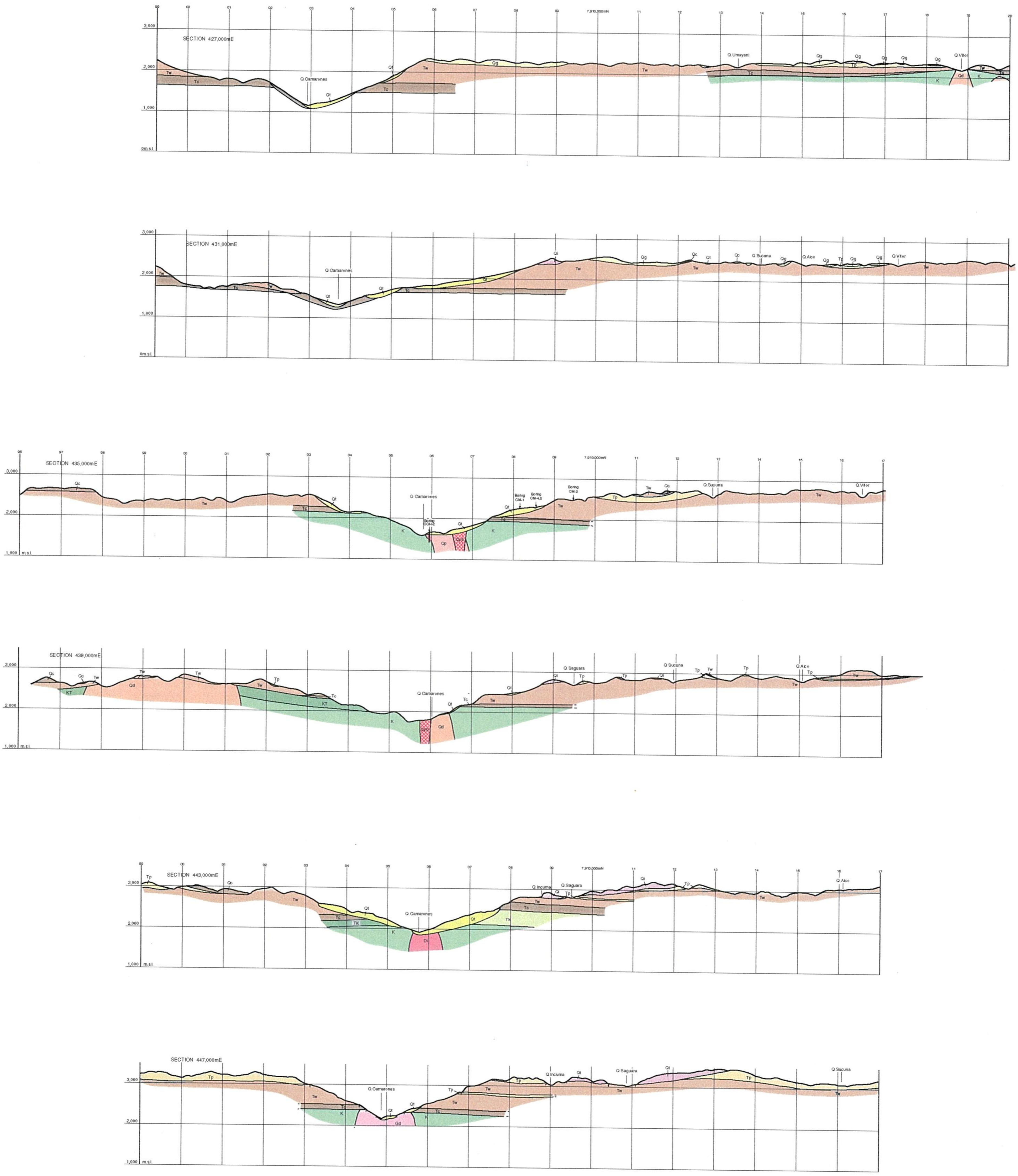


Fig. 2-2-37 Geological Profiles of the Camarones Area

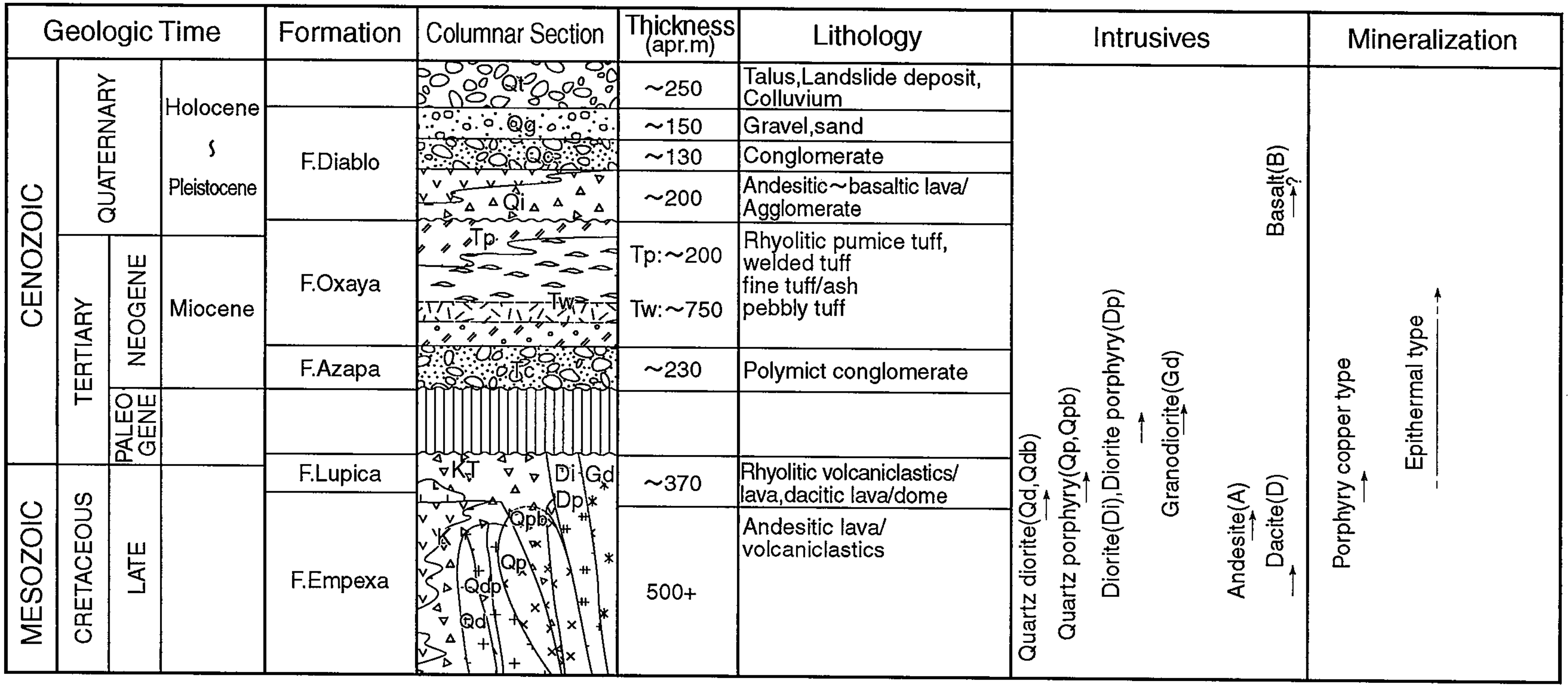


Fig. 2-2-38　Schematic Stratigraphic Columns of the Camarones Area

Cretaceous-Paleogene System, lower Miocene Series, lower Miocene-Pleistocene Series, Pleistocene-Holocene Series and intrusive bodies.

The Upper Cretaceous System occurs along the Quebrada Camarones in the central part of the area and along the Quebrada Vitor in the northwestern part of the area. And it consists of andesitic lava and pyroclastic rocks.

The Upper Cretaceous-Paleogene System occurs along the Quebrada Camarones in the central to the southern part of the area. And it consists of rhyolitic pyroclastic rocks.

The lower Miocene Series occur along the Quebrada Camarones in central part of the area and along the Quebrada Vitor. And it consists of polymictic conglomerate.

The lower Miocene-Pleistocene Series occur throughout the area with the exception of the drainage zone of the Quebrada Camarones. And it consists of rhyolitic ignimbrite which is composed of pebbly tuff, fine-grained tuff・volcanic ash, and welded tuff・pumiceous tuff in ascending order.

The Pleistocene-Holocene Series occurs along the Quebrada Camarones, northwestern, southeastern, and central-eastern parts of this area. It consists of andesitic~basaltic lava・agglomerate, conglomerate, sand and gravel, landslide deposits・colluvium・talus depopsits.

The intrusive bodies consist of granitic stocks and volcanic dikes. The stocks consist of quartz diorite, quartz dioritic breccia pipe, quartz porphyry, quartz porphyritic breccia pipe, diorite, diorite porphyry, and granodiorite and intrude into Upper Cretaceous-Paleogene System. Whole rock K-Ar age of diorite was 51.3 ± 1.7Ma. The dikes consist of andesite・dacite which intrude into the Upper Cretaceous System and basalt intruding into Upper Cretaceous-Paleogene System.

Most of the surface of this area is covered almost horizontally by thick Miocene ignimbrite. Therefore Upper Cretaceous-Tertiary System and older strata occur in the deeply dissected drainage basin of the Quebrada Camarones and in very small exposures in the southern and northwestern part of the area.

It is highly possible that the Upper Cretaceous System (K) forms dome structure in the Quebrada Camarones drainage zone and in the areas where relatively large granitic bodies have intruded into Upper Cretaceous-Tertiary System.

It is believed that the elevation of the bottom of the lowermost Upper Tertiary conglomerate (Tc) rises from the northwest to the southeastern parts of the area.

The Miocene welded tuff is relatively thin in the northwestern and south-central parts of the survey area indicating the rise of basement during the early stages of the early Miocene ignimbrite activity.

It is inferred that NNW-SSE trending lineaments occur in the western part of the area and NE-SW, NNW-SSE ~ NNE-SSW and WNW-ESE trending lineaments in the central to southern part (Fig. 1-12).

Mineralization and alteration of the area are; porphyry copper-type and epithermal-type pyrite mineralization developed in sericitized・silicified zones along the Quebrada Camarones, weak oxidized copper dissemination・pyrite・quartz veinlets accompanied by potash alteration in the southern margin, and quartz veinlet groups accompanied by potash alteration and sericitization in the northwestern part of the area.

(2) Stratigraphy

a. Upper Cretaceous System (K)

Distribution: Quebrada Camarones drainage zone in the central part of the area and Quebrada Vitor in the northwestern part.

Lithofacies: Propylitized green to dark green compact hard rock. Consists of andesitic massive to cataclastic lava, tuff breccia, and tuff.

Stratigraphy: This is the lowest unit of the survey area and is conformable to the overlying Upper Cretaceous-Paleogene System (KT). This is correlated to the Empexa Formation in northern Chile.

b. Upper Cretaceous-Paleogene System (KT)

Distribution: Quebrada Camarones drainage zone southward.

Lithofacies: Pale green, pale red, grayish white compact hard rocks. These are rhyolitic pyroclastic rocks containing many fragments (maximum 8mm) of quartz crystals and consist of tuff breccia and tuff. In rare cases glassy lenses are included and eutaxitic structure is observed. Silicification and sericitization are common and the texture is not clear. The rocks are similar to the quartz porphyry, which will be mentioned later.

Stratigraphy: This unit conformably overlies the Upper Cretaceous System (K) and is unconformably overlain by Miocene Series. The possibility of this unit being the effusive phase of the quartz porphyry is high. This is correlated to the Lupica Formation in northern Chile.

c. Lower Miocene Series (Tc)

Distribution: Quebrada Camarones drainage zone in the central part of the survey area and along the Quebrada Vitor in the northwestern part.

Lithofacies: Relatively strongly cemented dark gray conglomerate. Polymictic conglomerate composed of pebbles of Upper Cretaceous (K), Upper Cretaceous-Paleogene (KT), and granitic rocks. Size of the pebbles range from several to twenty centimeters.

Stratigraphy: This unit overlies the Upper Cretaceous (K) and Upper Cretaceous-Paleogene (KT) Systems unconformably and is overlain conformably by lower Miocene-Pleistocene (Tw) Series. This is correlated to the Azapa Formation in northern Chile.

d. Lower Miocene-Pleistocene Series (Tw, Tp)

Distribution: Throughout the survey area with the exception of the drainage zone of Quebrada Camarones.

Lithofacies: This unit is ignimbrite and is composed of, in ascending order, gray porous pebbly tuff, pale red porous fine-grained tuff・volcanic ash, grayish white to pale purple welded tuff・pumiceous tuff. All constituent rocks are rhyolitic and contain quartz and biotite. The welded tuff contains a thin layer of pumiceous tuff that divides the tuff into upper and lower parts.

Eutaxitic structure is observed in both welded tuff and pumiceous tuff. Seventy-three vertical exposures measuring about 2m×2m in size were studied in the area. Ten to thirty essential fragments were recognized from each of these exposures and their thickness and length were measured and their ratio (flatness) was calculated. Of the rock samples collected for density measurements for gravity survey analysis, correlation exists between the density and the flatness of the essential fragments from the above exposures (Fig. 2-2-39).

Contour map of the flatness of essential fragments in ignimbrite is shown in Figure 2-2-40. The low flatness part in this figure in the northeastern part of the area corresponds to the uppermost pumiceous tuff. It is seen that those compact and hard welded tuffs that cannot be distinguished by the unaided eyes have differences in the flatness of contained rock fragments. In pyroclastic flows consisting of high temperature flow units, the degree of welding increases downward because of its own weight. The vesicular essential fragments are flattened into lenses. Therefore the flatness of the essential fragments in the flow unit is closely related to the position, particularly the depth, of the fragments within the flow unit. Thus comparison of the flatness of the fragments within the flow units provides indications of the overburden of the fragments. Border of the flow units are not observed in the lower parts of the welded tuff extending from the southern part of the area to the northwestern part, and thus this ignimbrite is believed to form a single flow unit. In these huge flow units, it is very conceivable that the thickness attain several hundred meters. Thus low flatness, such as in the southern and northwestern part of the area, indicate relatively thin overburden, while high flatness is an indication of relatively thin ignimbrite below the fragments.

Stratigraphy: This unit overlies the Miocene Series (Tc) conformably and is overlain unconformably by Pleistocene-Holocene (Qi, Qc, Qg, Qt). The K-Ar age of the biotite in the lower part of this ignimbrite is 20±0.5Ma. This is correlated to the Oxaya Formation of northern Chile.

e. Pleistocene-Holocene Series (Qi, Qc, Qg, Qt)

Distribution: Drainage area of the Quebrada Camarones and northwestern, southeastern, and central-eastern parts of the survey area.

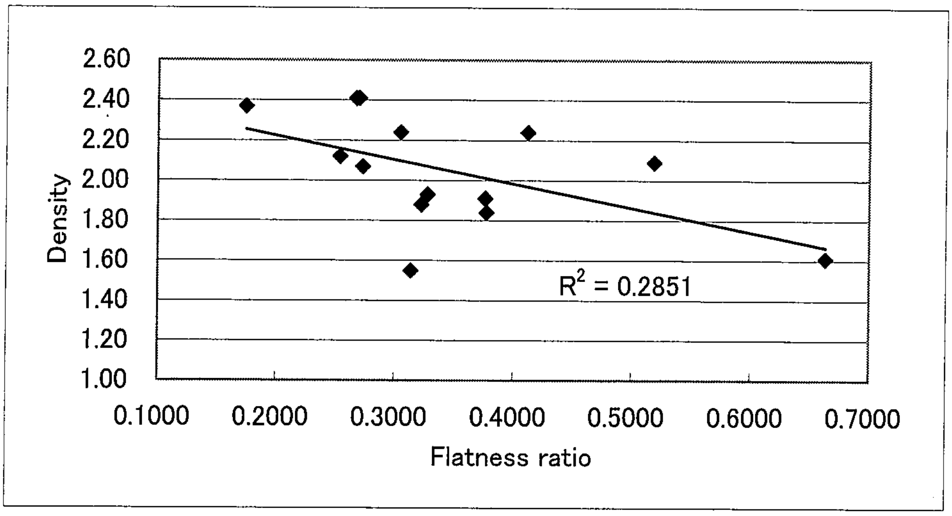
Lithofacies: This series consists of; dark gray to black andesitic to basaltic lava and agglomerate (Qi), dark gray conglomerate (Qc), gravel and sand (Qg), and landslide deposits・colluvium・talus deposits (Qt). Both banks of the Quebrada Camarones constitute large-scale landslide zones and there are many recurrences of landslides, and most of the geologic blocks broken into complicated forms are those of lower Miocene (Tc) and lower Miocene-Pleistocene Series (Tw, Tp).

Stratigraphy: This series unconformably overlie the lower Miocene-Pleistocene (Tw, Tp) Series. This is correlated to Oxaya formation in northern Chile.

(3) Intrusive rocks

a. Quartz diorite (Qd)

Distribution: Quartz diorite stocks occur in the drainage area of the Quebrada Camarones, southern part, and along the Quebrada Vitor in northwestern part.



Flatness ratio = Thickness/Length

Fig. 2-2-39 Flatness Ratio of Essential Fragments in Ignimbrite and Density of Rocks

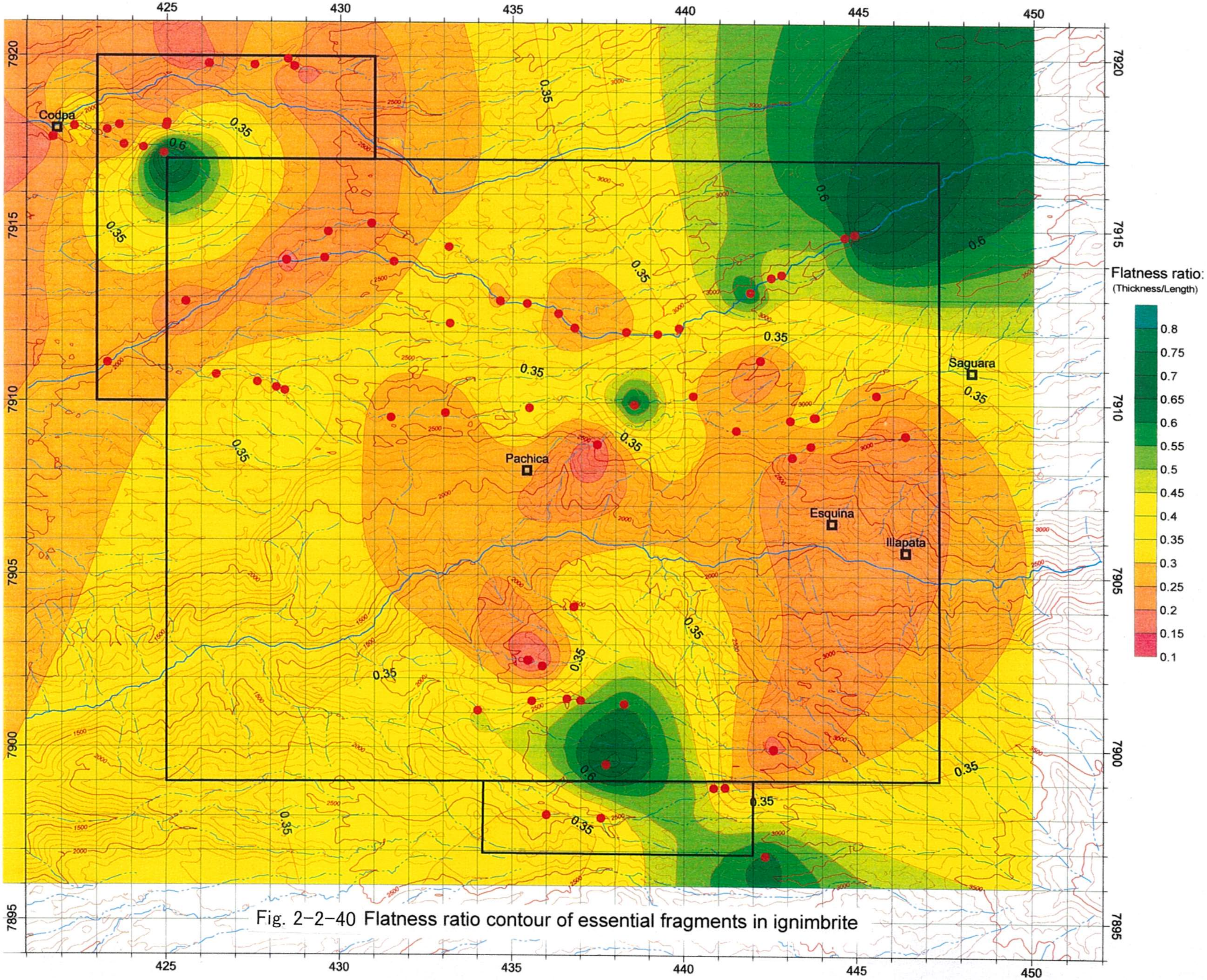


Fig. 2-2-40 Flatness ratio contour of essential fragments in ignimbrite

Lithofacies: Pale purple to pale red, green, gray medium-grained rock. This is generally weakly altered, and sericitization, chloritization, and epidotization are relatively common. Weak tourmalinization and biotitization are observed in the southern and northwestern parts and potash feldspar veinlets are observed in this rock in the southern and northwestern parts of the area.

Age of intrusion: It is indicated in geological maps that this rock has intruded into the Upper Cretaceous-Paleogene Series (KT) and is intruded by diorite, diorite porphyry, quartz porphyritic breccia pipe, but the boundaries of these rocks are not clear.

b. Quartz dioritic breccia pipe (Qdp)

Distribution: Distributed in quartz diorite bodies (Qd) along the Quebrada Camarones and the southern part of the survey area.

Lithofacies: Gray to pale red breccia. Lithology is the same as quartz diorite. This is believed to be breccia pipe from the mode of occurrence. Silicification, sericitization, and tourmalinization are observed.

Age of intrusion: This has intruded into quartz diorite (Qd).

c. Quartz porphyry

Distirbution: Along the Quebrada Camarones.

Lithofacies: It is generally strongly altered and is white. It contains many quartz phenocrysts attaining 8mm in size. Silicification and sericitization are common, and chloritization is also observed in places. Oxidized copper minerals, chalcopyrite, and pyrite are disseminated.

Age of intrusion: This rock has intruded into the Upper Cretaceous System (K) and quartz diorite (Qd) and is intruded by quartz porphyritic breccia pipe. The K-Ar age of this altered rock is 67±2Ma(CODELCO, 2000).

d. Quartz porphyritic breccia pipe (Qpb)

Distribution: Drainage area of the Quebrada Camarones, occurs closely with relatively large quartz porphyry (Qp) bodies.

Lithofacies: Strong to medium altered white breccia. Contains many fragmented quartz phenocrysts attaining 8mm in size. Because of strong alteration, the texture is not clear and this rock cannot be distinguished from quartz porphyry (Qp) by unaided eyes, but clastic structure is clear under microscope and is similar to Upper Cretaceous-Paleogene System (KT). This considered to be breccia pipe from its mode of occurrence. Silicification, sericitization, kaolinization, jarositization, and chloritization are observed. Quartz-tourmaline network veinlets and limonitization are developed in this body in the southern part of Pachica. Quartz network veinlets are observed in a small body along the Quebrada Camarones.

Age of intrusion: This unit has intruded into quartz porphyry (Qp).

e. Diorite (Di)

Distribution: Drainage area of the Quebrada Camarones.

Lithofacies: Dark green fine to medium-grained rock. Medium to weakly altered, epidotization, smectitization, sericitization, biotitization, amphibolitization are observed and oxidized copper mineral and pyrite dissemination occurs in some places.

Age of intrusion: This has intruded into Upper Cretaceous (K), Upper Cretaceous-Paleogene (KT) Systems and quartz diorite (Qd).

f. Diorite porphyry (Dp)

Distribution: Drainage area of the Quebrada Camarones and southern part of the area.

Lithofacies: Gray fine to medium-grained rock. Weakly altered and chloritization, epidotization, silicification, sericitization, and amphibolitization are observed. Weak pyrite dissemination is observed at Quebrada Camarones, and weak dissemination of green oxidized copper minerals and tourmalinization are found in the southern part.

Age of intrusion: This unit has intruded into the Upper Cretaceous-Paleogene System (KT) and quartz diorite (Qd). Whole rock K-Ar age of 51.3 ± 1.7Ma was obtained from a body near Esquiña in the eastern part of the area.

g. Granodiorite (Gd)

Distribution: Drainage area of the Quebrada Camarones.

Lithofacies: Gray to green medium-grained rock. Generally weakly to medium altered and chloritization, epidotization, silicification, sericitization, and amphibolitization are observed. Pyrite dissemination and tourmalinization occur in the Quebrada Camarones area.

Age of intrusion: Geological maps indicate intrusion of this unit into the Upper Cretaceous System (K) and diorite (Di), but the boundaries of these rocks are not clear.

h. Andesite (A)

Distribution: Occurs in the drainage area of the Quebrada Camarones as dikes.

Lithofacies: Pale green medium-grained rock. Medium alteration including epidotization and sericitization is observed.

Age of intrusion: This unit has intruded into the Upper Cretaceous System (K).

i. Dacite (D)

Distribution: Occurs in the western drainage area of the Quebrada Camarones as dikes and in the eastern part of the Camarones as small stocks.

Lithofacies: Dikes are grayish white to pale green with coarse-grained quartz phenocrysts and is propylitized to a medium degree. Stocks are pale red to gray with medium-grained quartz phenocrysts and are weakly smectitized.

Age of intrusion: This unit has intruded the Upper Cretaceous System (K).

j. Basalt (B)

Distribution: Occurs as dikes in the southern part of the survey area (upper reaches of a southern tributary of the Quebrada Camarones).

Lithofacies: Dark green fine-grained rock. Medium chloritization and sericitization are observed.

Age of intrusion: This unit has intruded into the Upper Cretaceous-Paleogene System (KT).

(4) Geologic structure

The surface of this area is covered by nearly horizontal thick Miocene ignimbrite. Therefore, Upper Cretaceous-Paleogene (KT) System and older formations occur only in the deeply dissected Quebrada Camarones drainage zone and in very small scale in the southern and northwestern parts of the area. These K and KT units consist of massive volcanic rocks and pyroclastic material and the strike and dip data are practically non-existent. And the only available data are N20° E strike and 20° W dip of Upper Cretaceous tuff of (K) to the south of Pachica along the Quebrada Camarones. This Upper Cretaceous (K) System occur along the Quebrada Camarones and in the northwestern part of the survey area and this forms the basement of the area. Along the Quebrada Camarones, granitic bodies have intruded into the Upper Cretaceous System (K) and Upper Cretaceous-Paleogene System (KT) at the southern to eastern side of Pachica. Upper Cretaceous-Paleogene System (KT) overlies the Upper Cretaceous (K) formations elongated in the N-S direction with about 4km width and with its center at about 4km east of Pachinca. And relatively large intrusive bodies occur in the Upper Cretaceous (K) units on the western side of the above and near Illapata on the eastern side. There is a possibility that the Upper Cretaceous (K) formations form dome structures where these relatively large intrusive bodies occur.

The elevation of the lower boundary of the lowest Neogene Tertiary conglomerate (Tc) is about 2,200m at the Quebrada Vitor in the northwestern part of the survey area. It is about 1,550m at the Qubrada Camarones in the southwestern part, about 2,000m at the Camarones in the south-central part, about 2,350m at the Camarones in the eastern part, and about 2,800m in the central part of the survey area. It is seen that the base of Tc rises from the northwestern part of the area southeastward.

Formations younger than Neogene Tertiary is distributed nearly horizontally with gentle undulations. There are two layers of Miocene-Pleistocene welded tuff (Tw) with pumice tuff bed in-between, and each of these two welded tuff layers is considered to be one unit flow. The thickness of the lower welded tuff is relatively thin in the northwestern and south-central parts of the survey area thus these are believed to be locations where the topographic high of the basement existed at the early stages of the ignimbrite activity in early Miocene.

Occurrence of lineaments trending the NNW-SSE direction are inferred in the western part of the survey area and those with NE-SW, NNW-SSE～NNE-SSW and WNW-ESE trend in the central to southern part (Fig. 1-12).

(5) Mineralization

Mineral showings confirmed in the survey area are shown in Figure 2-2-41.

a. Mineralized zones in the Quebrada Camarones drainage area

Along the Quebrada Camarones, pyrite dissemination zones occur for a distance of about 8km eastward of the southern part of Pachica, and for about 4km along the southern tributary. Pyrite dissemination is developed in the intrusive bodies (quartz porphyry, quartz diorite, diorite, diorite porphyry, granodiorite) and in the host rocks (Upper Cretaceous K formations, Upper Cretaceous-Paleogene KT formations) in the vicinity.

Copper mineral dissemination occurs within the pyrite mineralized zones in three parts along the Quebrada Camarones, namely western, central, and eastern mineralized zones.

The copper mineralization in the western zone occurs in the quartz porphyry body and in the surrounding Upper Cretaceous formations (K). In the quartz porphyry body, pale green

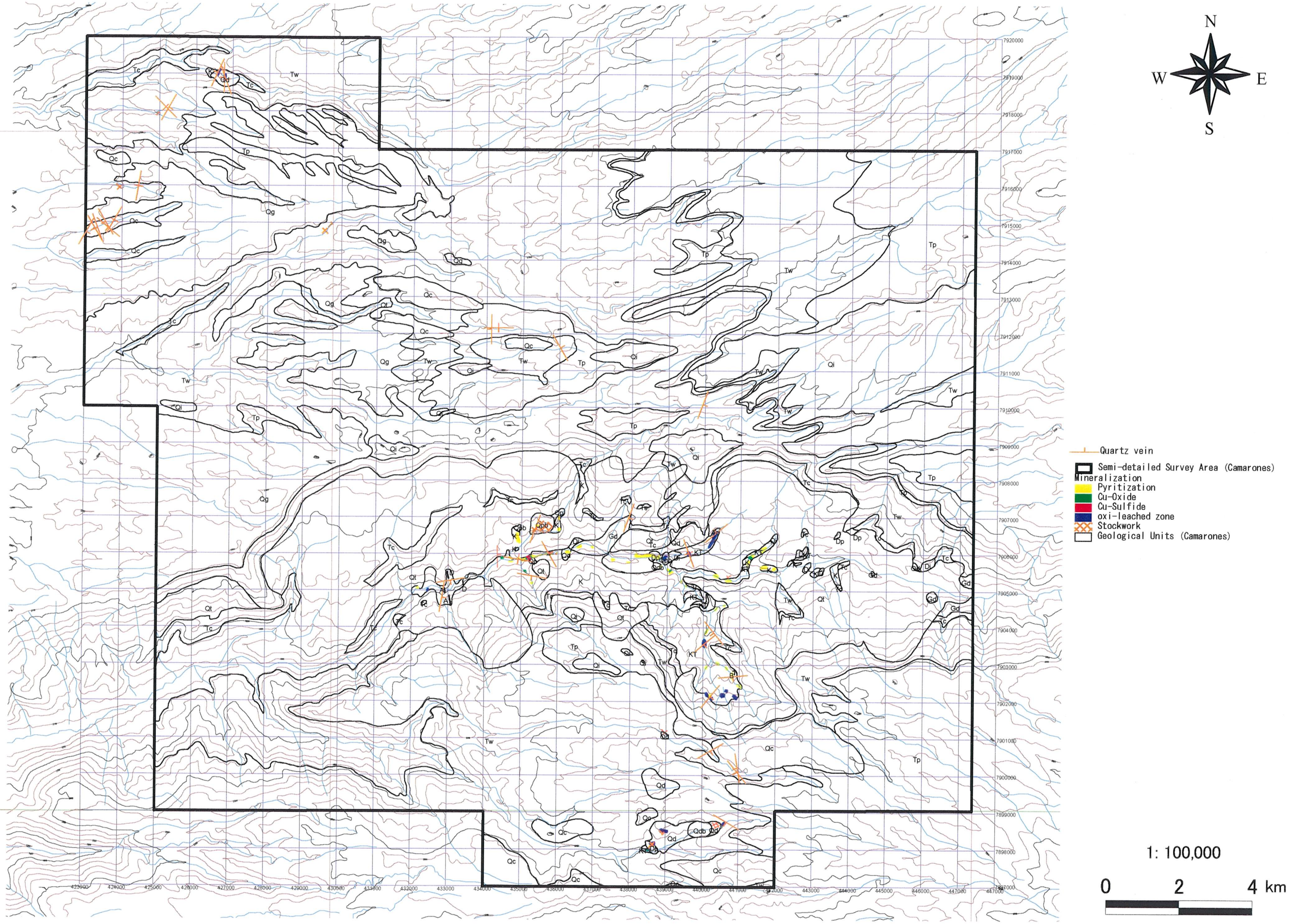


Fig. 2-2-41 Mineralization Map of the Camarones Area

meta-alunogen containing copper has seeped out from fractures for 180m in each of the north and south banks of the stream, and quartz network veins are developed in parts of the mineralized zones. The quartz porphyry is silicified, chloritized, and sericitized and is disseminated by chalcocite, chalcopyrite, and pyrite, and green oxidized copper minerals and tenorite is disseminated on the surface of these quartz porphyry bodies. Also weak dissemination of green oxidized copper minerals, chalcopyrite, chalcocite, and other minerals associated with quartz veins is observed in the propylite near the quartz porphyry. Drilling (CCH-2) carried out on the northern bank is 220m deep, and penetrated a secondary enrichment zone of approximate average copper grade of 0.15% between 0 and 220m depth and of 1.00% at 97.5 and 109.5m interval. Quartz porphyritic breccia pipe occurs at 500~1100m north of the stream, and quartz-tourmaline network veins and limonite dissemination are developed in these pipes, but copper minerals do not occur.

The copper mineralization of the central zone occur near the concentration of a relatively large quartz diorite body and small bodies of quartz porphyritic breccia pipe, quartz dioritic breccia pipe, diorite, and diorite porphyry. The mineralization consists of green copper oxidized minerals and pyrite dissemination.

The copper mineralization of the eastern zone consists of weak dissemination of green oxidized copper mineral dissemination in amphibolized and sericitized diorite.

The pyrite-mineralized zone along the southern tributary of Quebrada Camarones consists of fine-grained pyrite dissemination in silicified and sericitized rhyolitic pyroclastic rocks. The surface consists of limonite formed by oxidation of pyrite, kaolin, alunite, and jarosite.

b. Mineralized zones in the southern margin of the survey area

Weak dissemination of green oxidized copper minerals and limonite・hematite occurs in diorite porphyry intruded into quartz diorite at the southern margin of the survey area. This diorite porphyry is chloritized and tourmalinized. Hematite・quartz veinlets containing many large pyrite pseudomorphs are observed about 150m north of this dissemination, and veinlets of potash feldspar occur in the quartz diorite.

c. Mineralized zones in the northwestern margin of the survey area

Many quartz veinlets are developed in the quartz diorite at the northwestern part of the survey area. The major part of the quartz veins consists of milky white coarse grains, and network is formed locally. These veins are transected by later chalcedonic quartz veinlets.

The host rocks are silicified, epidotized, sericitized, amphibolized, biotitized, and potash feldsparized. Epidote, biotite, tourmaline, and potash feldspar accompany some of the earlier quartz veins. Also boxwork of limonite and hematite indicating the existence of pyrite are found in some cases, but pyrite itself or copper minerals have not been found. The host rock is disseminated by limonite・hematite, and kaolin veinlets are developed transecting this oxidized zone.

d. Other quartz veins

Other than the above, chalcedonic quartz veinlets occur in the Miocene and Quaternary formations in the northwestern, central, and southern parts of the area.

e. Results of measurements of fluid inclusions in the mineralized zones

The results of the measurement of fluid inclusions in the samples from quartz veinlets and calcite veinlets in the mineralized zones and the vicinity are shown in appended AP-5. The samples are all from veins in formations and rock bodies of Paleogene and older units. Samples suitable for measurements were not obtained from the quartz veins in the quartz porphyry of the Quebrada Camarones west mineralized zone.

The fluid inclusions were all gas-liquid two-phase type with the exception of two-phase and poly-phase (containing transparent and opaque daughter minerals) material from the samples at the southern tributary of Quebrada Camarones.

The salinity is generally low (average 0.4~0.7 NaCl wt%).

The homogenization temperature varies by the locality in a range of 364~225℃ with a regular trend. Namely the temperature is highest near Camarones central mineralized zone and gradually decreases southward, but decreases rapidly eastward (Fig. 1-12). Also temperature of the mineralized zone in the northwest is relatively high.

(6) Alteration

The distribution of the altered minerals of the survey area is shown in Figure 2-2-42.

Sericitization and silicification are developed in the Quebrada Camarones western to eastern mineralized zones. The zones to the west and east of Quebrada Camarones mineralized zones are propylitized zone and sericitization is found sporadically in the Illapata district further to the east.

Potash alteration occurs in the Quebrada Camarones central mineralized zone and in the southernmost mineralized zone of the area and both consist of potash feldspar and biotite.

Potash alteration consisting of potash feldspar and biotite and sericitization are developed in the northernmost mineralized zone of the area.

(7) Geochemical anomalies

The threshold values of geochemical anomalies were decided as follows. Analytical values of 268 samples including rock geochemical prospecting and ore assay samples were used. The inflection points of the cumulative frequency distribution were used and the threshold values were divided into 5 to 7 steps. The values less than the limit of detection were treated as half of the detection limit.

The distribution of rock geochemical anomalies is plotted in Figure 2-2-43. The rock geochemical anomalies of each district are as follows.

West of Camarones west mineralized zone: Cu (weak), Hg (strong)
Camarones west mineralized zone: Cu-Mo-As (strong)
Westernmost~south of Camarones west mineralized zone: Pb-Zn-Hg (strong)
Camarones central mineralized zone: Cu-Mo-As (strong)
Between Camarones central and eastern mineralized zone : Au-Ag-Zn-Mo-Hg (strong)
Camarones eastern mineralized zone: Au-Hg (strong)
Camarones southern tributary mineralized zone: Pb-Mo-As-Hg (strong)
East of Camarones Illapata: Cu (weak)
East of Camarones southern Illapata: Zn (strong)
Southernmost mineralized zone: Cu-Mo-As-Hg (strong)

It is seen from the above that; the anomalies of the west and central mineralized zones of the Quebrada Camarones are of porphyry copper-type and that of the peripheral zones are of epithermal-type. The epithermal activity occurred following the porphyry copper mineralization, and in the southernmost mineralization zone porphyry copper and epithermal anomalies occur overlapping each other.

Fundamental statistic of the geochemical analysis results of the Camarones area is listed for each rock body and formation in Table 2-2-2. With the exception of the quartz porphyry

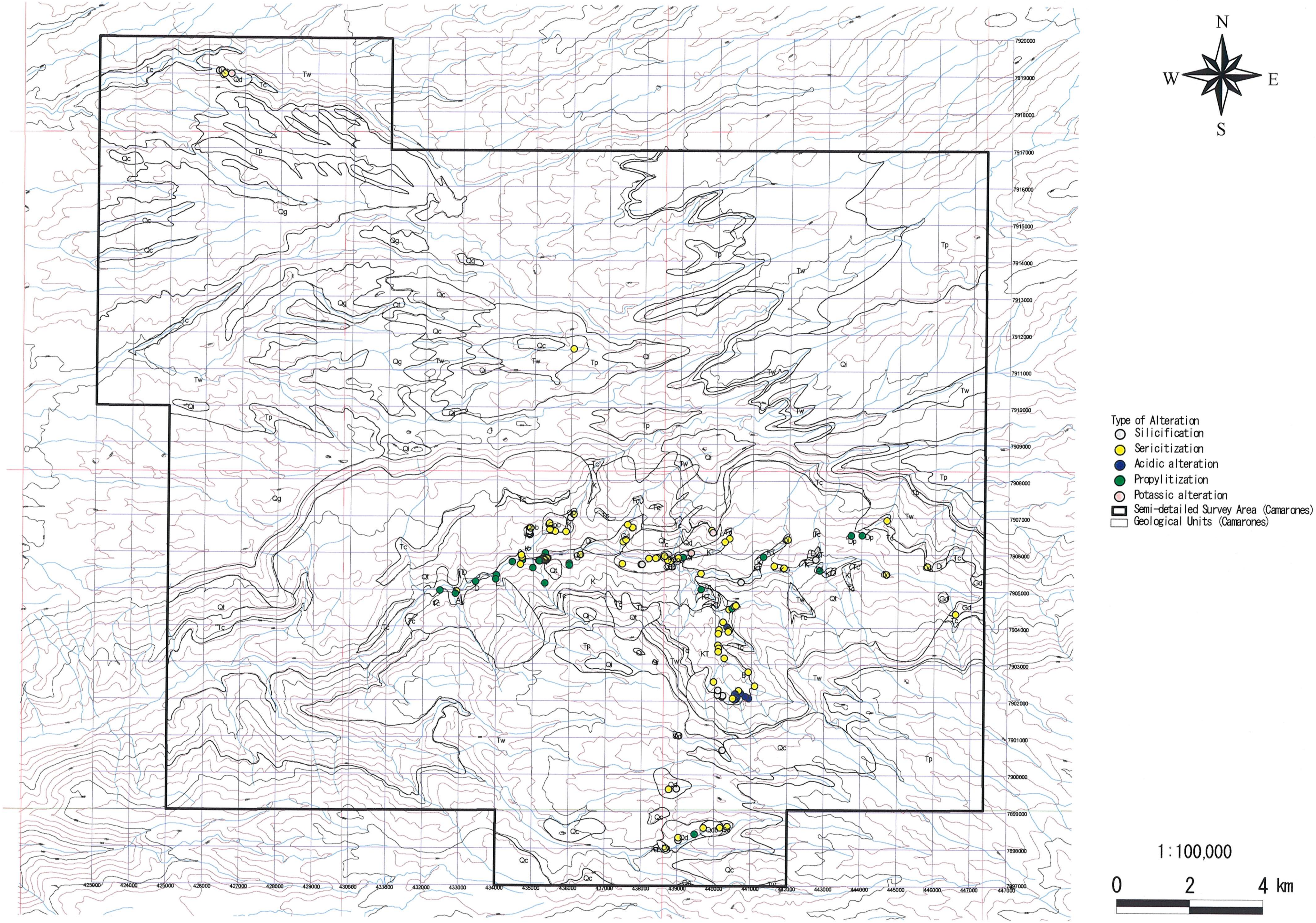


Fig. 2-2-42 Distribution Map of Alteration Minerals at the Camarones Area

Table 2-2-2 Basic Static Value of Rock Samples in the Camarones Area

Granodiorite (Gd)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	68	24	81	5	18	10	0.010	3	0.1
Median	82	21	50	5	14	10	0.005	3	0.1
Standard deviation	49	15	120	3	10	0	0.014	0	0.1
Minimum	7	6	1	1	7	10	0.005	3	0.1
Maximum	141	52	433	9	34	10	0.053	3	0.2
Number of sample	11	11	11	11	11	11	11	11	11

Diorite porphyry (Dp)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	117	22	47	5	32	10	0.007	3	0.3
Median	45	23	53	5	11	10	0.005	3	0.4
Standard deviation	166	17	20	2	40	0	0.005	0	0.3
Minimum	18	4	23	3	3	10	0.005	3	0.1
Maximum	471	45	72	8	96	10	0.017	3	0.7
Number of sample	7	7	7	7	6	6	6	7	7

Diorite (Di)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	42	20	72	4	28	10	0.005	6	0.2
Median	46	20	83	3	20	10	0.005	6	0.3
Standard deviation	18	19	39	4	22	0	0.000	3	0.1
Minimum	18	1	16	1	12	10	0.005	3	0.1
Maximum	60	37	106	9	61	10	0.005	9	0.3
Number of sample	4	4	4	4	4	4	4	4	4

Quartz porphyry (Qp)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	683	26	28	4	28	10	0.007	6	0.5
Median	182	27	19	4	13	10	0.005	3	0.3
Standard deviation	1300	12	24	3	36	0	0.004	5	0.6
Minimum	7	5	3	1	3	10	0.005	3	0.1
Maximum	4963	57	108	14	122	10	0.015	20	3.5
Number of sample	36	36	36	36	23	23	23	36	36

Quartz diorite (Qd)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	63	29	57	5	32	10	0.013	5	0.3
Median	52	29	52	4	22	10	0.005	3	0.2
Standard deviation	68	16	43	2	40	0	0.012	6	0.6
Minimum	6	1	7	1	5	10	0.005	3	0.1
Maximum	448	69	242	10	199	10	0.049	32	3.8
Number of sample	52	52	52	52	45	45	45	52	52

F. Lupica (KT)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	24	50	41	7	76	11	0.047	46	3.4
Median	18	31	19	5	66	10	0.005	3	0.1
Standard deviation	19	106	80	5	54	4	0.206	259	21.6
Minimum	6	5	1	1	8	10	0.005	3	0.1
Maximum	92	740	412	20	229	30	1.344	1782	148.0
Number of sample	47	47	47	47	42	42	42	47	47

F. Empexa (K)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Average	377	120	104	11	111	11	0.013	12	0.4
Median	87	38	79	3	30	10	0.005	4	0.2
Standard deviation	1093	629	97	35	352	3	0.012	26	0.5
Minimum	7	1	18	1	2	10	0.005	3	0.1
Maximum	7129	5145	746	190	2340	28	0.050	170	2.2
Number of sample	66	66	66	66	55	55	55	66	66

Table 2-2-3 Geochemical Correlation Coefficients of Rock Samples in the Camarones Area

	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)	Au (ppb)	Ag (ppm)
Cu (ppm)	1								
Pb (ppm)	0.015	1							
Zn (ppm)	0.066	0.524	1						
Mo (ppm)	0.239	-0.001	0.043	1					
As (ppm)	-0.017	0.058	-0.015	0.080	1				
Sb (ppm)	-0.012	0.313	0.127	0.016	0.379	1			
Hg (ppm)	0.024	0.004	-0.012	0.221	0.046	0.449	1		
Au (ppb)	-0.006	0.006	0.018	0.058	0.001	0.330	0.081	1	
Ag (ppm)	0.138	0.008	-0.010	0.060	-0.003	0.314	0.059	0.979	1

	Log Cu (ppm)	Log Pb (ppm)	Log Zn (ppm)	Log Mo (ppm)	Log As (ppm)	Log Sb (ppm)	Log Hg (ppm)	Log Au (ppb)	Log Ag (ppm)
Log Cu (ppm)	1								
Log Pb (ppm)	0.274	1							
Log Zn (ppm)	0.381	0.141	1						
Log Mo (ppm)	0.168	0.217	-0.102	1					
Log As (ppm)	-0.004	0.358	-0.083	0.360	1				
Log Sb (ppm)	-0.025	0.171	0.040	0.102	0.239	1			
Log Hg (ppm)	0.011	0.129	-0.005	0.192	0.112	0.272	1		
Log Au (ppb)	0.220	0.172	0.217	0.184	0.094	0.306	0.254	1	
Log Ag (ppm)	0.302	0.197	0.012	0.156	0.041	0.228	0.229	0.369	1

Table 2-2-4 Results of Principal Component Analysis

Eigenvectors

	1	2	3	4	5	6
Log Cu (ppm)	0.3049	-0.5079	-0.2886	0.2515	-0.0141	-0.0492
Log Pb (ppm)	0.3824	0.0138	-0.4229	-0.2149	0.2557	-0.4995
Log Zn (ppm)	0.1582	-0.5871	-0.1026	-0.4568	-0.3315	0.0950
Log Mo (ppm)	0.3294	0.2954	-0.3078	0.4147	-0.3979	0.3661
Log As (ppm)	0.2973	0.4371	-0.4052	-0.2538	0.0638	0.1305
Log Sb (ppm)	0.3392	0.2068	0.3614	-0.4827	0.2509	0.1782
Log Hg (ppm)	0.3139	0.1891	0.4033	0.0306	-0.5949	-0.5633
Log Au (ppb)	0.4192	-0.1570	0.3142	-0.0167	-0.0433	0.4715
Log Ag (ppm)	0.3867	-0.1254	0.2763	0.4596	0.4934	-0.1286

Eigenvalue and its contribution

	1	2	3	4	5	6
Eigenvalue	2.388	1.488	1.197	0.942	0.772	0.719
Contribution (%)	26.532	16.533	13.302	10.469	8.579	7.992
Cumulative contr.(%)	26.532	43.064	56.366	66.835	75.414	83.407

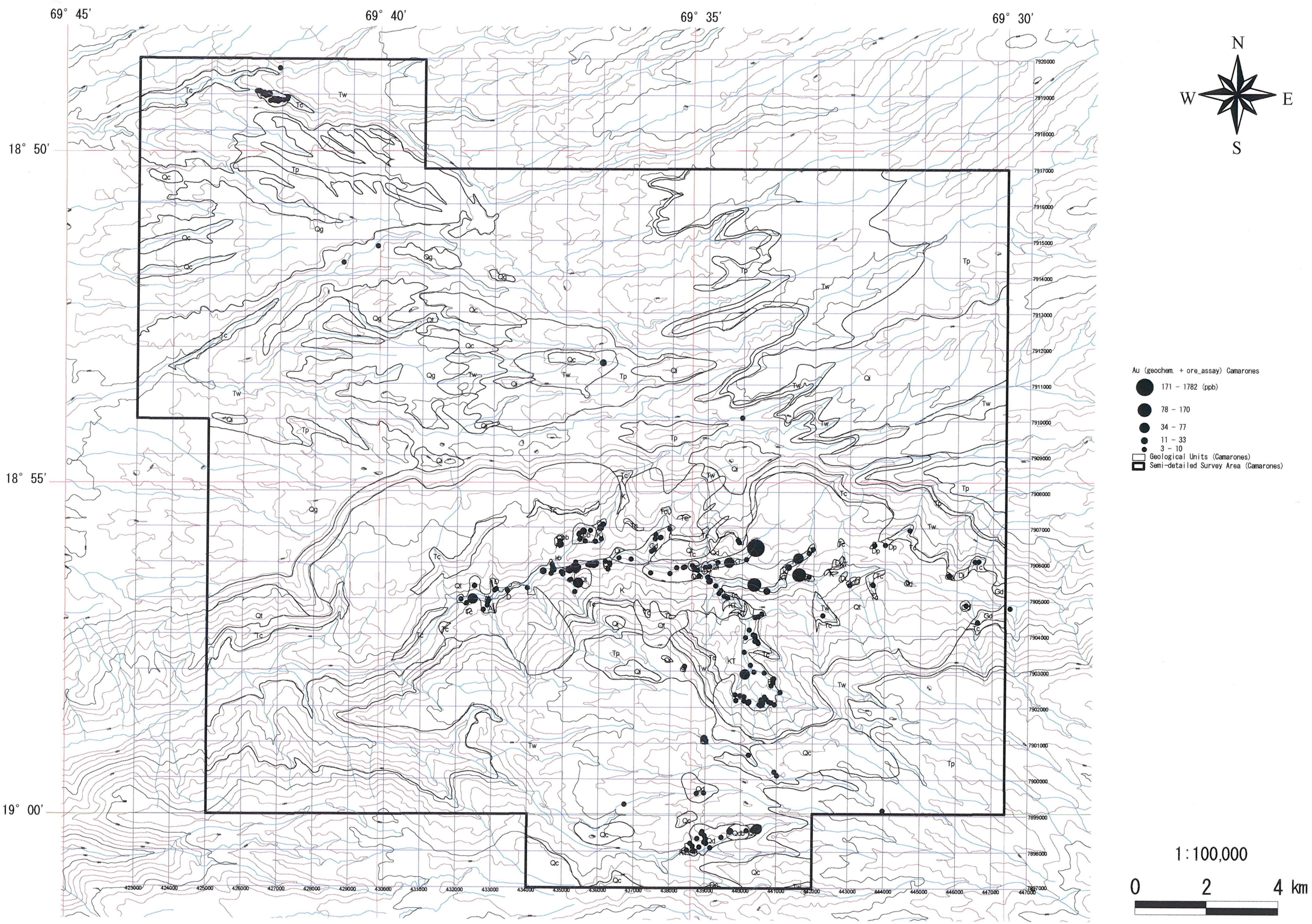


Fig. 2-2-43 (1) Geochemical Anomaly Map in the Camarones Area (Au)