Table II-1-1 Descriptions of thin sections in the project area (1)

Ser. No.	Sample No.	District	Coordination S	Coordination W	Rock Name	Geo. Unit	Texture	Phenocryst, crystals: quartz	plagioclase	K-feldspar	biotite	muscovite	hornblende	augite	hypersthene	olivine	Accessory Minerals: apatite	zircon	rutile	sphene	magnetite	ilmenite	pyrite	hematite	Alteration and Metamorphic Minerals: quartz	tridymite	cristobalite	albite	biotite	muscovite	garnet	fluorite	spinel	corderite	sillimanite	epidote	prehnite	sericite	chlorite	serpentine	natrolite	calcite	limonite	Remarks
1	A1022	Block B	9°24'38"	57°24'04"	Bi granite	Grupb	Equigranular.	○	◎	○	●						·			●	●														●		·	●				·	
2	A1034	Block B	9°21'03"	57°27'59"	Ho diorite	Di	Ophitic		?				?	?										·											○			○					Strong chloritization and saussuritization
3	A1036	Block B	9°19'39"	57°27'59"	Ho-bearing bi rhyorite	Puis	Porphyritic	○	○	◎	●		·				·			·	●			·	·				·								○	○					Recrystalization
4	A1039	Block B	9°24'37"	57°21'14"	Ho-bearing bi granodiorite	Gruph	Equigranular.	○	◎	◎	●		·				·			·	·														·		·	·					
5	A1047	Block B	9°22'36"	57°21'14"	Ho-bearing bi granite	Gr II a	Blasto-porphyritic	◎	○	◎	○		·							●	·			·	·				·								·		●				·	Cataclastic and recrystalization
6	C1004	Block B	9°22'30"	57°31'17"	Bi granite	Gr II b	Equigranular.	◎	○	◎	●						·			·	·			·											·		·	·				·	K-feldspar rich
7	C1013	Block B	9°23'21"	57°19'56"	Bi granite	Gr II b	Equigranular.	○	○	◎	●						·			●	·														·		·	●					K-feldspar rich and monzonitic
8	D1020	Block B	9°26'32"	57°20'33"	Ho gabbro	Gb	Poikilitic		◎				◎				·				·			·	·				·								·	○				·	Weak recrystalization
9	E1003	Block B	9°24'35"	57°29'18"	Bi granite	Grupm	Blasto-porphyritic	○	○	◎	●						·			·	·				·				·						·	·	●	●				·	Cataclastic and recrystalization
10	E1007	Block B	9°20'25"	57°31'57"	Ho dacite	Puiv	Porphyritic	○	◎				●								·			·		·									·			●				·	Strong recrystalization and silicification
11	J1007	Block B	9°21'47"	57°27'21"	Bi granite	Grupb	Equigranular.	◎	○	○	●							·			·			·	·				·						·		●	·					Coarse, weak recrystalization
12	A1105	Block C	9°32'32"	56°40'47"	Bi granite	Grupm	Blasto-porphyritic	○	○	◎	●						·			·	·			·	·				·								·	·					Cataclastic and recrystalization
13	A1108	Block C	9°30'40"	56°40'47"	Bi granite	Gruph	Equigranular.	◎	○	○	●						·	·		·	●			·	·				·						·		·	·					Weak recrystalization
14	A1120	Block C	9°30'32"	56°31'35"	Bi granite	Gr II b	Equigranular.	◎	○	○	●						·	·		·	·			·	·				·						·		·	●					Weak recrystalization, plagioclase and epidote rich
15	C1027	Block C	9°28'47"	56°36'51"	Bi granite	Grupm	Equigranular.	○	○	◎	●			·			·	·		·	●			·							·				●		·	●				·	Epidote rich
16	D1069	Block C	9°31'03"	56°34'18"	Bi granite	Gr II b	Equigranular.	○	○	◎	●						·	·		●	·														·		·	●					
17	E1035	Block C	9°29'01"	56°40'07"	Bi rhyorite	Puiv	Porphyritic	◎	●	○	●							·			·					○									●			·					Recrystalization and silicification
18	E1042	Block C	9°28'43"	56°40'07"	Bi dacite	Puiv	Porphyritic	○	○	◎	●										●					○		○							●		·	●					Albitization and silicification
19	J1029	Block C	9°30'58"	56°40'07"	Ho-bearing bi granite	Gruph	Equigranular.	◎	○	○	●						·			·	●			·											·		·	●				·	Weak recrystalization
20	E98001	Block E	10°20'33"	56°09'29"	Ho-bearing bi granodiorite	Gb	Equigranular.		◎		·		○				·			●	·			·											·			○				·	Chloritization of mafic minerals only

◎ : abundant, ○ : common, ● : a little, · : rare, ? : pseudomorph.

Table II-1-1 Descriptions of thin sections in the project area (2)

Ser. No.	Sample No.	District	Coordination S	Coordination W	Rock Name	Geo. Unit	Texture	Phenocryst, crystals: quartz	plagioclase	K-feldspar	biotite	muscovite	hornblende	augite	hypersthene	olivine	Accessory Minerals: apatite	zircon	rutile	sphene	magnetite	ilmenite	pyrite	hematite	Alteration and Metamorphic Minerals: quartz	chalcedony	cristobalite	albite	biotite	muscovite	garnet	fluorite	spinel	cordierite	sillimanite	epidote	prehnite	sericite	chlorite	serpentine	natrolite	calcite	limonite	Remarks
21	E98002	Block E	10°20'45"	56°11'00"	Ho-bearing bi monzonite	Px	Blasto-porphyritic	●	○	◎	·		●				·	·		·	●			·	·										·			○				·	Mylonitization and recrystalization (bi seggre.)
22	E98004	Block E	10°21'32"	56°13'59"	Ga-bi schist	Px	Blastosamitic	●			●	·						·			◎				◎				●		○		·								●	
23	E98006	Block E	10°24'40"	56°14'14"	Ho-bi granite	Px	Blasto-porphyritic	◎	◎		○		○				·			·	·		·	●												·	·	◎				Mylonitization and recrystalization (bi seggre.)
24	E98008	Block E	10°25'35"	56°13'13"	Cor-Sill gneiss	Px	Blasto-porphyritic	○	◎		●							·			·				◎				○	●				●	●	·		○				●	Strongly gneissose, recrystalization
25	E98024	Block E	10°31'02"	56°10'15"	Cpx-bearing ho-bi granite	Gr I	Equigranular	○	◎	○	○		○				·			·	●		·	·	·											·		·					Weak mylonitization, biotite segregation
26	E98029	Block E	10°23'57"	56°05'52"	Arkose sandstone	Px	Clastic	◎	○	○	●	●					·										·									·		·				·	
27	E98030	Block E	10°24'41"	56°05'52"	Bi granite	Px	Equigranular	○	○	◎	●						·	·			·															·		·					massive
28	F98001	Block F	10°02'18"	55°01'31"	Bi granite	Px	Blasto-porphyritic	○	◎	○	●	·					·	·			·				-											·		·					Mylonitization and recrystalization (bi seggre.)
29	F98003	Block F	10°02'11"	55°01'31"	Bi-bearing Cpx dolerite	Dyke	Dolemic		◎		·			◎							·			·										○			○	●			·	Chloritization and serpentinization
30	F98006	Block F	10°01'32"	55°00'31"	Chl-epi schist	Px	Lepidoblastic					·									·									◎					●		·		○			Original: diabase ?
31	F98027	Block F	10°00'55"	55°00'56"	Bi granite porphyry	Px	Blasto-porphyritic	○	○	◎	●						·			·	·			·	·											·		·	·	·			Mylonitization and recrystalization of quartz.
32	G98001	Block G	9°58'12"	55°14'40"	Two mica granite	Gr II	Blasto-porphyritic	○	◎	○	·	·					·				·			·	·							●						·	·			·	Mylonitization and recrystalization of quartz.
33	G98013	Block G	9°55'21"	55°14'10"	Cpx-bi granodiorite	Px	Equigranular	○	◎	○	●			·			·			·	·			·	·											·		·	●			·	Weak mylonitization
34	G98014	Block G	9°54'37"	55°15'28"	Two mica granite	Px	Granoblastic	◎	○	○	·						·	·			·			·	·							●						·	●			·	Mylonitization and recrystalization of quartz.
35	G98023	Block G	9°56'11"	55°08'56"	Bi granite	Px	Equigranular	○	◎	○	·						·				·			·													·	·	·			·	massive
36	G98027	Block G	9°51'13"	55°09'51"	Biotite granite	Gru	Equigranular	○	○	◎	·										·			·													·		·	●			·	Weak cataclastic (Qz subgrain)
37	G98030	Block G	9°59'11"	55°20'12"	Biotite granite	Gr III	Equigranular	○	○	◎							·			·	·			·													·		·	·			·	Weak cataclastic (Qz & Pl subgrain)
38	H98001	Block H	9°42'07"	55°48'28"	Ho-bi granodiorite	Px	Equigranular	●	◎	◎	·		·				·			·	·			·													·		·	●			·	Strong saussuritization, massive
39	H98003	Block H	9°42'02"	55°47'06"	Ho-bi granite porphyry	Gru	Porphyritic	○	●	◎	·		·					·							·											·		·	●	●			·	Strong saussuritization, hornfelsic
40	H98009	Block H	9°43'43"	55°44'10"	Bi-ho granodiorite	Px	Equigranular	○	◎	○	·		●				·			·	·			·													·		·	●			·	Strong saussuritization, massive
41	H98012	Block H	9°43'18"	55°44'26"	Quartz arenite	Pui	Clastic	◎															·		·													·		·		·		·	

◎ : abundant, ○ : common, ● : a little, · : rare, ? : pseudomorph.

Table II-1-2 Descriptions of polished sections in the project area (1)

Ser. No.	Sample No.	District	Coordination		Rock Name	Occurrence	Identified minerals								
			S	W			pyrite	goethite	hematite	magnetite	ilmenite	chalcopyrite	covellite	sphalerite	gold grain (number)
1	A1054	Block B	9°24'38"	57°24'04"	Silicified rock	Lm-sr-ch, qz vein contact, oxidized pyrite to hm.	○				●	・		・	
2	A1055	Block B	9°24'38"	57°24'04"	Altered rock	Contact between qz vein and granite.	・	○							
3	A1057	Block B	9°22'43"	57°13'38"	Silicified rock	Sr-ep-py, lens and film-like py. along fracture.	○	・				○			1
4	A1058	Block B	9°22'43"	57°13'38"	Granite	Ep-ch, py dissemination, sheared.	●	●		●		・			
5	A1065	Block B	9°22'39"	57°14'25"	Granite	Py dissemination in Kf porphyritic bi-granite.	◎					●			
6	B1016	Block B	9°21'33"	57°25'41"	Granite (sheared)	Py rich qz vein, with mal-az-cp.	◎					◎	●	●	
7	B1017	Block B	9°21'33"	57°25'41"	Granite (sheared)	Qz vein filling shear py+cp films with mal.	◎					◎		・	
8	A1206	Block C	9°29'47"	56°33'53"	Altered rock	Silicification and argillization with py diss.	・	●				・			
9	A1207	Block C	9°29'47"	56°33'53"	Altered rock	Silicification and argillization with py diss.									
10	A1209	Block C	9°31'29"	56°29'00"	Quartz vein	With py, bornite and cp.	●					○	●		3
11	A1210	Block C	9°31'29"	56°29'00"	Quartz vein	With py, bornite and cp.	●					・	・		
12	A1211	Block C	9°31'29"	56°29'00"	Quartz vein	With py, bornite and cp.	○					・	○		10
13	C1047	Block C	9°27'15"	56°32'16"	Oxided breccia	Strong hm, cp occurred, py dissemination.		◎							
14	D1060	Block C	9°31'03"	56°34'18"	Vein ore	Almost oxidized sulphide ore.		◎							11
15	D1070	Block C	9°31'03"	56°34'18"	Bi-granite	Kf porphyritic, no pyritization.	●		●	●	・				
16	D1073	Block C	9°30'39"	56°35'17"	Altered rock	Oxidized sulphide ore, contact to vein.		○	●						
17	D1078	Block C	9°28'43"	56°36'29"	Oxidized ore	Massive oxidized sulphide ore.			◎	◎					
18	F98002	Block F	10°02'13"	55°01'31"	Quartz vein	Cubic py+ hm filling fractures.		●	●						
19	F98005	Block F	10°02'02"	55°01'27"	Quartz vein	Blocks width 20cm, cubic hm+ py+ sr in fractures.	・	●							
20	F98025	Block F	10°01'32"	55°00'31"	Quartz	Qz-Kf pegmatite lens with Mn stain.	・								

◎ : abundant, ○ : common, ● : a little, ・ : rare

Table II-1-2 Descriptions of polished sections in the project area (2)

Ser. No.	Sample No.	District	Coordination		Rock Name	Occurrence	Identified minerals								
			S	W			pyrite	goethite	hematite	magnetite	ilmenite	chalcopyrite	covellite	sphalerite	gold grain (number)
21	F98026	Block F	10°01'32"	55°00'31"	Copper ore	Qz bearing malachite films (max. 15cm).		·							
22	F98032	Block F	9°58'12"	54°58'45"	Quartz vein	T: N75W, W: 10cm, massive py diss.		●							
23	F98039	Block F	9°58'09"	54°58'44"	Quartz vein	W: 8cm, with py boxwork.	○	●							5
24	F98043	Block F	10°01'32"	55°00'31"	Quartz vein	Quartz vein with Mn in fractures.		●							
25	G98010	Block G	9°57'42"	55°14'03"	Quartz vein	T: N25E, qz vein(width: 8cm) with pyrite boxwork.		◎							4
26	G98011	Block G	9°56'27"	55°12'57"	Gneiss ?	T: approximately N70W, with sr-qz- ep- K-f- py.	●					·			
27	G98015	Block G	9°52'23"	55°20'10"	Quartz vein	Brecciated qz vein with coarse grain pyrite diss.	○					●	●		6
28	G98020	Block G	9°53'17"	55°20'56"	Quartz vein	T: N75W, silica-py vein(W: 6cm) in granite.	○								15
29	G98032	Block G	9°57'56"	55°21'24"	Silicified rock	T: N-S oriented, W: 20cm, py-ch-hm bearing qz vein.	◎	·					·		
30	G98033	Block G	9°52'23"	55°20'10"		Strong silicification, rich py diss.	●					○	·		28

◎ : abundant, ○ : common, ● : a little, · : rare

Table II-1-3 Results of X-ray diffraction analyses in the project area (1)

Ser. No.	Sample No.	District	Coordination		Descriptions	Detected Minerals																		Remarks
			S	W		quartz	plagioclase	K-feldspar	albite	biotite	sericite	illite	chlorite	kaolinite	smectite	talc	halloysite	calcite	pyrite	hematite	goethite			
1	A1013	Block B	9°23'38"	57°28'10"	Brown altered granite, hematitization-limonitization-sericitization, vein contact.	◎								○			△							
2	A1021	Block B	9°24'41"	57°24'00"	Light gray sheared schistose-mylonitic, sericitized rock(vein contact), fine qz vein.	◎					○	○		△										
3	A1054	Block B	9°24'41"	57°24'00"	Brown/ light g reenish gray, limonitization-sericitization-chloritization, vein(white fine qz) contact, oxidized pyrite to hm.	◎						○												
4	A1057	Block B	9°22'43"	57°13'38"	Pink silicified rock, sericitization-epidotization-pyritization (K-enriched), lens and film-like pyrite, along fracture.	◎	○	○	◎															
5	A1058	Block B	9°22'43"	57°13'38"	Dark gray granite, epidotization-chloritization, py dissemination, sheared.	◎			◎		○													
6	B1010	Block B	9°22'26"	57°20'00"	Light brown silicified granite, hematite-sericite-pyrite films in fracture, width: 12cm.	◎						○												
7	B1011	Block B	9°22'12"	57°19'33"	Strongly silicification, magnetite alteration.	◎	◎	○	◎	○														
8	B1015	Block B	9°21'33"	57°25'41"	Pink tail sediments in Garompo, sericitization, sheared, strongly rill, pyrite chalcopyrite, K enriched.	◎	◎	○	○		△													
9	B1018	Block B	9°31'10"	56°34'58"	Pink, quartz vein filling sheared granite, sericite-pyrite(T: N5W/37E, W: 3cm), ch-ep-py, silicified, K-enriched.	◎	◎	○	○		△													
10	B1019	Block B	9°22'34"	57°14'22"	Pink porphyry granite, k-feldspar/biotite agglom., chlorite-sericite-pyrite, silicified, K-enriched.	◎	◎	○	◎		○													
11	A1151	Block C	9°32'42"	56°32'18"	Brown, weathered argillized granite.	◎					·			○										
12	A1152	Block C	9°32'42"	56°32'18"	Brown, weathered argillized granite.	◎								○										
13	C1050	Block C	9°29'46"	56°33'35"	Sheared, pyrite dissemination, sericitization, partly oxidized to brown.	◎					○	○												
14	D1065	Block C	9°31'03"	56°34'18"	Altered host rock contacted to vein, almosy ic clay.	◎					○	○												
15	D1066	Block C	9°31'03"	56°34'18"	Light reddish brown, almost clay, sampling(50cm) from D1065.	◎		○			△			△										
16	D1067	Block C	9°31'03"	56°34'18"	Light reddish brown, almost clay, sampling(1m) from D1065.	◎					△			○										
17	D1073	Block C	9°30'39"	56°35'17"	Dark brown, oxidized sulphide, contact to vein.	△														○	△			
18	E98013	Block E	10°21'49"	56°25'13"	T: N30E, quartz veinlets in sericite-quartz schist.	◎					○			○	△									
19	F98004	Block F	10°02'08"	55°01'32"	Altered rock, pyritization-hematitization-silicification (in gneiss?)	◎	○	○			○													
20	F98006	Block F	10°01'32"	55°00'31"	Talc-chlorite-schist.								◎			◎								

◎ : abundant, ○ : common, △ : a little, · : rare.

Table II-1-3 Results of X-ray diffraction analyses in the project area (2)

Ser. No.	Sample No.	District	Coordination		Descriptions	Detected Minerals																		Remarks
			S	W		quartz	plagioclase	K-feldspar	albite	biotite	sericite	illite	chlorite	kaolinite	smectite	talc	halloysite	calcite	pyrite	hematite	goethite			
21	F98013	Block F	10°01'32"	55°00'31"	Red weathered schist with limonitized quartz, sampling width: 1.0m.	◎								△										
22	F98027	Block F	10°00'55"	55°00'56"	Calcite veinlets in fracture, pink Na-feldspar.	◎	◎	◎					○					○						
23	F98041	Block F	9°58'14"	54°58'35"	Reddish white, sericitization and hematitization, weathered granite.	◎					◎													
24	G98002	Block G	9°57'42"	55°14'03"	Red-white weathered granite and light brown mylinite, sampling width: 2.0m.	◎	◎				○			○										
25	G98003	Block G	9°57'42"	55°14'03"	Red-white weathered granite, sampling width: 2.0m.	◎					○			○				·						
26	G98004	Block G	9°57'42"	55°14'03"	Red-white weathered granite, sampling width: 2.0m.	◎	·	○			·			○										
27	G98013	Block G	9°55'21"	55°14'10"	K-f and bi rich, granite gneiss, with oriented bi, bearing dissemination pyrite.	◎					○													
28	G98017	Block G	9°52'23"	55°20'10"	Sheared granite, strongly fractured, fine grain pyrite dissemination +films.	◎					○								○					
29	G98018	Block G	9°53'17"	55°20'56"	Cataclasite (granite ?), cubic pyrite dissemination +films.	◎					○													
30	G98031	Block G	9°58'51"	55°20'30"	Sericitization-quartz rich, similar to greisen.	○					◎													
31	H98001	Block H	9°42'07"	55°48'28"	Equigranular monzogranite, ch-ep-py alteration.	◎	○	○			○			○										
32	H98006	Block H	9°40'34"	55°41'51"	Strong silicification +hematitization, hematite in fractures, sheared granite.	◎					○													
33	H98007	Block H	9°40'20"	55°41'21"	Strong silicification-sericitization-hematitization(vein and veinlets), sheared granite.	◎					○													
34	H9801-1	Block H	9°43'18"	55°44'26"	Stream sample, red siliceous rock (silicification-hematitization).	◎					○													

◎ : abundant, ○ : common, △ : a little, · : rare.

Table II-1-4 List of dating results in the project area

Ser. No.	Sample No.	District	Coordination		Rock Name	Geol. Unite	Texture	Potassium (K wt %)	Rad. ^{40}Ar (10^{-6} cc/g)	K-Ar Age (Ma)	Air Cont. (%)
			S	W							
1	A1022	Block B	9°24'38"	57°24'04"	Ho bearing Bi-granite	Gruph	Porphyritic.	4.24±0.08	25813±269 25061±258	1129±19.0 1104±19.0	0.68 0.50
2	E1003	Block B	9°24'35"	57°29'18"	Bi-Granite	Grupm	Porphyric.	3.33±0.07	21860±224 26255±270	1193±20.0 1360±21.0	0.44 0.79
3	A1105	Block C	9°32'32"	56°40'47"	Bi-Granite	Grupm	White, Kf and qz porphyritic.	3.08±0.06	23768±243 23802±242	1340±21.2 1341±21.2	0.50 0.37
4	A1108	Block C	9°30'40"	56°40'47"	Ho bearing Bi-granite	Gruph	Euhedral biotite, qz porphyritic.	3.68±0.07	25125±262 22328±351	1240±20.0 1137±134	0.71 0.45
5	E1042	Block C	9°28'43"	56°40'07"	Bi-dacite	Puiv	Dark, fine grain, with olivine.	2.76±0.06	30245±312 26009±271	1414±22.1 1538±23.3	0.19 0.49

Table II-1-5 List of fluid inclusion results in the project area

Ser. No.	Sample No.	District	Coordination		Rock Name	Description	Temperature (℃)			Salinity (%)	
			S	W			Number	Range	Average	Number	NaCl eq.
1	A1021	Block B	9°24'41"	57°24'00"	Altered schist	Sheared schistose and mylonitic, fine qz vein.	20	251.0~>400	334.5	5	>21.0
2	A1054	Block B	9°24'41"	57°24'00"	Silicified rock	Lm-sr-ch, vein, oxidized pyrite to hm.	22	245.7~>400	356.2	6	23.8
3	A1061	Block B	9°22'34"	57°14'22"	Quartz vein	Fine qz vein with limonite and hm.	30	102.4~>400	218.4	5	6.6
4	A1153	Block C	9°32'42"	56°32'18"	Quartz vein	Quartz veins in kaolinitizated granite.	34	101.6~>400	160.6	5	11.2
5	D1048	Block C	9°31'03"	56°34'18"	Quartz	Massive qz block, euhedral qz in crack.	20	98.2~>400	195.5	5	33.0
6	D1068	Block C	9°31'03"	56°34'18"	Quartz	Sheared qz vein to O: 1~2cm gravel.	20	228.2~>400	297.4	5	8.4
7	D1071	Block C	9°30'39"	56°35'17"	Vein ore	W: 40 to 50cm, bearing geothite.	20	194.6~>400	314.7	5	5.3
8	F98002	Block F	10°02'13"	55°01'31"	Quartz vein	Blocks of 20cm, cubic py+ hm filling fractures.	25	272.3~>400	320.2	5	9.1
9	F98026	Block F	10°01'32"	55°00'31"	Copper ore	Qz bearing malachite films(max. 15cm).	40	151.5~335.3	237.3	5	19.8
10	F98038	Block F	9°58'09"	54°58'44"	Quartz vein	W: 30cm, sachaloidal with slight py diss.	32	185.8~>400	276.7	5	8.4
11	G98015	Block G	9°52'23"	55°20'10"	Quartz vein	Brecciated quartz vein with coarse grain py diss.	30	103.2~244.3	168.9	5	11.2

1-4 Geological Survey Results

The following are the results of the Geological survey in blocks E, F, G and H.

1-4-1 Block E

(a) Generalities

Block E with a surface area of 32,713 Ha., is located in the south-southeast of Alta Floresta City and accessible by a 60 km two-way gravel road that connects the cities of Alta Floresta and Colorado do Norte.

Within block E there exist one-way and two-way gravel roads connecting the farms of the region. Due to the leveled topography, outcrops are rarely found but they are more frequently seen in the low-hill slopes oriented northwest.

The garimpo named Cabeça is considered as the most important garimpo in the block E region and it is located 8 km to the west of block E.

During the 1998 year geological survey, a total of 8 samples for thin sections, 25 ore samples and 1 sample for X-ray analysis were collected within the area of the block E area.

(b) Geology

The region covered by block E is represented by the following geologic units: Xingu Complex(Px), Ductile Shearing Zone(Dsz), Pre Uatumã granite(Gr1), Iriri Formation from Uatumã Supergroup(Pui), Middle Proterozoic Basic intrusive(Gb), Tertiary age Residual Sediment(Trs), Dykes(Db) and Quaternary age Recent alluvium.

The geologic map and gold mineralization sites are indicated in Fig. II-1-5.

(i) Xingu Complex unit (Px)

Xingu Complex unit (Px) in the region, is represented by gneiss, augen gneiss, granite gneiss, schist, amphibolite and BIF. They are all oriented along the northwest regional trend.

The predominant rocks in block E are granite gneiss and gneiss of granodioritic to tonalitic composition.

The granite gneiss commonly is weakly foliated and locally intruded by pegmatoid vein with N60W disposition. Some of the pegmatoid veins intruded in gneissic rocks show minerals as tourmaline and large muscovite in soil.

The BIF which is present in the northwest part of the area, consists of alternated iron-rich bands, mostly magnetite, with bands of fine grained quartz.

The schists are predominantly quartz-sericite-schist, and their paragenesis suggests a possible metasedimentary origin. It outcrops with a regional northwest trending at regular intervals between a wide zone of gneissic rocks that suggest an alternation of thin schist band within wider gneissic bands.

The widest schist zone outcrops outside of block E towards south and southwest. It shows an elongated form (width of 8 km and length of more than 30 km) with a NW-SE trend that crosses the Cabeça garimpo. This zone runs in the southeast part along the south edge of block E.

This large schist zone is considered by Metamat as the most favorable geological unit to host a gold deposit in block E, mostly due to the presence of Cabeça alluvial garimpo totally located inside the zone. Another positive factor is the presence of strong ductile shearing of N70W to N80W direction that crosses the Cabeça garimpo area and that is considered as possible tectonic trap to host gold mineralization.

(ii) Pre Uatumã Granite (Grl)

In the southern part of block E, a foliated hornblende biotite-granodiorite presenting a weak mylonitization was interpreted as an older granitic intrusion possibly related to Juruena type granodiorite.

(iii) Iriri Formation (Pui)

In the southwest edge of block E of the Xingu Complex, the schist zone is covered by volcanic rocks of acid composition and correlated to the Iriri Formation. The volcanic outcrops present a W-NW trend and composed mainly by rhyolite showing flux structure, rhyodacite and locally dacitic tuff.

(iv) Basic Intrusive (Gb)

In the Central North portion of block E area, a large gabbroic body is intruded in gneiss and granite gneiss of Xingu Complex. Thin section analysis indicated this body as biotite bearing hornblende gabbro with weak pyritic dissemination.

(v) Tertiary age Residual sediment (Trs)

The presence of the Tertiary age sedimentary unit in the southwestern portion of block E

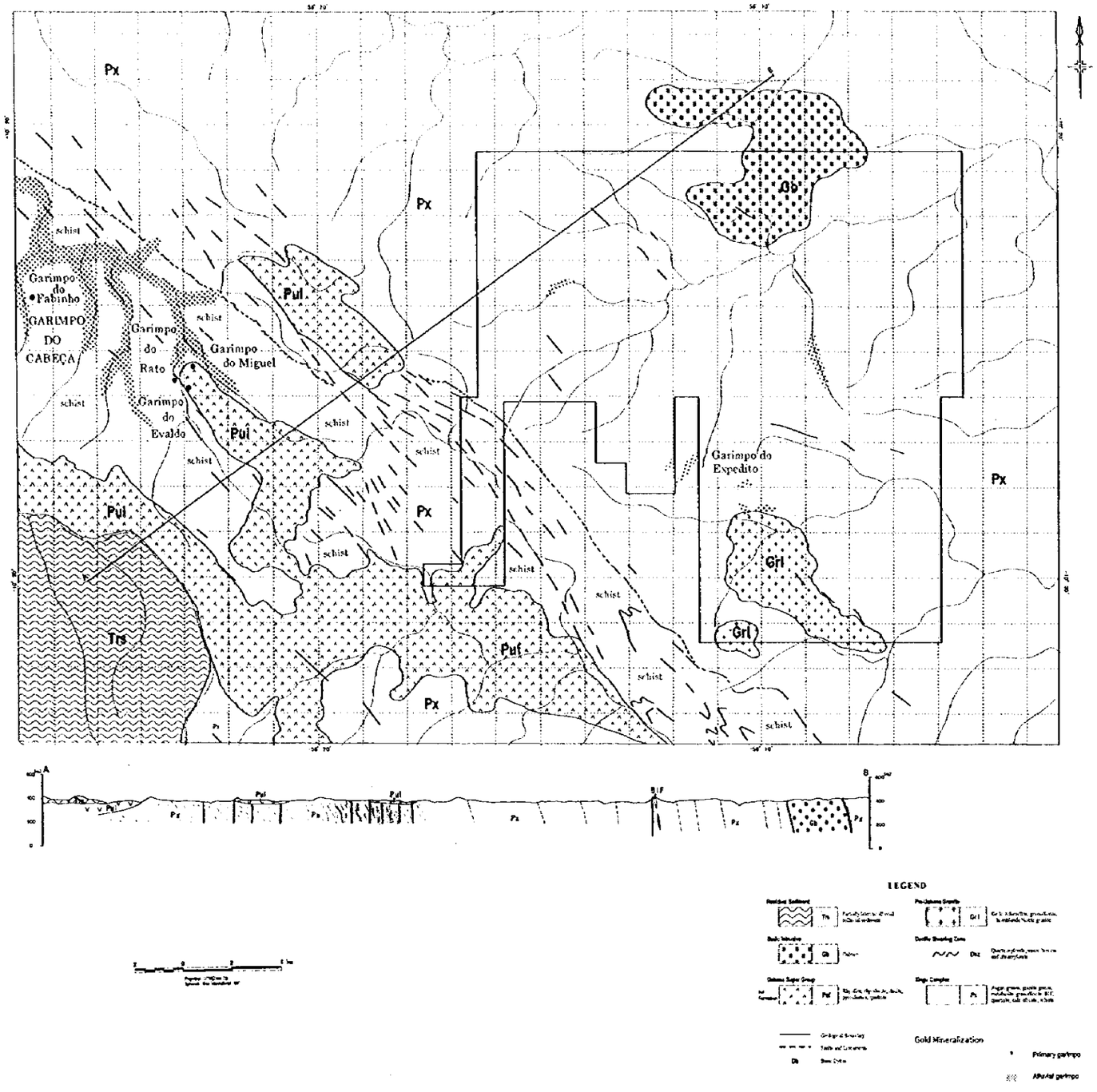


Fig. II-1-5 Geological map and cross section of the Block E

region was interpreted by Landsat image.

(vi) Dykes (Db)

The dykes which are essentially of diabase composition, cut most of the unit in the block E area.

(VII) Airborne magnetic and radiometric data

The wide schist zone and the Iriri volcanic rock present the strongest Potassium response as shown in Fig. II-1-6, while the gabbroic intrusive are well represented by the total magnetic anomaly as shown in Fig. II-1-7.

(c) Mineralization

The Cabeça alluvial garimpo is by far the biggest alluvial gold mineralization in the block E region. It is located 8 km outside to the west of block E and enclose the upper reach of Paranaita and the Ariranha rivers.

The source of the Cabeça alluvial gold mineralization is probably related to quartz veins and veinlets that fill the ductile shearing with N70W to N80W direction. In spite of that, it is still unknown any large primary mineralization in the Cabeça alluvial garimpo region.

An evaluation survey carried out by Metamat in 1994 in 5 small primary garimpos of the Cabeça alluvial garimpo area, indicated that gold bearing quartz vein filling mylonitized garnet-quartz-sericite schist represents one of the gold sources for the Cabeça alluvial garimpo. The gold grade values in these quartz veins resulted in values up to 30 gr./ton with vein thickness between 15 cm and 150 cm. The mylonitic trend was N75W, however, the gold rich quartz veins were formed by filling secondary fracturing systems of N20E~N30E and N5W~N15W directions. In comparison, the gold mineralization within the area of block E indicates by far a less gold potential.

During the 1998 Geological Survey, 25 ore samples were collected for chemical analysis in the block E region. From this total, 12 were samples of quartz veins filling the Cabeça garimpo schist zone and the remaining 13 samples were mostly from quartz veins and pegmatoid veins filling gneissic rock of the Xingu Complex unit.

As shown in Appendix 1, no anomalous values for gold as well as for another elements were detected in these samples.

During the geological survey, a few small scale alluvial garimpo were observed within the block E area, however field observations indicated that the probable gold sources of these garimpo are low grade gold bearing quartz vein or pegmatitic veins filling gneissic rock of the Xingu Complex unit.

(d) Discussion

The main objective of the geological survey in the block E area was to find a favorable geological condition to host a gold mineralization, as exemplified by the Cabeça garimpo schist zone.

The reconnaissance survey carried out during the Phase I, showed that the large schist zone totally outcrop outside of the block E area.

Inside of block E, the predominant rocks are granite gneiss and gneiss. Quartz veins and pegmatoid veins with N60W direction are intruded in the gneissic rocks of the Xingu Complex unit and show large tourmaline and muscovite in soil. The gold sources for the small scale alluvial garimpo present in the block E area are probably related to these low gold grade bearing quartz vein and pegmatitic veins.

Chemical analysis of 25 samples, as shown in Appendix 1, indicated no anomalous values for gold as well as for another elements.

The survey results are thought to indicate that the block E area presents a very low potentiality to host a major gold deposit.

1-4-2 Block F

(a) Generalities

Block F with a surface area of 10,000 Ha is located far away to the east of Alta Floresta city and very close to the Guaranta do Norte city. It is accessible by either, a two-way gravel road from Guaranta do Norte City or by a 25-km two-way gravel road from Matupa city.

The agricultural and cattle-raising activities are strongly developed within this block and around 50% of the entire area is connected either by one-way or two-way gravel road network connecting the farms of the region. The topography is strongly leveled and within the area, outcrops are very rarely found.

The alluvial gold was extensively worked by garimpeiros, mostly in the southwest and central part of this block.

During the Phase I of this geological survey, a total of 37 ore samples, 7 polished ore samples and 3 sample for fluid inclusion studies were collected within block F area.

(b) Geology

Block F region is represented by the Xingu Complex(Px), Ductile Shearing Zone(Dsz), Dykes

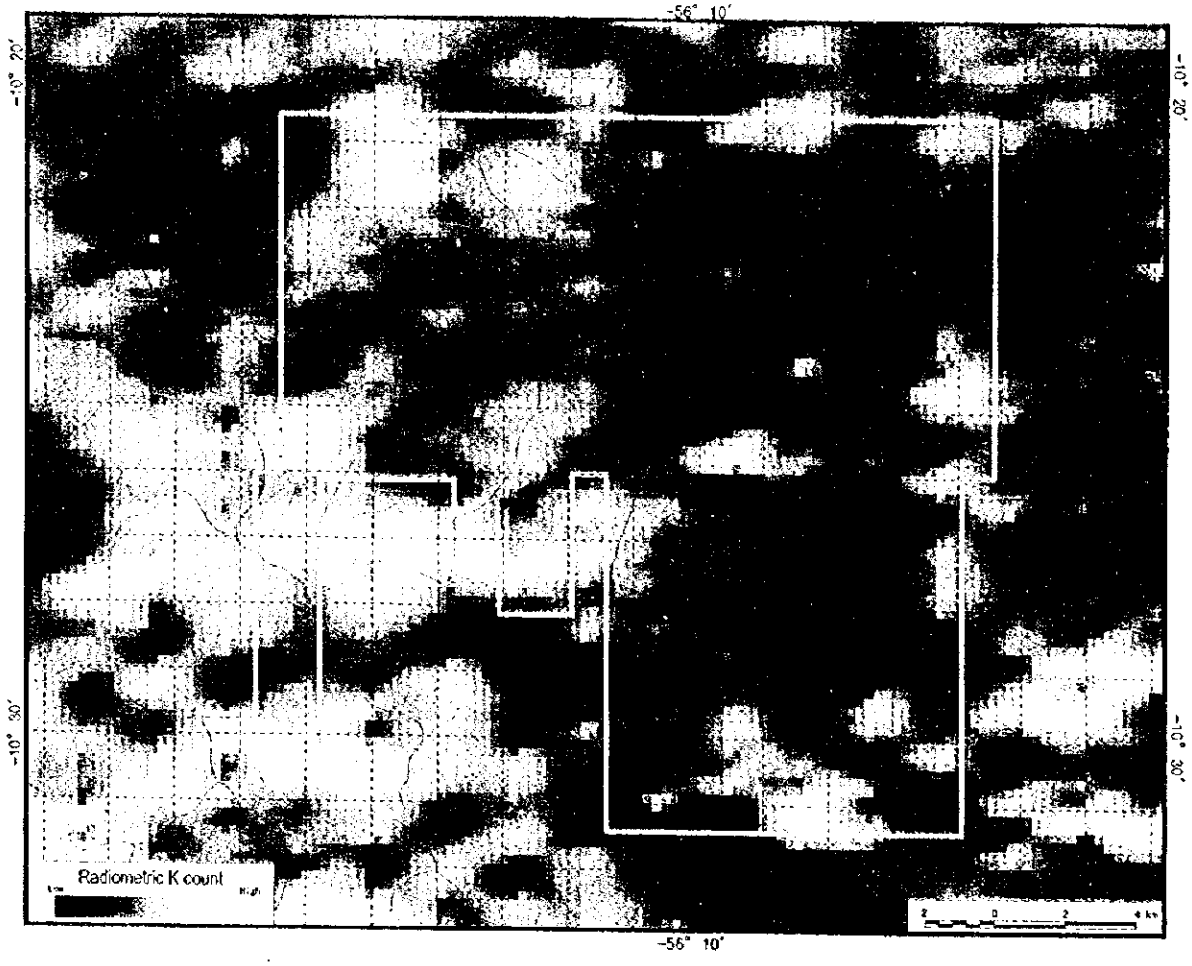


Fig. II-1-6 Radiometric potassium count in the Block E

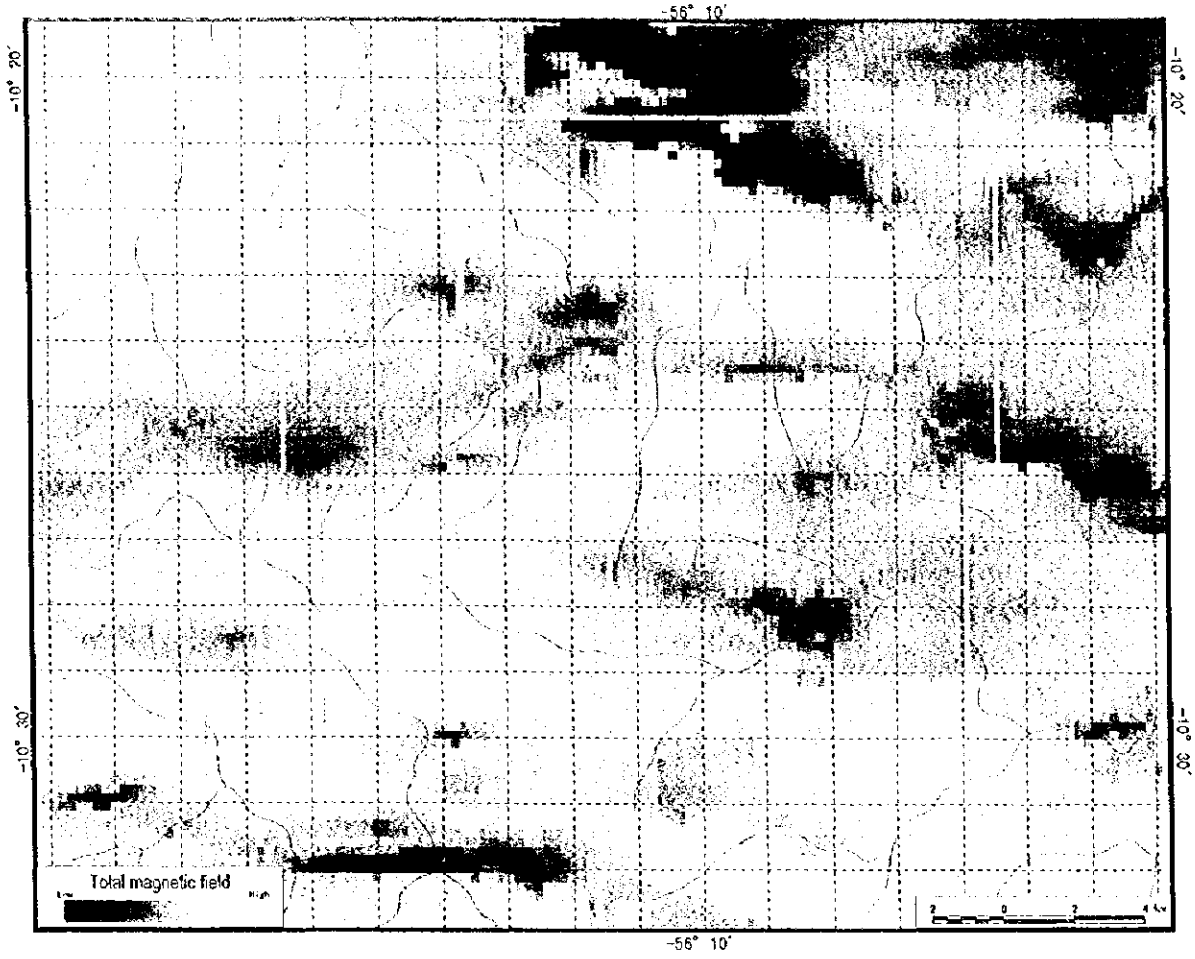


Fig. II-1-7 Total geomagnetic field in the Block E

(Db) and by the Quaternary age Recent Alluvium.

Fig. II-1-8 shows the geologic map and the gold mineralization sites.

(i) Xingu Complex(Px)

The Xingu Complex unit outcrops in the entire area of block F, showing lithologies as gneiss with quartz diorite composition, granite gneiss and schist.

Metamat considered that the talc-chlorite schist, which outcrops in Serrinha do Guaranta garimpo, are the remains of volcano-sedimentary sequence. This schist shows an elongated outcrop along W-NW direction and hosts a ductile shearing of N60W direction as well as various dykes with granitic composition. Other ductile shear zones that cut granite gneiss and gneiss, were observed within the block F area. The preferential directions observed for these ductile shear zones were between W and NW, being only one showing a NNE direction. As observed in Serrinha do Guaranta garimpo and in Aluizio garimpo, old bearing quartz veins fill some of these shearing zones.

(ii) Dykes (Db)

A wide diabase dyke is intruded with unknown direction in the southwestern edge of the block F area. The diabase presents disseminated pyrite and it is thought that its intrusion caused a strong alteration as silicic, pyritic and hematitic alteration in the gneissic host rock.

(iii) Airborne geophysical data

As shown in Fig. II-1-9 and Fig. II-1-10, no additional information can be obtained from the airborne geophysical data collected in the area of block F.

(c) Mineralization

During the geological survey of the Phase I, an evaluation survey of garimpos was made in Serrinha do Guaranta garimpo (located in the southwestern part of block F area) and in Aluizio Garimpo (located in the northern part of the same area).

By this survey, three different types of gold mineralization in the Xingu Complex terrain were confirmed within block F area showing common features, such as the same shearing structure that controls their mineralization. These three types are described below.

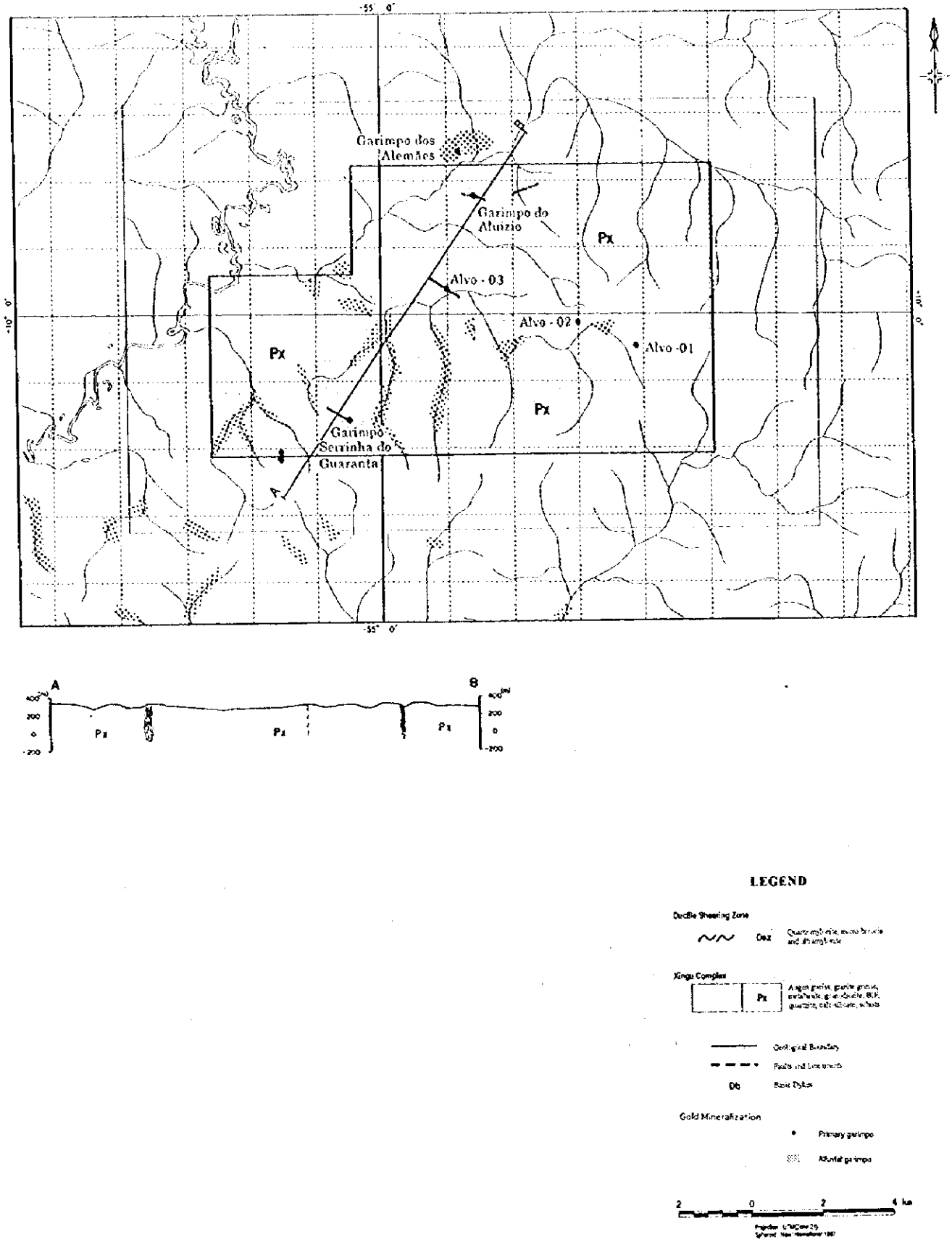


Fig. II-1-8 Geological map and cross section of the Block F

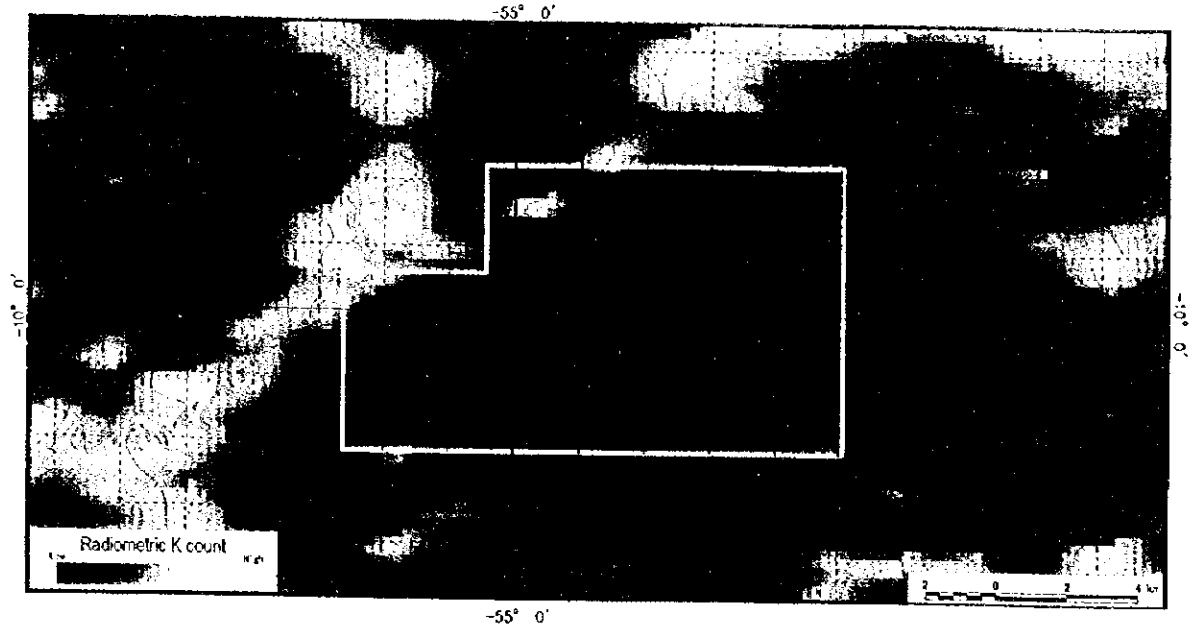


Fig. II-1-9 Radiometric potassium count in the Block F

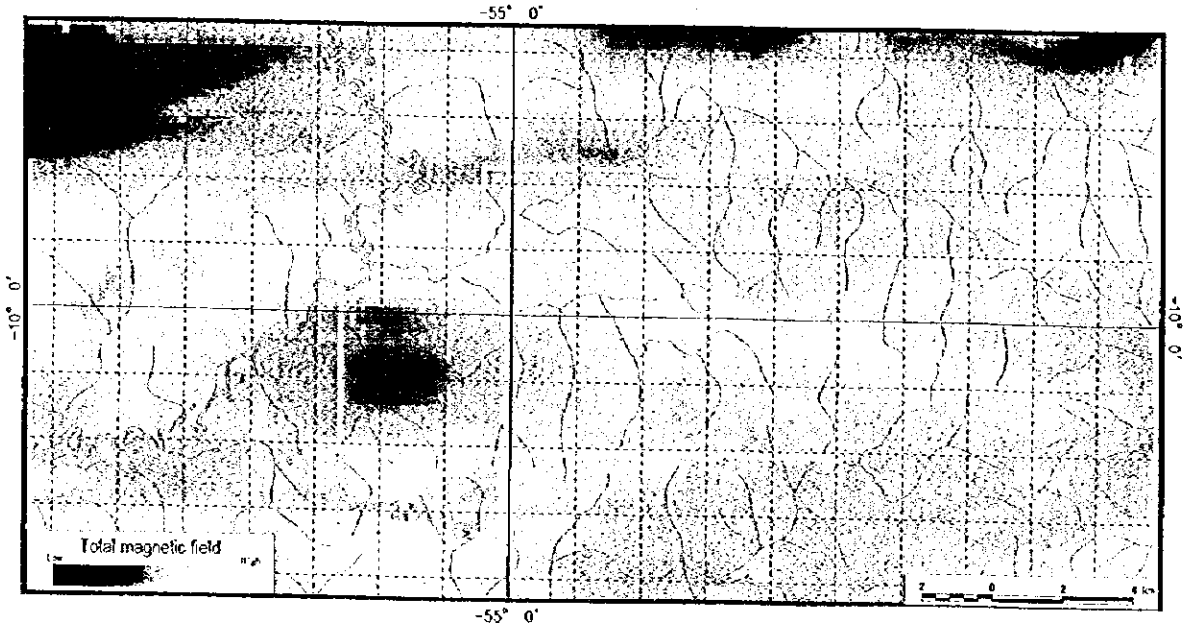


Fig. II-1-10 Total geomagnetic field in the Block F

i) Gold mineralization associated to diabase dyke.

Gold mineralization located in the southwestern edge of the block F area and intruded in shearing plane was confirmed in two parallel quartz veins located in both sides of one large diabase dyke of unknown direction. Disseminated pyrite was observed within diabase dyke and a strong alteration with silicification, pyritization and hematitization were observed in the gneissic host rock.

The quartz vein sample F98002 taken in the south of the diabase dyke, showed values of 0.11ppm Au. It presented cubic pyrite disseminated on the whole vein and hematite filling the vein fractures. Fluid inclusion test carried out in the vein showed a salinity of 9.1% NaCl and homogenization temperatures averaging 320°C, which are typical of a mesothermal gold mineralization type. Another quartz vein sample taken in the north of the diabase dyke indicated a gold value of 1.21 ppm.

ii) Serrinha do Guaranta Gold mineralization

As shown in Fig. II-2-11, the Serrinha do Guaranta garimpo area is located in the southwestern part of block F. The gold mineralization is host by sulphide rich quartz veins filling ductile shearing of N60W direction in talc-chlorite schist.

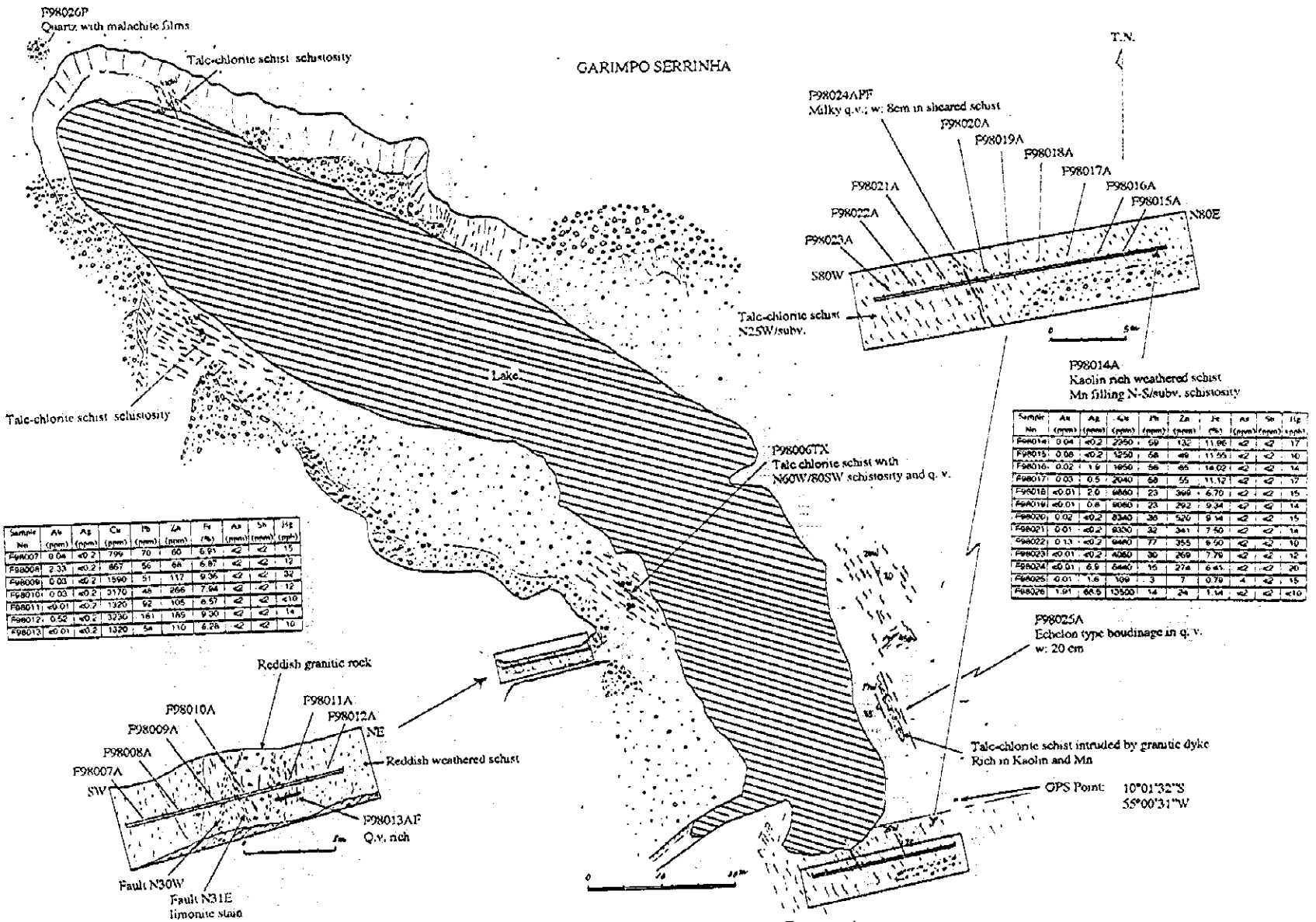
In order to confirm the lateral distribution of gold mineralization within the schist, a total of 22 ore samples were collected during the geological survey of the Phase I .

Two sites were selected within the garimpo area and in each of the sites were performed channel sampling (Fig. II-2-11). Each sample had a standard 2.0 meter width and the sampling disposition were transversal to the mineralization trend. A 32 meters wide zone was sampled making a total of 16 samples.

Analytical results proved that the talc-chlorite schist host a gold mineralization, as confirmed by gold values (2 meters average) of 2.33 ppm, 0.52 ppm, and 0.13 ppm in talc-chlorite schist samples. The gold bearing sulphide rich quartz vein filling the subvertical N60W ductile shear zone was not found, however the sample F98026, which is supposed to represent the gold bearing quartz vein, was taken from the garimpo tailing. Results indicated Au: 1.91 ppm; Ag: 68.5 ppm and Cu: 1.35%, while fluid inclusion test performed in this sample, showed a salinity of 19.8% NaCl and homogenization temperatures averaging 237°C.

Analytical results also confirmed that the schist zone host a strong copper mineralization, averaging 0.43% Cu in 32 meters.

Due to the strong weathering in the sampling sites, most of the samples were taken from



Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
P98007	0.04	<0.2	799	70	60	6.91	<2	<2	15
P98008	2.33	<0.2	867	56	68	6.87	<2	<2	12
P98009	0.03	<0.2	1590	51	117	9.36	<2	<2	32
P98010	0.03	<0.2	3170	48	266	7.94	<2	<2	12
P98011	<0.01	<0.2	1320	92	105	6.57	<2	<2	<10
P98012	0.52	<0.2	3250	161	189	9.30	<2	<2	14
P98013	<0.01	<0.2	1320	54	110	6.26	<2	<2	10

Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
P98014	0.04	<0.2	2350	59	132	11.86	<2	<2	17
P98015	0.08	<0.2	1250	58	49	11.55	<2	<2	10
P98016	0.02	1.9	1650	56	66	14.02	<2	<2	14
P98017	0.03	0.5	2040	68	55	11.12	<2	<2	17
P98018	<0.01	2.0	6860	23	396	6.70	<2	<2	15
P98019	<0.01	0.8	8060	23	292	9.34	<2	<2	14
P98020	0.02	<0.2	8340	36	520	9.14	<2	<2	15
P98021	0.01	<0.2	9350	32	341	7.50	<2	<2	14
P98022	0.13	<0.2	6440	77	355	9.50	<2	<2	10
P98023	<0.01	<0.2	4080	30	269	7.76	<2	<2	12
P98024	<0.01	6.9	6440	15	278	6.45	<2	<2	20
P98025	0.01	1.6	109	3	7	0.79	4	<2	15
P98026	1.91	66.5	13500	14	24	1.14	<2	<2	<10

Fig. II-1-11 Sketch of Garimpo Serrinha do Guaranta

strongly weathered schist. The only outcrop of fresh schist zone was observed in the central part of the garimpo area, and the average grade for 12 meters was 0.86% Cu.

Based on these results, it is expected a low grade and large volume gold-copper deposit in talc-chlorite schist of Serrinha do Guaranta area.

iii) Aluizio Gold mineralization

The Aluizio garimpo located in the northern part of block F and not surveyed previously by Metamat, present parallel quartz veins bearing gold associated with pyrite and filling N80W direction shear zone in granitic rock (Fig.II-2-12).

The quartz veins present a width between 3 cm and 30 cm, milkish white in general and strongly disseminated by pyrite. The width of the zone filled by quartz veins ranges between 4 and 10 meters and locally reaches 30 meters.

A zone of more than 500 meters in length with quartz veins was confirmed. It presents at least a open pit of 150 meters in length and 20m in width in its east end. A possible continuity of this zone, found far east from the open pit, is supposed to be duet o another large garimpeiro pit located approximately 800 meters to S60E.

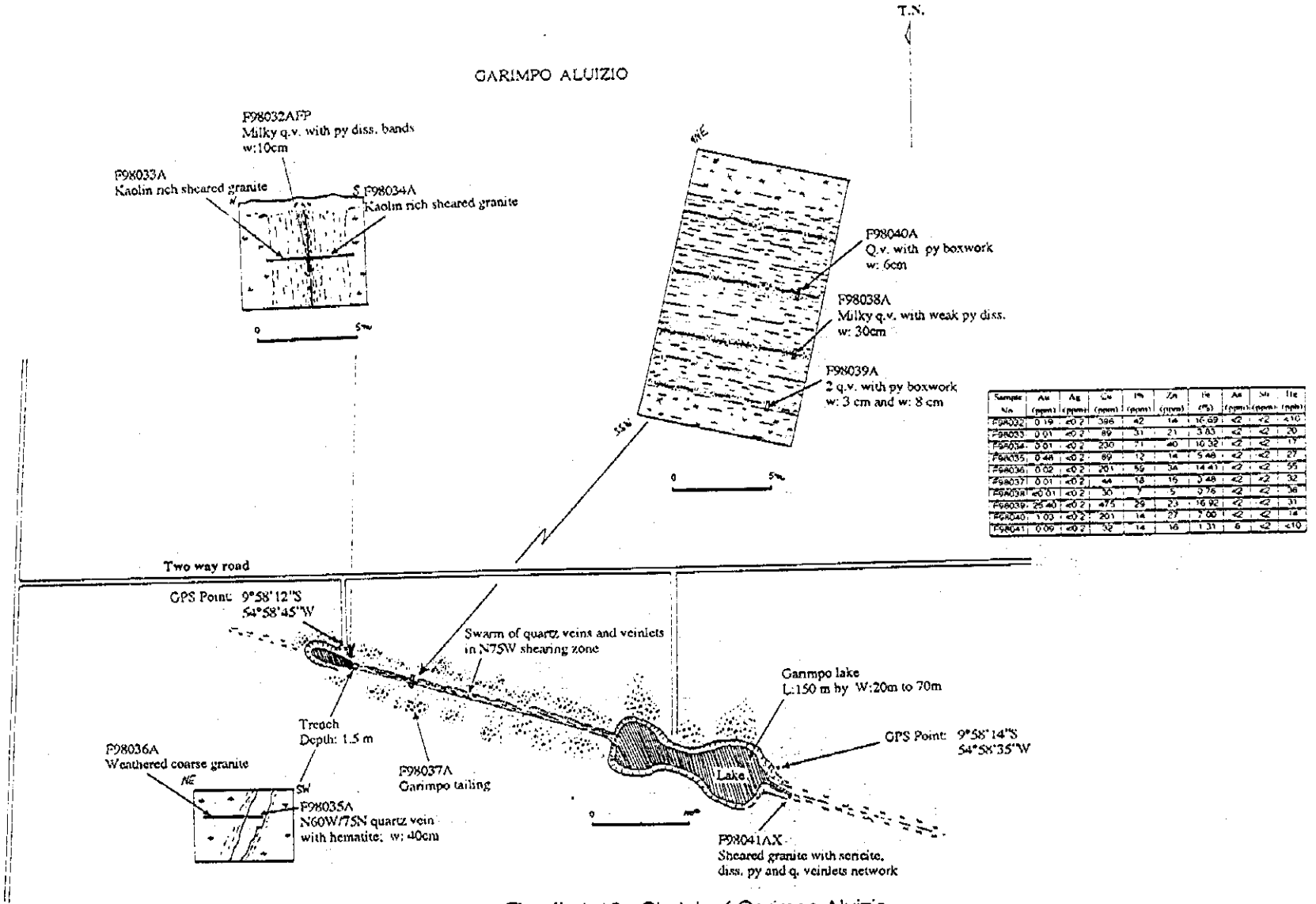
During this Phase I, a total of 10 ore samples were collected in the Aluizio garimpo area, mostly from parallel quartz veins bearing sulphide and gold and filling N80W direction shear zone.

Analytical results for seven sulphide rich quartz veins provided relatively low gold content, in the order of less than 1 ppm with the exception of the sample that F98039 proved to have a higher value of 25.40 ppm. Sheared granite that hosts the quartz veins was sampled on two sites, however its analytical results presented no promising gold values. Fluid inclusion test of quartz vein sample (F98038), presented a salinity of 8.4% NaCl and homogenization temperatures averaging 276°C.

(d) Discussion

Prior to 1986, Metamat surveyed 4 target areas by grid soil geochemical survey in the block F. Promising results were found in the target area named Serrinha do Guaranta where a northwest trending of an area of 12 Ha with superposed anomalies of Cu, Pb, Zn, Cr, Ni, Co, Bi, Sb and Cd were detected in the northwestern part of Serrinha do Guaranta garimpo.

These superimposed soil anomalies were better represented by copper anomalies showing 260 ppm values of NW-SE direction. Analytical results for gold were considered very low, showing gold grades very randomly distributed.



Sample No.	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
F98032	0.19	<0.2	396	42	14	16.69	<2	<2	<10
F98033	0.01	<0.2	89	31	21	3.83	<2	<2	20
F98034	0.01	<0.2	230	71	40	10.58	<2	<2	17
F98035	0.44	<0.2	89	12	14	5.48	<2	<2	27
F98036	0.02	<0.2	201	59	34	14.41	<2	<2	55
F98037	0.01	<0.2	44	18	15	3.48	<2	<2	32
F98038	<0.01	<0.2	30	7	5	0.76	<2	<2	36
F98039	25.40	<0.2	475	29	23	16.92	<2	<2	31
F98040	1.03	<0.2	201	14	27	7.00	<2	<2	14
F98041	0.09	<0.2	32	14	16	1.31	6	<2	<10

Fig. II-1-12 Sketch of Garimpo Aluizio

A follow-up survey by using geophysical methods of IP and magnetometry indicated a large exposition of talc-chlorite schist of NWW direction. A detailed geological survey carried out by Metamat in Serrinha do Guaranta garimpo, confirmed that gold bearing sulphide rich quartz vein fills a N60W subvertical ductile shearing in talc-chlorite schist. The mineralized quartz veins were associated with chalcopyrite, malachite, cuprite and goethite.

The geological survey of this Phase I indicated that Serrinha do Guaranta and Aluizio areas presented the most favorable geological and tectonical condition to host a major gold and copper deposit in the block F area. Especially, since gold mineralization in the Serrinha do Guaranta area is observed in talc-chlorite schist which is the host rock of gold quartz vein, the relative wide scale of mineralization can be expected.

1-4-3 Block G

(a) Generalities

Block G with a surface area of 51,479.57 Ha is located 60 km to the east of Alta Floresta City. Its access can be made from Matupa city by a 35 km two-way gravel road that connects the cities of Matupa and Novo Mundo. From Novo Mundo a 12 km two-way gravel road reaches block G.

Inside the G area there are one-way and two-way gravel roads connecting the farms of the region. The topography is leveled in the western part of block G showing almost no outcrops. At the eastern and northern part there exist an increase in the numbers of outcrops due to the outcrops of Teles Pires granite and sediments of Beneficiente Group.

There exist many primary garimpos located inside of a large shearing zone that crosses the block G area of northwest direction and including some large garimpos such as, Luizão garimpo and Pezão garimpo. This large shear zone is located between two granitic batholiths intruded in the Xingu Complex unit.

During the geological survey of 1998, a total of 6 samples were collected for thin sections, 7 X-ray samples, 27 ore samples, 6 polished ore samples and 1 sample for fluid inclusion studies.

(b) Geology

The block G region is represented by the following geologic units: Xingu Complex(Px), Ductile Shearing Zone(Dsz), Pre-Uatumã granite(GrII and GrIII), Teles Pires granite from Uatumã Supergroup(Gru), Middle Proterozoic Beneficente Group(Pb), Dykes(Db) and Quaternary age Recent alluvium.

Fig. II-1-13 shows the geologic map and gold mineralization sites.

(i) Xingu Complex(Px)

The Xingu Complex unit outcropping in the entire block G area, is intruded by several granitic batholiths of different ages and oriented in conformity with the regional trend of E-W and WNW-ESE directions.

The Xingu Complex represents the largest exposition unit in the block G area and it is composed by gneiss and granite gneiss, and presenting locally, a tonalitic composition.
A strong regional shear zone of a width of ten kilometers along NW direction crosses the gneiss and granite gneiss in the central part of block G. The resulting sheared rocks suffered strong potassic, sericitic and pyritic alteration.

Within the shear zone, the granite gneiss and gneiss show evidence of mylonitization and recrystalization of quartz as well as injections of K-feldspar rich solution within gneissic foliation. These solutions, composed mainly by quartz and K-feldspar present fluorine as well as dark mica (biotite) and light mica (muscovite).

Parts of gneiss and granite gneiss not affected by alteration nor by the K feldspar rich injections, shows rocks with the original composition and texture, as observed in clinopyroxene-biotite granodiorite of the sample G98013.

(ii) Pre-Uatumã granite(GrII and GrIII)

In the southwest and south of the block G area, the airborne survey interpreted potassium medium intensity anomalies as two granitic batholiths which were classified as Gr I type in the Geological map.

In the southern part of the block G area, a two mica granitic batholith, with blastoporphyritic texture and rich in fluorine (sample G98001) was classified as Gr I type granite. The batholith was strongly mylonitized, altered and presenting disseminated gold, pyrite, chalcopyrite and bornite mineralization associated with the shearing process. A strong K- feldspar alteration is observed in the entire body, however, locally it is observed kaolinitic alteration or carbonatic alteration as calcite veinlets. The boundary of the Gr II granite with the gneissic rocks was not observed, but it is supposed to have a transitional boundary with the gneissic units of the Xingu Complex.

In the southwestern portion of the survey area, a large batholith of syenitic-biotite granite (sample G98030) was classified as Gr III type pre-Uatumã Granite. A slight orientation of biotite was observed in outcrops as well as a sericite rich veins, similar to greisen, along of the boundary

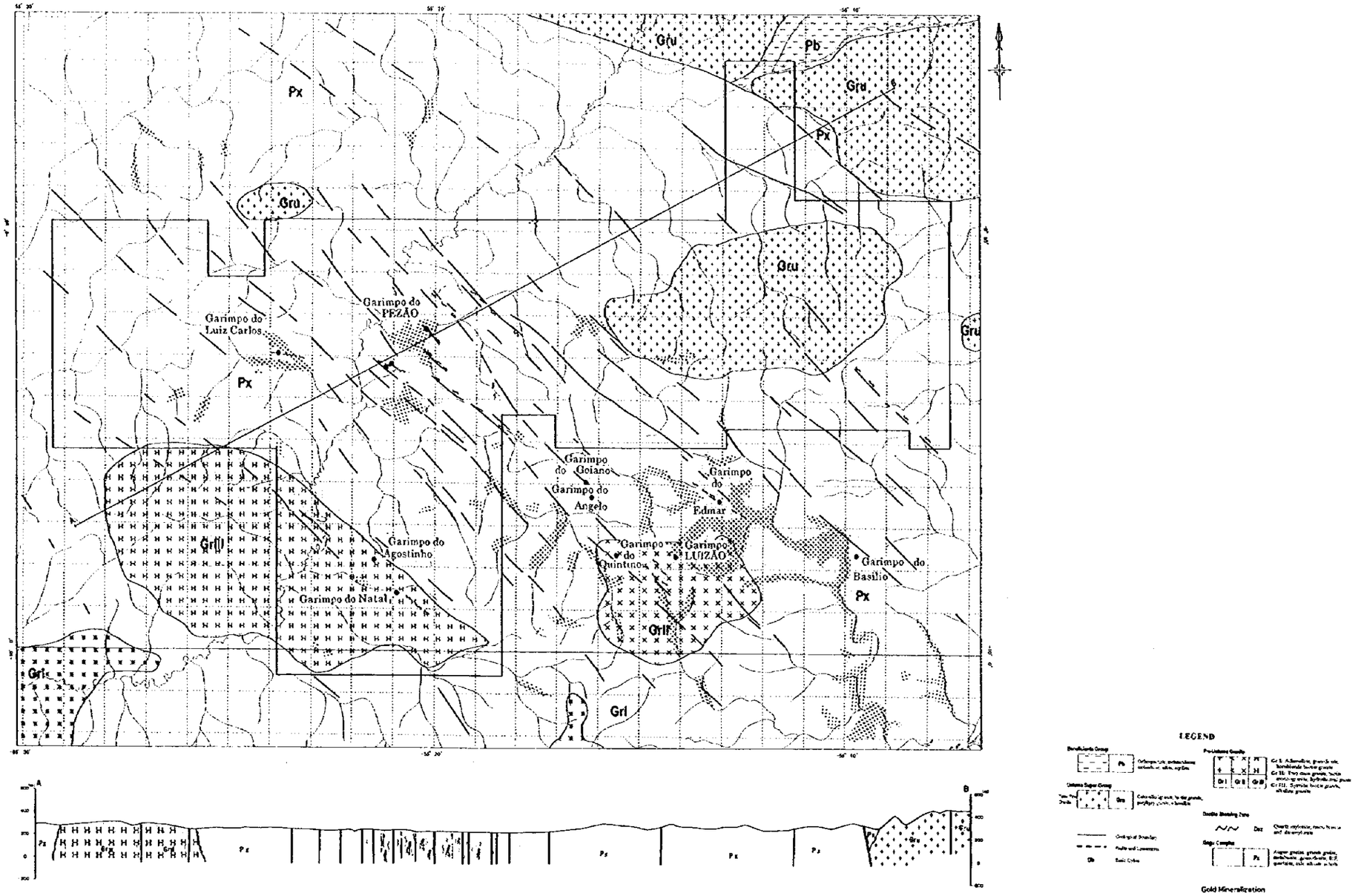


Fig. II-1-13 Geological map and cross section of the Block G

with the Xingu Complex unit.

(iii) Teles Pires granite(Gru)

Metamat considered the large and homogeneous batholith intruded in the eastern part of the block G area as typical Teles Pires granite. Microscopic analysis of the sample G98027 classified it as equigranular, biotite granite (Table II-1-1). Teles Pires-type granite was cited by Silva et al. (1980) as mainly intruded along the southern margin of the Cachimbo graben zone.

Three others granitic batholiths previously interpreted in the northern part of the survey area characteristically present a high airborne potassium anomaly similar as the Teles Pires-type granite and based in these characteristics, these granitic batholiths were classified as Teles Pires-type granite.

(iv) Beneficente Group(Pb)

In the northeast part of the block G area, a sedimentary unit was interpreted by Landsat TM techniques as part of the Beneficiente Group sediments.

(v) Dykes (Db)

The dykes are essentially of diabase composition and they cut most of the unit in the block G area.

(vi) Shear zones

As suggested by Araujo et al. (1975), Metamat recognized 3 regional fracturing system in the block G area, as follows:

1) The oldest system along a general NW direction, that affected the Xingu Complex unit and older granite.
2) An intermediate system, of NE direction, that affected the Uatuma Group rocks.
3) The later and younger system of approximate E-W direction, that affected both Xingu Complex unit and the Uatumã Group.

The existence of the E-W direction system was confirmed by airborne magnetic data.

Landsat and radar images confirmed the oldest system of NW trend in the central part of the survey area. This system is represented by the NW shear zone affecting mainly the Xingu Complex rock and older granitoids.

(vii) Airborne geophysics and radiometric data

As shown in Fig, II-1-14, the Teles Pires-type granite and the GrII and GrIII types Pre Uatumã granite presented the strongest Potassium anomaly, while the Fig II-1-15 shows E-W magnetic anomalies intersected by NW-SE structures.

(c) Mineralization

The geological survey carried out in block G showed that the most favorable area to find a major gold deposit exist inside an extensive zone connecting the two biggest primary garimpos in the block G region, named Luizão garimpo and Pezão garimpo. This favorable area is located in the central part of the block G area as a part of a NW direction large shear zone of ten kilometers wide located between two granitic batholiths intruded in the Xingu Complex unit.

1) Garimpo Luizão

The primary garimpo named Luizão is located outside of block G area in the southeast portion of the shear zone. This garimpo is located within a two mica granitic batholith with blastoporphyritic texture, presenting a strong potassium alteration and rich in fluorine.

The batholith was strongly sheared, locally mylonitized, altered and presenting disseminated gold, pyrite, chalcopyrite and bornite, associated with the shearing process (Fig.II-1-16).

The ores samples taken during the geological survey presented the following results: the sample G98008 was a brecciated, sulphide rich sample with gold values of 6.49 ppm, the samples G98009 and G98010 were of quartz veins filling shearing plane, with gold values of 0.10 ppm and 71.20 ppm. Five channel samples taken from shearing zone, mylonitic bands presented no gold values.

2) Garimpo Pezão

The primary garimpo named Pezão is located in the northwest end of the shear zone in the central part of block G, as shown in Fig. II-1-13. Pezão garimpo has a N60W large open pit excavated within a river. The sulphide-rich samples from Pezão garimpo are brecciated, locally mylonitized an composed mainly by pyrite, with local enrichment of bornite and malachite. From the ore samples taken during the geological survey, the following samples: G98015, G98016, G98017 and G98033 confirmed strong gold mineralization and subordinated copper mineralization. High gold grades of 27.40 ppm and 50.00 ppm were confirmed in samples G98015 and G98016 respectively, and innumerable gold grains were visible in the polished ore samples numbers G98015 and G98033. Fluid inclusion tests in sample G98015 showed a salinity of 11.2% NaCl and

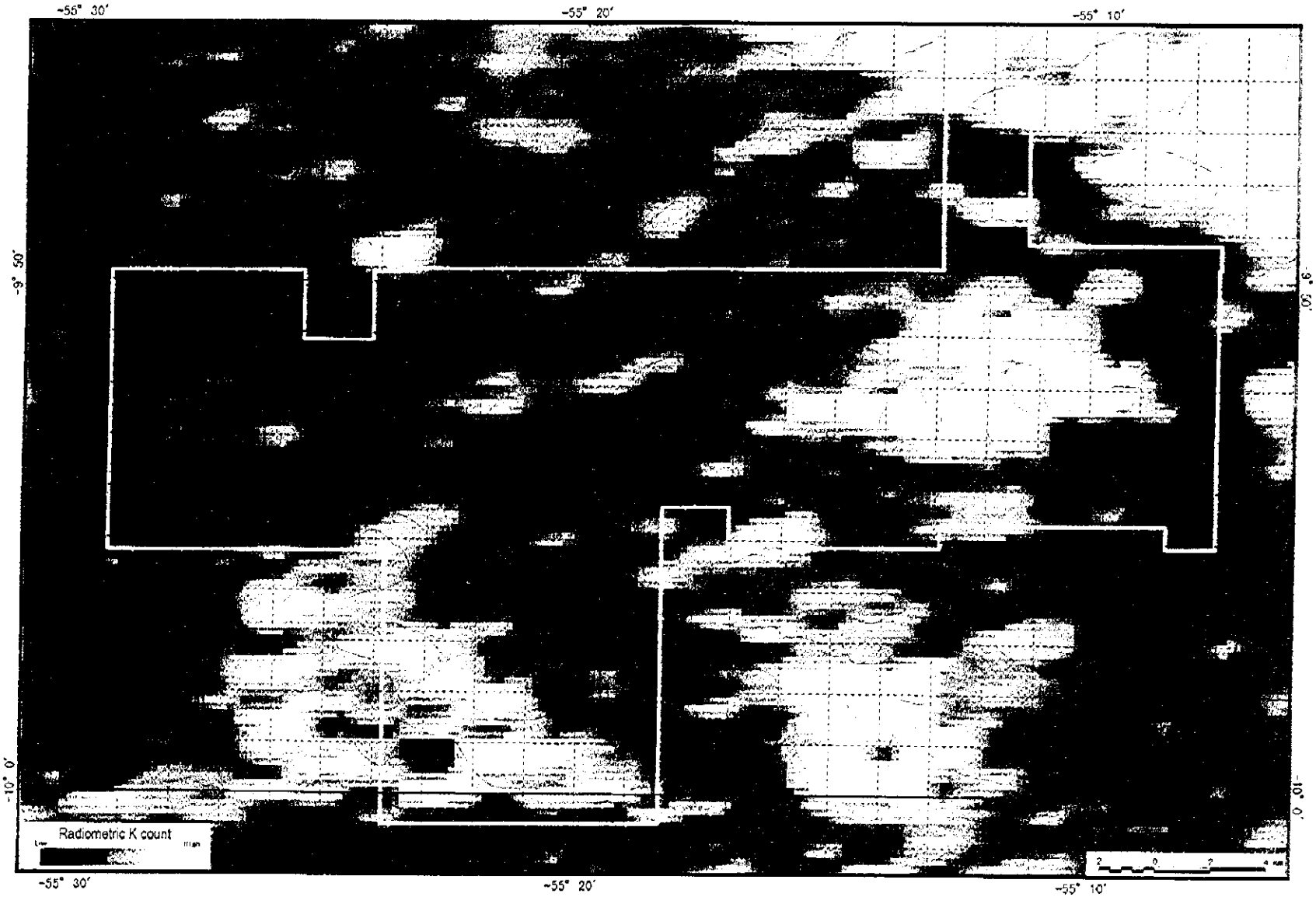


Fig. II-1-14 Radiometric potassium count in the Block G

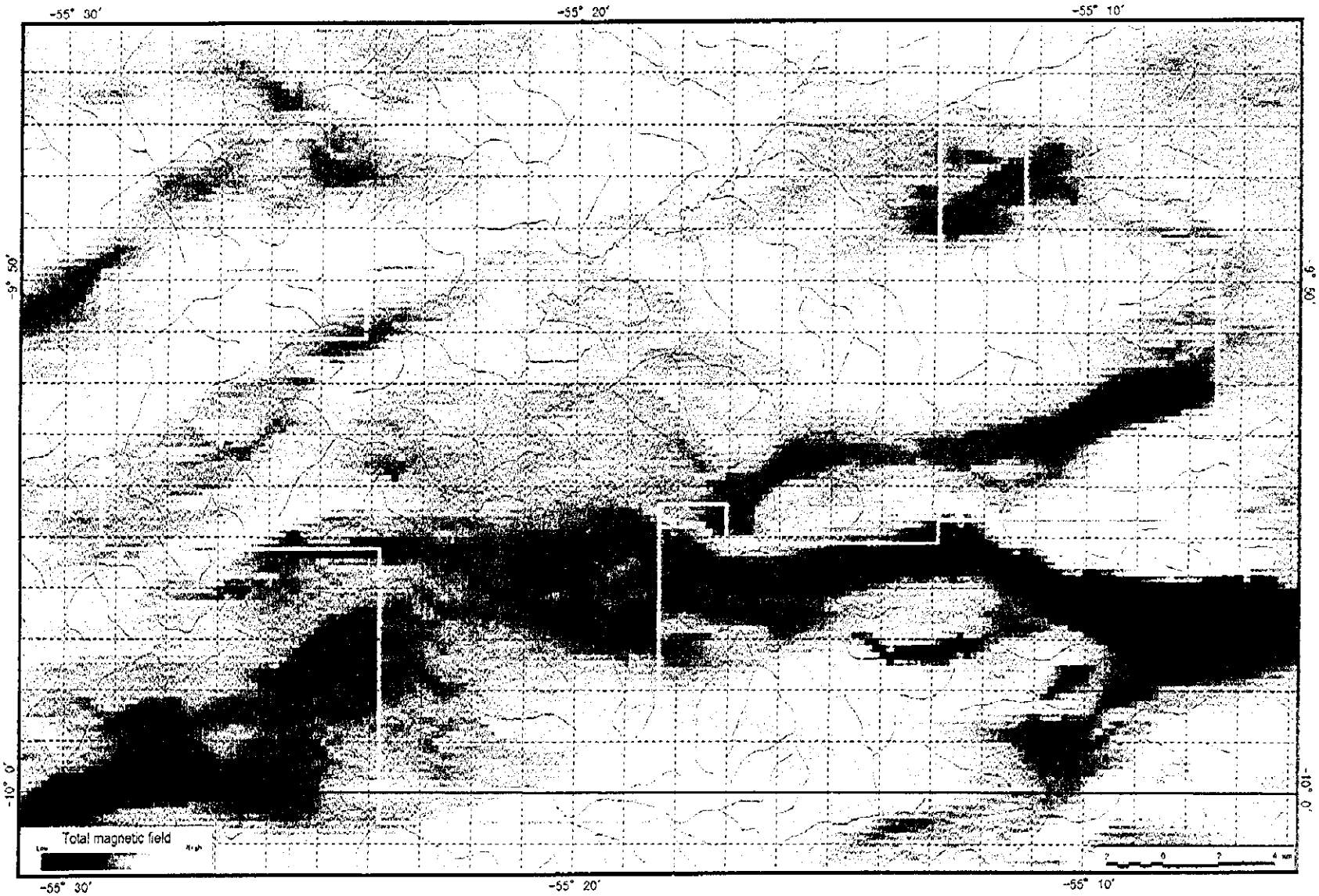
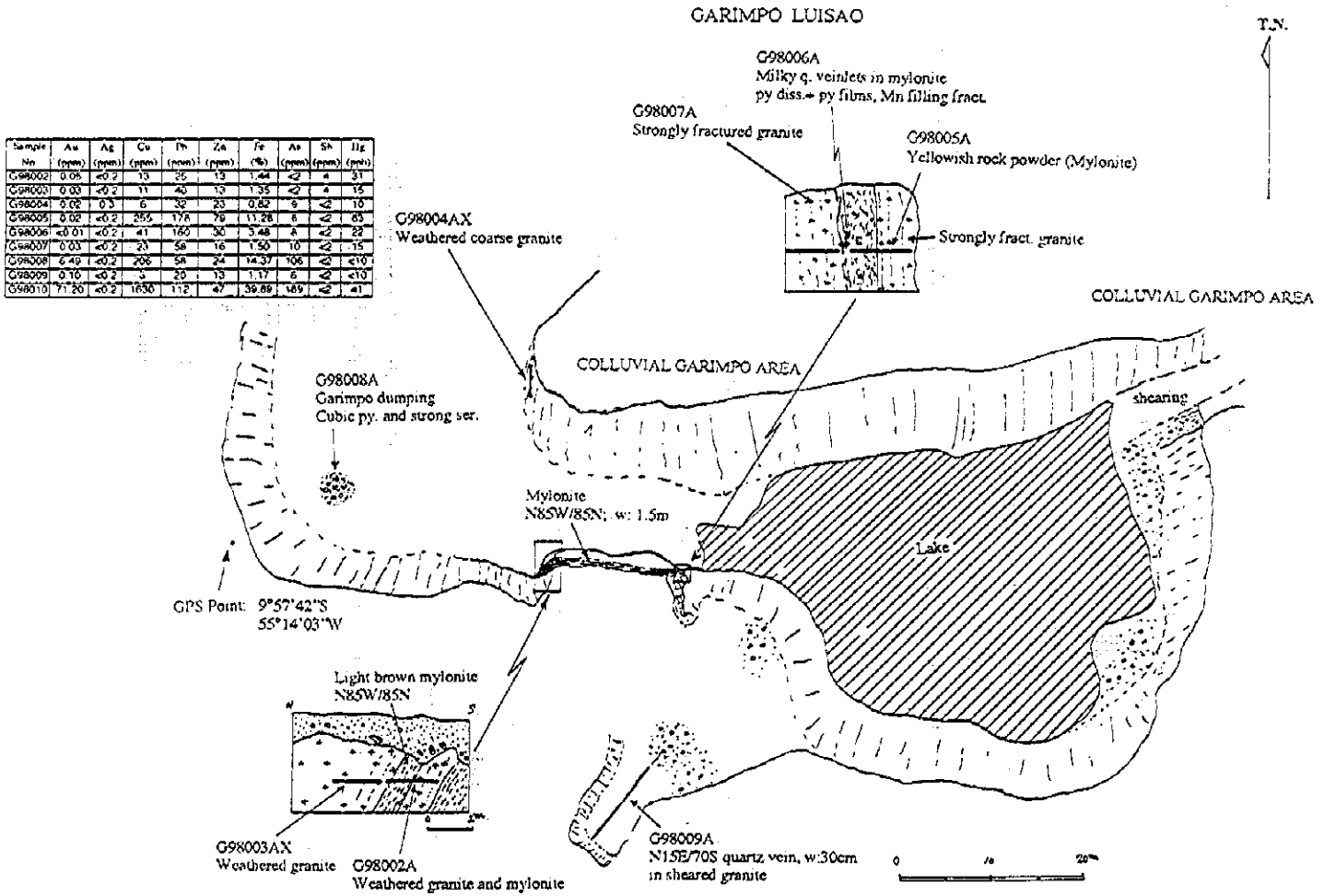


Fig. II-1-15 Total geomagnetic field in the Block G



Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
G98002	0.05	<0.2	13	25	13	1.44	<2	4	31
G98003	0.03	<0.2	11	40	13	1.35	<2	4	15
G98004	0.02	0.3	6	30	23	0.62	6	<2	10
G98005	0.02	<0.2	265	178	78	11.28	8	<2	65
G98006	<0.01	<0.2	41	160	30	5.48	8	<2	22
G98007	0.03	<0.2	23	58	16	1.50	10	<2	15
G98008	6.49	<0.2	206	58	24	14.37	106	<2	<10
G98009	0.10	<0.2	5	20	13	1.17	6	<2	<10
G98010	71.20	<0.2	1630	112	47	39.89	189	<2	41

Fig. II-1-16 Sketch of Garimpo Luisao

homogenization temperatures averaging 169°C.

3) Others Garimpos

The presence of other primary garimpos inside the shear zone located between Luizão garimpo and Pezão garimpo, are a strong confirmation of the high potentiality of the area to host various gold mineralization.

A strong potassium alteration was broadly observed within the shear zone, between Luizão garimpo and Pezão garimpo for which a sericitic, silicic and pyritic alteration were observed locally in the proximity of the primary garimpo.

The following 5 samples taken from small primary garimpos present gold values in sheared granite gneiss or quartz veinlets network in sheared granitic rocks: G98018, G98019, G98020, G98021 and G98022. These samples presented respectively, the following gold values 1.13 ppm, 0.03 ppm, 7.22 ppm, 3.82 ppm, 41.8 ppm and 0.22 ppm.

(d) Discussion

The geological survey carried out in the block G area confirmed that the most favorable area to find a major gold deposit exists inside a NW trend large shear zone, several kilometers wide and connecting two biggest primary garimpos in the Block G region, named Luizão garimpo and Pezão garimpo.

The Luizão garimpo is located in the southeastern edge, while the garimpo Pezão is located in the northwestern end of this shear zone, in the central part of Block G.

The Luizão primary garimpo is hosted by a strongly sheared and locally mylonitized two- mica granitic batholith, with strong K-alteration, rich in fluorine and presenting disseminated gold, pyrite, chalcopyrite and bornite.

The Pezão primary garimpo presented a N60W large open pit excavated inside one river. Its sulphide rich ore is brecciated, locally mylonitized and composed mostly by pyrite, with local enrichment of bornite and malachite. The geological survey indicated that the Pezão garimpo area was not restricted only to the open pit site, but a very extensive area was mined by garimpeiros. This very extensive area mined by garimpeiros in the Pezão area, suggests the existence of a larger primary gold deposit bigger than the sulphide rich brecciated vein found at the bedstream.

All the ore samples taken during the geological survey confirmed strong gold mineralization and subordinated copper mineralization.

The presence of other primary garimpos inside of the shear zone located between Luizão

garimpo and Pezão garimpo indicates a strong confirmation of the high potentiality of the area to host various gold mineralization.

1-4-4 Block H

(a) Generality of the area

Block H with a surface area of 20,000 Ha is located 30 km northeast of Alta Floresta City. It can be accessed from Alta Floresta city by a 40 km two-way gravel road that connects this city and one farm that is located inside of block H. The 600 meters length crossing of the Teles Pires River can be made by ferry with capacity for two tracks.

The access within the survey area is very poor and can be made by using only a two-way gravel road crossing the central north part of the area.

The topography in the eastern part of the survey area is leveled, but in the western part it is uneven due to the outcrops of Teles Pires granite and Beneficiente Group sediments.

The main garimpo activities in the survey area was due to the alluvial garimpo in the Teles Pires and Rochedo rivers as well as to another alluvial garimpo located in drainages of the central part of the area. The presence of a primary garimpo inside the Block H area is unknown.

During the 1998 geological survey, a total of 4 samples were collected for thin sections, 4 samples for X-ray analysis and 9 samples for ore analysis.

(b) Geology

The Block H region is represented by the following geological units: Xingu Complex(Px), Ductile Shearing Zone(Dsz), Pre Uatumã granite(Grl), Uatumã Supergroup Iriri Formation (Pui) and Teles Pires Granite(Gru), Dykes(Db) and Quaternary age Recent alluvium(Qa).

Fig. II-1-17 indicates the geologic map and gold mineralization sites in this area.

(i) Xingu Complex(Px)

The Xingu Complex unit covers half of the survey area and rarely found outcrops of granodiorite and granodioritic composition terrains confirmed it.

In the alluvial garimpo located in the central part of block H, it was observed outcrops of hornblende-biotite granodiorite, classified in the Xingu Complex.

In the western part of the survey area, a chlorite-epidote-pyrite-sericite-kaolinite alteration was observed in granodioritic rocks of the Xingu Complex.

In the northeastern edge of the survey area, a shear zone of unknown direction was identified to cut the Xingu Complex rocks. A strong alteration presenting silicification, sericitization and hematitization was observed within of the shear zone in two sites with 1 km distance.

(ii) Pre Uatumã granite (Grl)

In the southeast and southwest of the survey area, the Xingu Complex unit is intruded by granitic batholith considered as Jamena type by CPRM, in PNPO - Area MT-2.

(iii) Iriri Formation (Pui)

Outcrops of volcanic rocks from Iriri Formation could not be confirmed due to the poor access within the area, however, its presence was mostly interpreted by means of Landsat Image and airborne radiometric data.

(iv) Teles Pires Granite(Gru)

The circular structure identified by Landsat Imagery in the central part of the survey area was confirmed to reveal the Teles Pires granite intrusion structure. The Teles Pires type granite, in the survey area, characteristically present high airborne potassium anomalies as shown on Fig.II-1-19. It was classified as Hornblende biotite Porphyritic Granite.

(v) Dykes (Db)

The dykes are essentially of diabase composition and they cut most of the unit in block H.

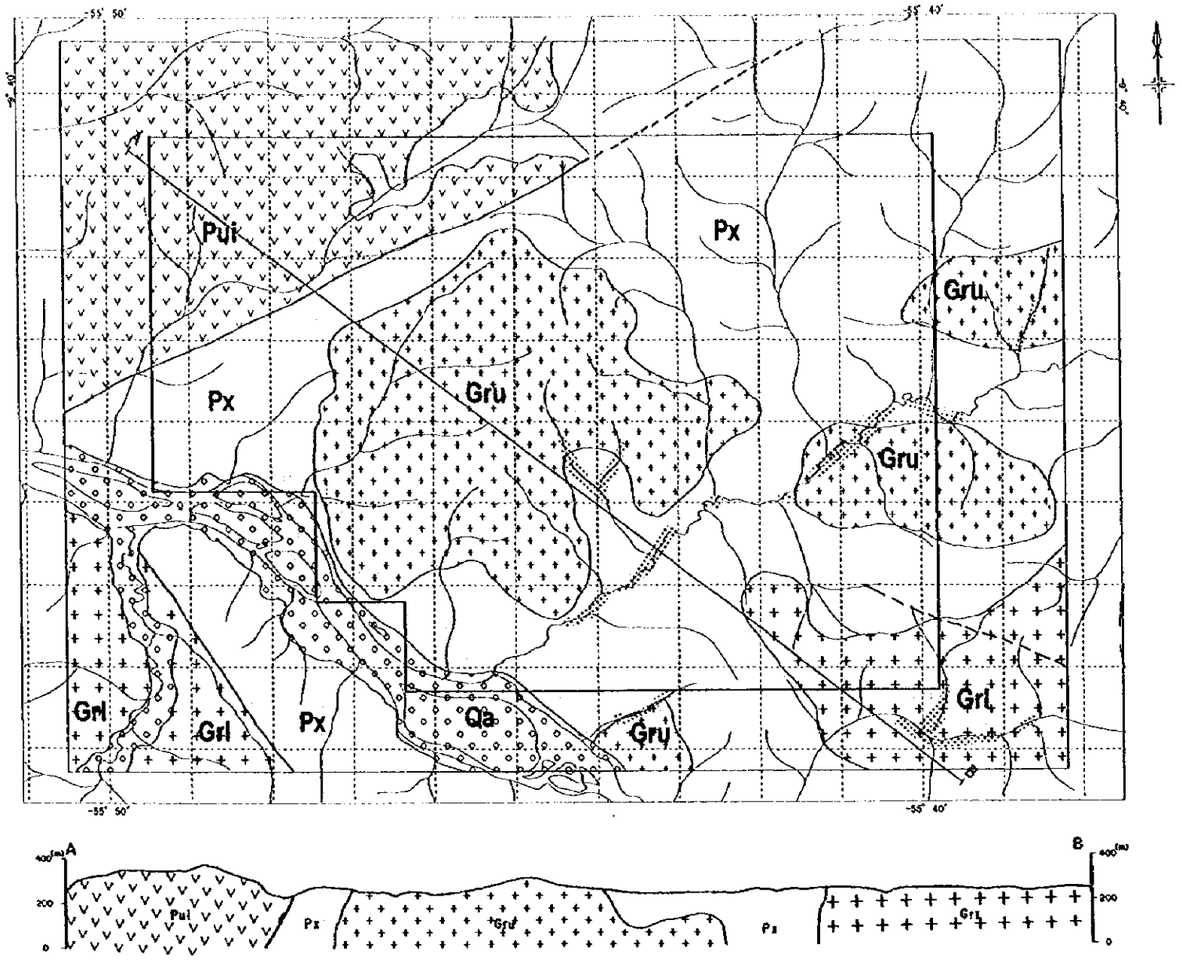
(vi) Airborne geophysical and radiometric data

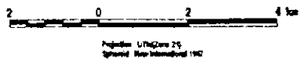
As seen in Fig.II-1-18, the Teles Pires-type granite and the Iriri Formation of the Uatuma Supergroup presented high Potassium anomalies, while the magnetic data clearly show a intrusive body at the western edge of the Block H area, as shown in Fig. II-1-19.

(c) Mineralization

Alluvial gold garimpo is found in Rochedo River and Teles Pires river, as well as in the rivers of the central part of Block H area. The gold in the Teles Pires and Rochedo rivers is probably related to upstream sources, but considered related to local sources for the gold in the streams of the central part of the survey area.

A strong silicic, sericitic and hematitic alteration were observed in sheared rocks at two sites in





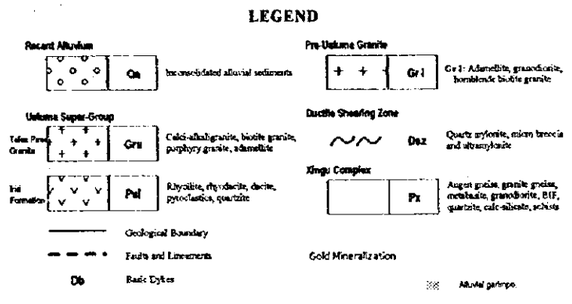


Fig. II-1-17 Geological map and cross section of the Block H

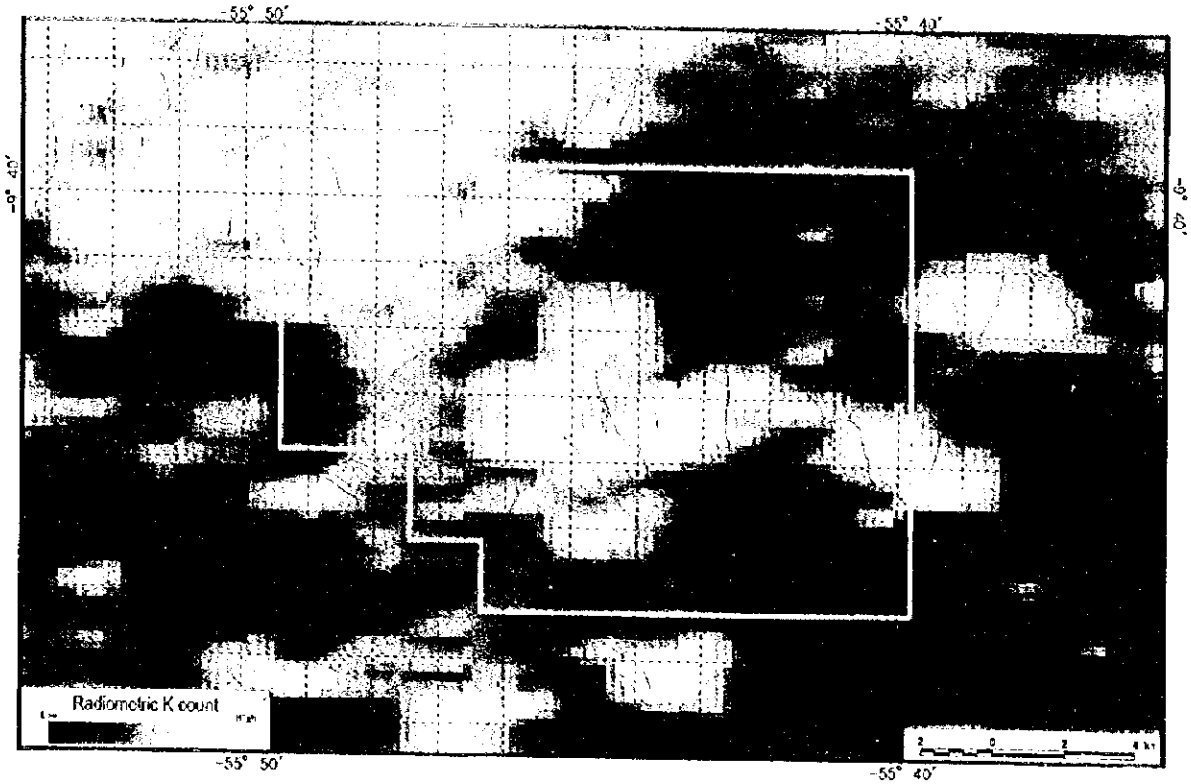


Fig. II-1-18 Radiometric potassium count in the Block H

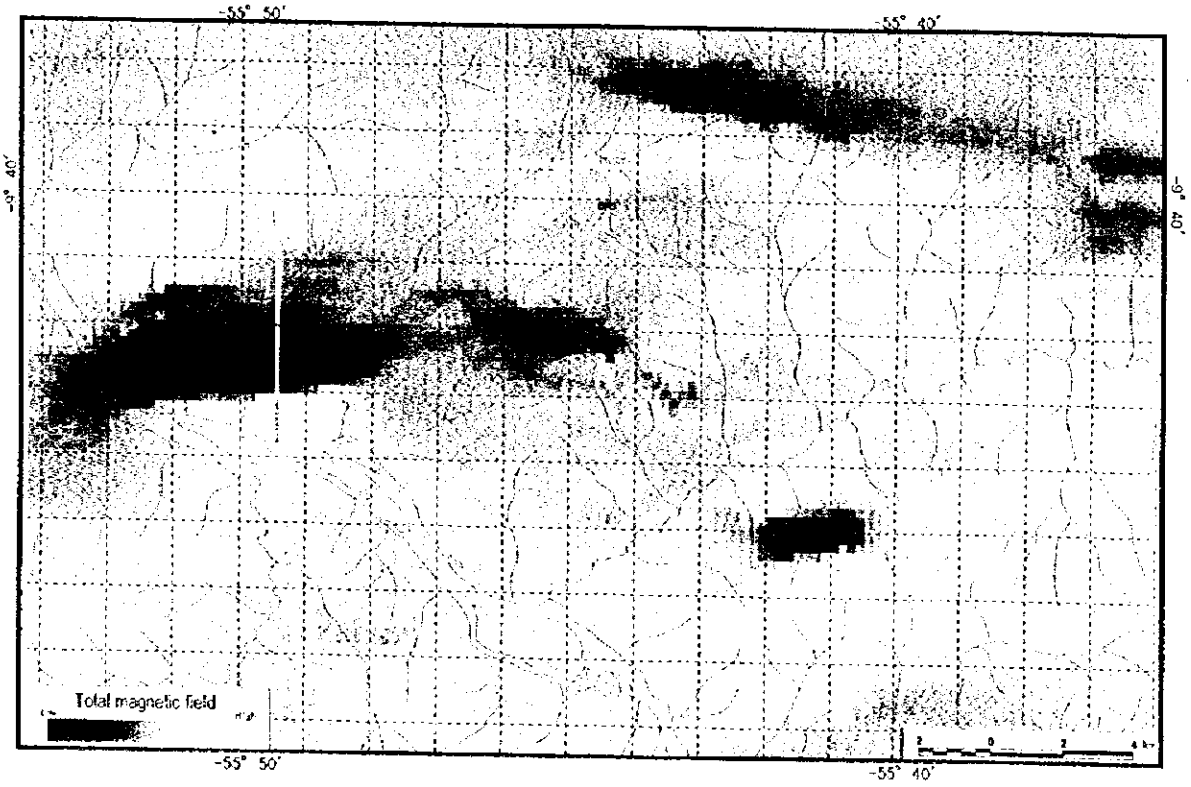


Fig. II-1-19 Total geomagnetic field in the Block H

the northeastern part of the survey area. Similar altered rocks were observed as gravel of the alluvial garimpo in the central part of Block H.

In the western part of the survey area, a chlorite-epidote-pyrite alteration was observed in equigranular monzogranite, however the analytical results of a quartz vein sample taken from altered monzogranite was confirmed to be barren.

Analytical results for 9 ore samples from block H indicated neither anomalies for gold nor anomalies for others elements.

(d) Discussion

The presence of a primary source of gold within block H area was confirmed by the existence of alluvial garimpo in the central part of the survey area, however, the location of the primary source of gold is still unknown.

Strong silicic, sericitic and hematitic alteration were observed in sheared rocks in two sites along the road. A similar altered rock was observed as mixed fragments in gravel of the alluvial garimpo in the central part of the survey area. Analytical results of these altered rocks indicated no anomalies for gold or for base-metal elements.

Analytical results of quartz vein sampled from chlorite-epidote-pyrite altered monzogranite was also confirmed to be barren.

The results of geological survey indicated no gold anomaly within block H area.

Chapter 2 Geochemical survey

2-1 Location of the Survey Areas

Geochemical survey was carried out in block B (Area: 200 km^2) and in block C (Area: 200 km^2) as shown in Fig. II-2-1 and Fig. II-2-2 respectively.

Block B is located in the northwestern part of the Alta Floresta area about 20 km north from Apiacas City. Block C is located in the northern part from central area at 20 km northwest from Paranaita City.

Apiacas City in block B and Paranaita City in block C were two base camps for the geochemical survey.

2-2 Survey Methods

(1) Sample collection

Geochemical sampling lines were arranged in the survey area as shown in Fig. II-2-12 and Fig. II-2-27. The direction of the sampling lines was decided north to south considering the directions of the lithological distribution and the geological structure. The soil samples were collected along the lines made by keeping an space of 1,200m between lines with a sampling interval of 100m. The geological survey including the description of the outcrops and float stones was carried out along the sampling lines by collecting simultaneously the soil samples. In important outcrops, sketching as well as color photographs were taken.

Holes for the collection of the soil samples were mechanically excavated to collect soil (about 1 kg weight) from B-horizon. The soil collected is described on a sheet (Appendix 2). The location of the collected soil were determined by using pocket compass and GPS.

The number of soil samples in two blocks is as follows:

Area	Number of soil samples
Block B	1,757 samples
Block C	1,733 samples

(2) Preparation of soil samples

Sample preparation was carried out at Intertek Testing Services (ITS) located in Luziania, Goias. After triturating under 10 mesh, the soil samples were analyzed by triturating again the samples under 150 mesh.

(3) Chemical Analyses

Elements, methods and detection limits for chemical analysis are shown as follows. The elements selected for analysis were Au, Ag, Cu, Pb, Zn, Fe, As, Sb and Hg related probably to gold mineralization.

Elements	Methods	Detection limits
Au	FIRE ASSAY-ICP	1 ppb
Ag	ICP	0.2 ppm
Cu	ICP	1 ppm
Pb	ICP	1 ppm
Zn	ICP	1 ppm
Fe	ICP	0.01 %
As	ICP	2 ppm
Sb	ICP	2 ppm
Hg	ICP	10 ppb

The results of chemical analyses in blocks B and C are shown in Appendices 4 and 9.

For checking purposes, 102 samples were also analyzed at Geolaboratory of Mitsubishi Material Natural Resources Development Corporation for Au and ITS for Ag, Cu, Pb, Zn, Fe, As, Sb and Hg. Their results are shown in Appendix 3.

2-3 Analytical Methods

The analytical results of the geochemical samples were also treated statistically by means of single element and multi element analyses.

A half value detection limit was used for the samples indicating values less than the detection limit. Based on the statistical calculations, computerized distribution maps were drawn for every element. The correlation matrices among the elements were also calculated and the Exploratory Data Analysis (EDA) method was applied to define the threshold values (anomalous values) for each element.

The factor analysis method was utilized in this survey for the multi element analyses in order to delineate the factor (group of elements) that controls the chemical nature of the samples.

Data analyses and interpretation were made using newly prepared geological map for each survey area.

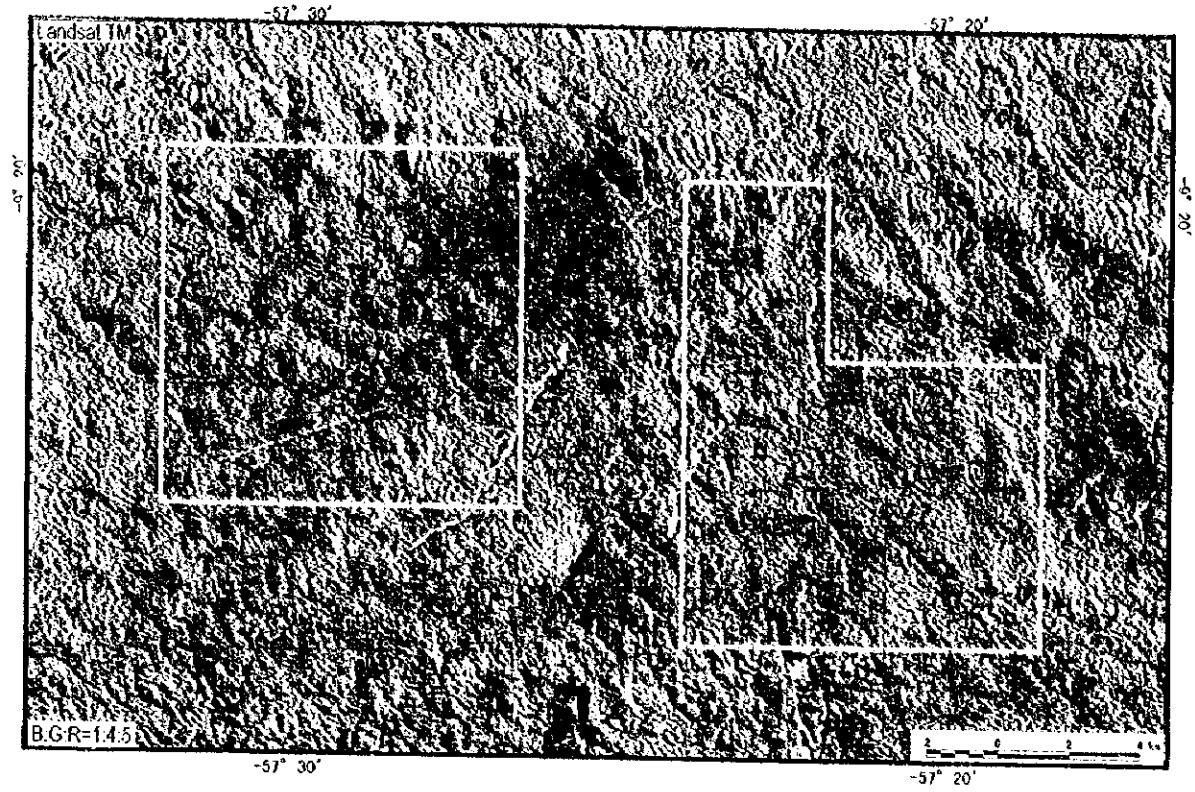


Fig. II-2-1 Geochemical survey area of the Block B

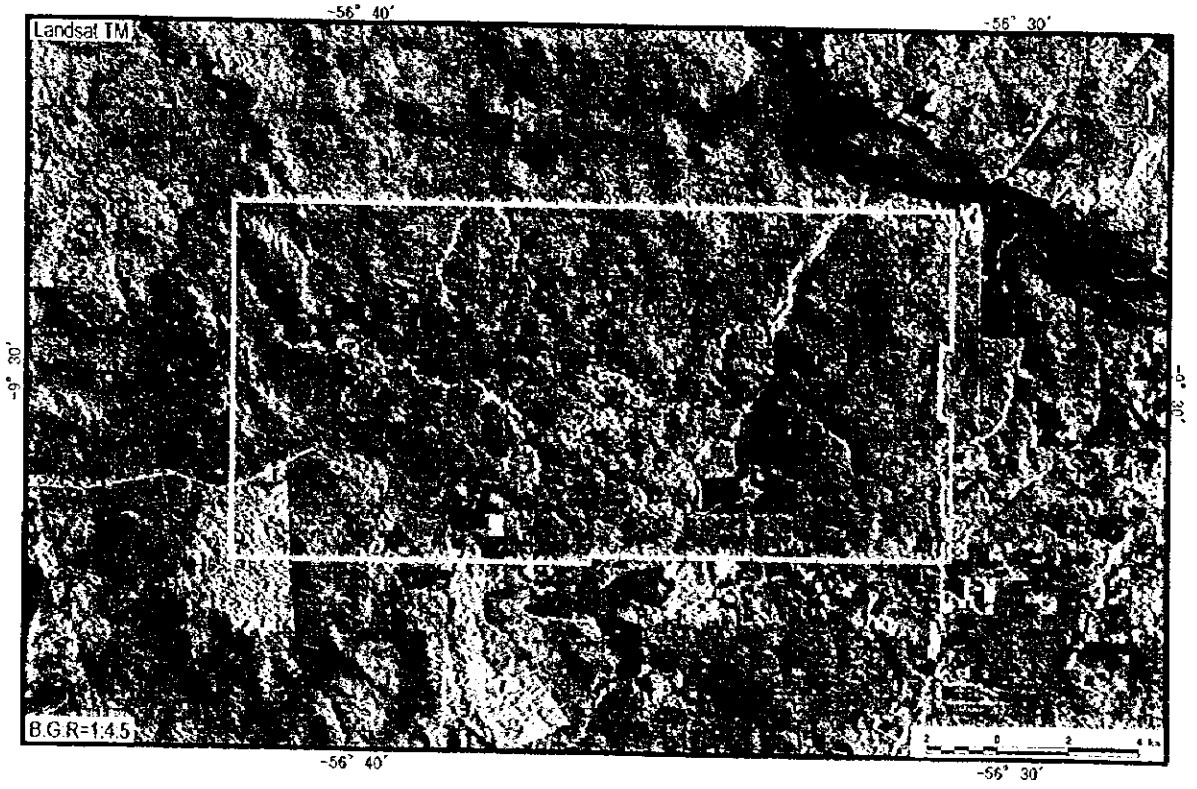


Fig. II-2-2 Geochemical survey area of the Block C

2-4 Survey Results

2-4-1 Block B

In block B, geochemical and geological surveys were conducted. Their results are described as follows:

(1) Result of the geological survey.

(i) Geology

The survey area consists of two blocks: western and eastern. The geological and profile map is indicated in Fig. II-2-3. The geology of the area can be described as follows:

(a) Lithology and stratigraphic

The geology of block B is composed of pre-Uatumã Granite of early Proterozoic, Uatumã Group of middle Proterozoic, dike and Quaternary. The Uatumã Group consists of Iriri Formation and Teres Pires Granite.

① Pre-Uatumã Granite

The Granite is composed of hornblende bearing biotite granite (Grilla) and biotite granite (Grillb).

The hornblende bearing biotite granite (Grilla) is distributed in central part to western part in the eastern block. The granite shows medium grains and includes feldspar, quartz, biotite and hornblende. Porphyritic potassium feldspars occur in the granite. Small biotite gathering as flakes is recrystallized and segregated in the granite. As the result of the microscopic observation (A1047 in table II-2-1), the granite shows cataclastic texture and includes alteration mineral of chlorite.

The biotite granite (Grillb) is distributed widely in central part to western part in the western block and in central part to northeastern part of the eastern block. The granite shows medium pinkish color and includes feldspar, quartz, biotite and hornblende. Porphyritic potassium feldspars occur in the granite. Small biotite gathering as flakes is recrystallized and segregated in the granite. As a result of the microscopic observation (A1013 in table II-2-1), the granite shows weak cataclastic texture and includes alteration minerals of chlorite, epidote and sericite.

② Iriri Formation of Uatumã Group

The formation is distributed widely in northern part and southern part in the western block and in eastern part of the eastern block. The formation is mainly composed of acidic volcanic rocks (Puiv) and rarely of quartzose sandstone (Puis).

The acidic volcanic rocks (Puiv) consist of gray, rhyolitic lava, tuff breccia and tuff. As the result of the microscopic observation (A1036, E1007), the rocks are composed of hornblende bearing biotite rhyolite and hornblende dacite showing weak cataclastic texture and including alteration minerals of chlorite and sericite.

The quartzose sandstone (Puis) shows white color and includes medium grains of quartz. The rocks are chloritized and epidotized in alteration. The rock seems to overlaps unconformably the lower granites.

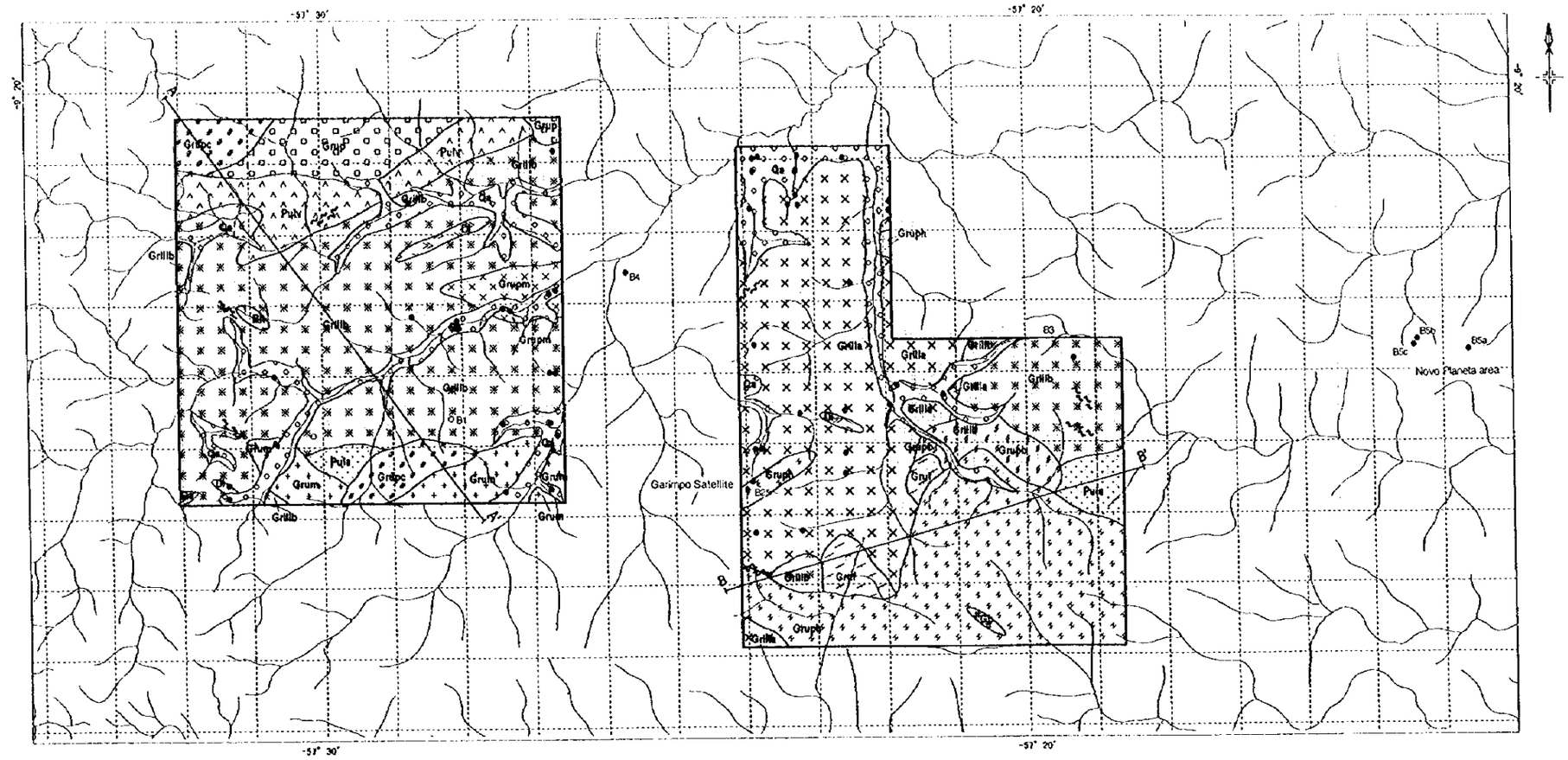
③ Teres Pires Granite of Uatuma Group

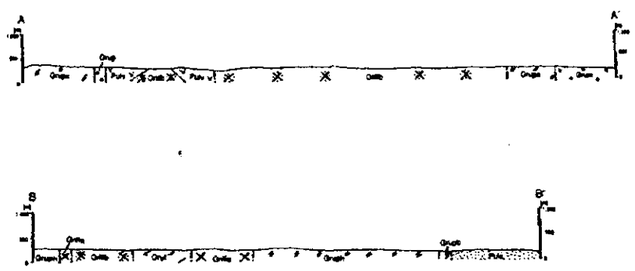
The Granite is composed of hornblende bearing biotite granite (Gruph), coarse to medium grind porphyritic biotite granite (Grupb), medium grained biotite granite (Grum), coarse grained biotite granite (Grupc), medium grained porphyritic biotite granite (Grupm), fine grained biotite granite (Gruf) and granite porphyry (Grup).

The Granite is composed of hornblende bearing biotite granite (Grilla) and biotite granite (Grillb).

The hornblende bearing biotite granite (Gruph) is distributed in the central to southern part of the eastern block. The granite mainly includes medium grained feldspar, quartz and biotite and rarely hornblende. Porphyritic potassium feldspars and quartz occurs in the granite. The biotite is not recrystallized and segregated in the granite. As the result of the microscopic observation (A1039), the granite shows equigranular texture and includes alteration mineral of chlorite. As the result of K/Ar dating (Table II-1-5), the granite indicated an age of 1.10 Ga to 1.13 Ga.

The coarse to medium grind porphyritic biotite granite (Grupb) is distributed in central part to eastern part in the western block and in eastern end, near the garimpo Satelite of eastern block. In the western block, the granite shows light pinkish color and includes medium grained feldspar, quartz and biotite. Porphyritic potassium feldspars occur in the granite. Small biotite gathering is recrystallized and segregated in the granite. In the eastern block, the granite includes medium to coarse-grained feldspar, quartz and biotite. Porphyritic potassium feldspars occur in the granite. The biotite is not recrystallized in the granite. As the result of the microscopic observation (A1022, J1007), the granite shows equigranular texture and includes alteration mineral of chlorite and epidote.





LEGEND

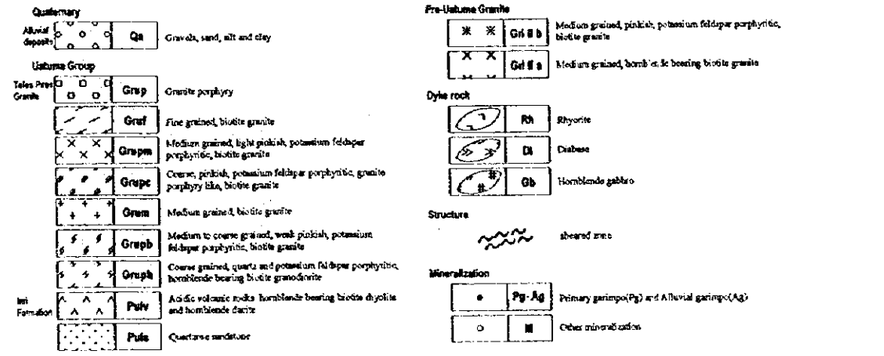


Fig. II-2-3 Geological map and cross section of the Block B

The medium grained biotite granite (Grum) is distributed in central part to southern part in the western block. The small biotite gathering is recrystallized and segregated in the granite.

The coarse-grained porphyritic biotite granite (Grupc) is distributed in northwestern part to eastern part in the western block. The granite shows pinkish color and includes medium-grained feldspar, quartz and biotite. Porphyritic potassium feldspars occur in the granite. Small biotite gathering is recrystallized and segregated in the granite.

Medium grained porphyritic biotite granite (Grupm) is distributed in the southeastern part of the western block. The granite shows pinkish color and heterogeneous and includes medium grained feldspar, quartz and biotite. The small biotite gathering is recrystallized and segregated in the granite. As the result of the microscopic observation (E1003), the granite shows cataclastic texture and includes alteration mineral of chlorite sericite and epidote. As the result of K/Ar dating (Table II-1-5), the granite indicated an age of 1.19 Ga to 1.36 Ga.

The fine grained biotite granite (Gruf) is distributed in the central to southern part of the eastern block. The granite includes fine-grained feldspar, quartz and biotite. Porphyritic potassium feldspars occur in the granite. The small biotite gathering is not recrystallized.

The granite porphyry (Grup) is distributed in northwestern part in the western block and intruded into the Iriri formation. The granite shows white color and includes porphyritic quartz.

④ Dykes

The dikes are composed of rhyolite (Rh), diabase (Di) and hornblende gabbro (Gb).

⑤ Quaternary

The quaternary (Qa) is distributed along the present rivers and composed of stream sediments and alluvial deposits. The stream sediments are soft and consist of gravels, sand, silt and clay. The alluvial deposits are slightly solidified and consist of gravels, sand, silt and clay. Many gold alluvial garimpos exist along the rivers.

(b) Geological structure

Sheared zones developed in the western block and in the eastern block. In the western block, two sheared zones trending ENE-WSW and WNW-ESE respectively, are developed and included quartz veins within the granites. In the eastern block, two sheared zones are developed along the NE-SW and NW-SE directions and include quartz veins in the granites.

(c) Relationship with the airborne geophysics results

As shown in Fig. II-2-4, the potassium contents shows relatively high values in the areas of coarse grained biotite granite (Grupc) and medium grained porphyritic biotite granite (Grupm) in the western block. Relatively high values are also found within biotite granite (Grillb), hornblende bearing biotite granite (Gruph) and coarse to medium grind porphyritic biotite granite (Grupb).

As shown in Fig. II-2-5, the total magnetic field indicates a NE-SW direction linear structure along the central to northern part in the western block. Especially, the linear structure is clear near the boundary between biotite granite (Grillb) and Iriri Formation (Puiv). In the eastern block, total magnetic field values are low in the areas of the porphyritic biotite granite (Grupb) and in the fine grained biotite granite (Gruf) in the western central area surrounding the garimpo Satelite.

(ii) Mineralization

Though many gold alluvial deposits are located along the rivers in block B, garimpeiros are slightly mining there. There exist primary gold garimpos that have been mined from open-pits. One of these garimpos, the so called garimpo Satelite, is mined and its gold is being collected from there.

The primary garimpos accompany pyrite dissemination and quartz veins along the sheared zones. Mineralization is recognized in areas of granite near intruded by diabase in southern part and in the silicified zones. Pyrite dissemination and decolorization of host rock by hydrothermal alteration are found accompanied with hematite, goethite and limonite of pseudomorph of pyrite by oxidation and weathering. Primary garimpos are not recognized in the area of Uatumã group in the northern part of western block.

The mineralization observed within the survey area and its surrounding area are described as follows:

① mineral showing B1

Mineral showing is represented by quartz veins observed on the road located in the central eastern part of the western block in a location near the crossing between the line number B07 and the road. Host rock is biotite granite and veins are lenticular and irregular in the E-W direction sheared zone in the granite.

According to the results of X-ray diffraction tests (A1013 in Table II-1-3), quartz, kaolin and halloysite were detected. The combination of kaolin and halloysite is thought to be due to

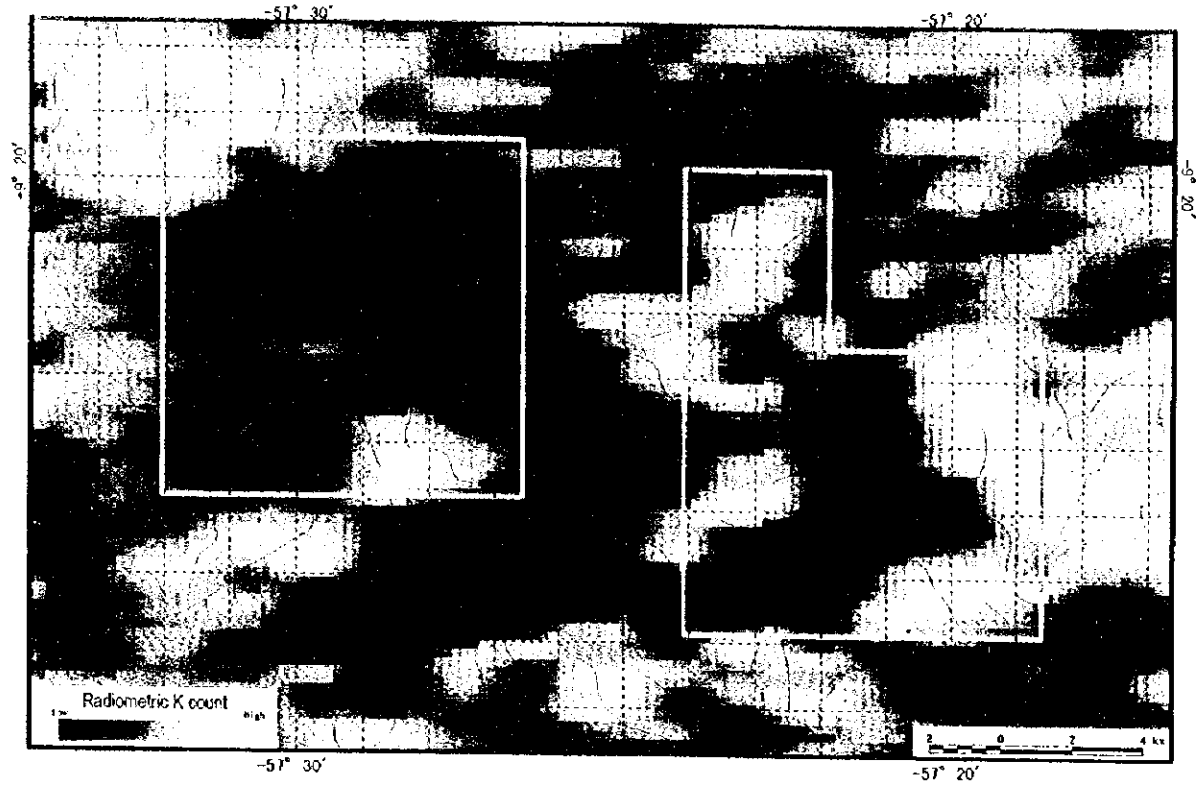


Fig. II-2-4 Radiometric potassium count in the Block B

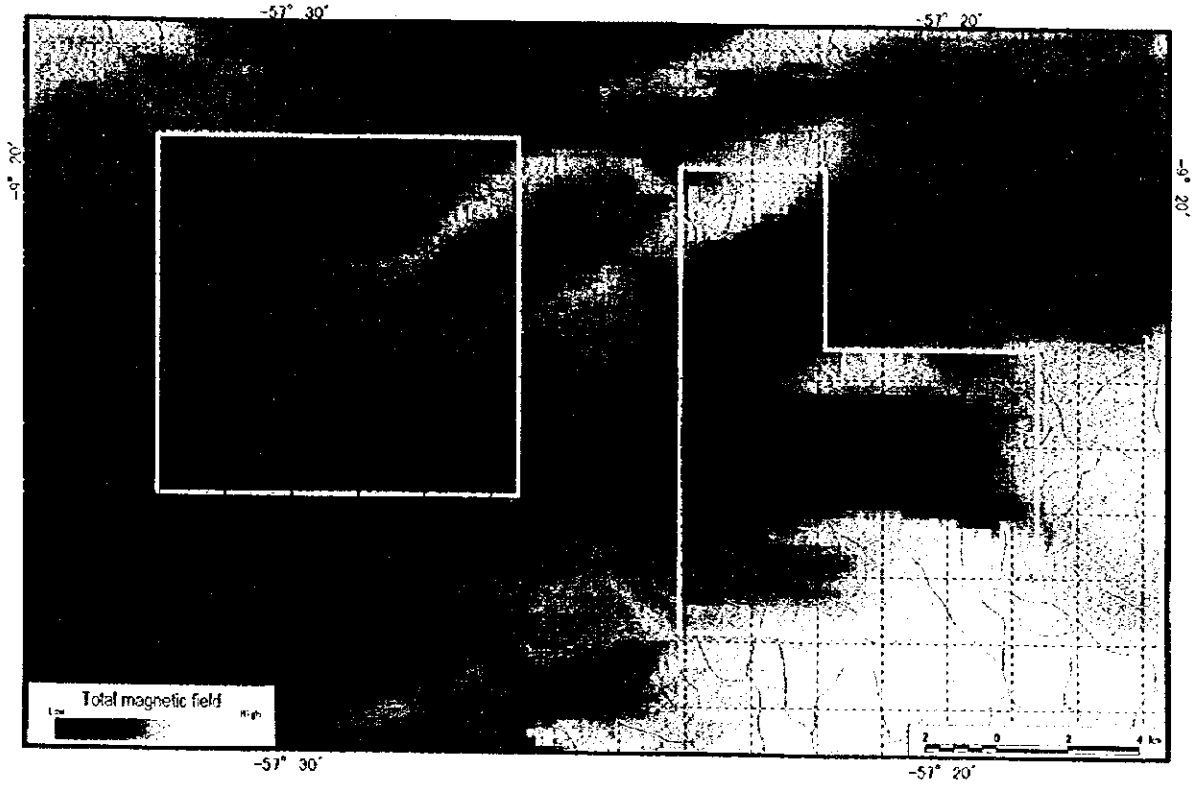


Fig. II-2-5 Total geomagnetic field in the Block B

weathering.

As the results of ore analysis, gold values show maximum values of 0.02 g/t of Au as shown in Appendix 1 (A1010 and A1014).

② Mineral showing B2 (Garimpo Satelite)

This mineral showing consists of primary deposits located in the western end of the eastern block. As shown in Fig. II-2-6, host rock is potassium porphyritic biotite granite. The site already mined is presently under water. Ores piled in the southern part are quartz veins and saprolite. The piled quartz veins occurred originally in the sheared zone within granites which changed to schist or mylonite. Gold is found concentrated near the boundary between quartz veins and schist of host rock according to explanation at the site. Fine-grained native gold grains are observed in saprolite including iron oxides.

According to the results of X-ray diffraction tests, quartz, sericite, illite and kaolin are detected from schist (A1021 in Table II-1-3) neighboring quartz vein. Quartz and illite are detected from A1054.

According to the observation of the polished ore samples (A1054 and A1055 in Table II-1-2), pyrite, chalcopyrite, ilmenite and goethite are confirmed in ore sample as shown Table II-1 2.

As the results of ore analysis, gold values show 4.81 g/t to 4.35 g/t of Au and 2.7 g/t to 3.0 g/t of Ag, as shown in Fig. II-2-6 and Appendix 1.

The results of fluid inclusion measurements, indicated homogenization temperatures from 334.5℃ to 356.2℃ and salinity of more than 21% to 23.8%.

③ Mineral showing B3

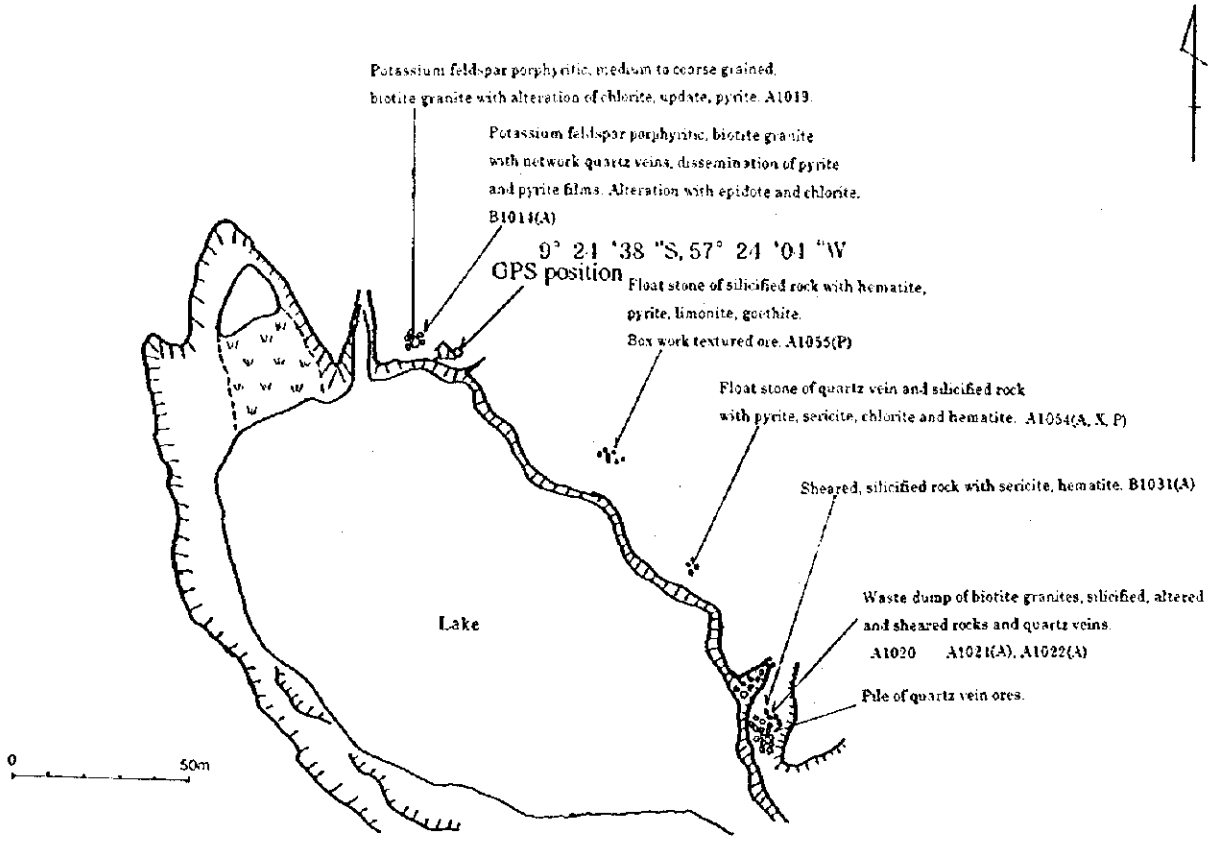
This mineral showing is located in the northeastern end of the eastern block. Host rock is quartzite or tuffaceous quartz schist. The mineralization is pyrite dissemination in the quartzite with quartz veins.

As the results of X-ray diffraction test(table II-1-3), quartz, potassium feldspar and albite were detected.

As the results of ore analysis, the maximum detected values were 8.12 g/t of Au and 1.4 g/t of Ag as shown in Appendix 1 (B1009 to B 1011 and J1011).

④ Mineral showing B4

This mineral showing consists of primary deposits located in a site out of the survey area,



Sample No.	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
A1021	<0.01	2.8	38	45	33	0.78	<2	<2	80
A1022	4.35	3.0	46	82	298	0.97	8	2	47
A1054	4.81	2.7	24	26	19	1.02	<2	<2	129
B1013	<0.01	0.5	3	42	50	1.77	<2	13	25
B1014	<0.01	<0.2	22	33	61	3.02	<2	15	13

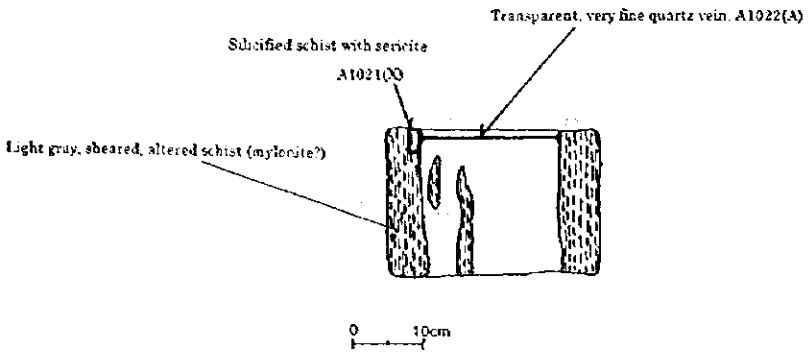


Fig. II-2-6 Sketch of Mineral showing B2 (Garimpo Satellite)

between the western and eastern blocks, as shown in Fig. II-2-7. Host rock is biotite granite. The site already mined is under water. Ore and clay waste mined are piled in the southeastern part. The waste ores include quartz veins with pyrite, bornite and chalcopyrite in rich and disseminated pyrite and massive pyrite in host rock. The quartz veins piled are hosted in the sheared granite which changed to schist or mylonite. As the results of X-ray diffraction test, quartz, potassium feldspar, albite and sericite are detected in the altered host rock.

Silicified granite with quartz veins includes ore minerals of gold, chalcopyrite, sphalerite, pyrite and magnetite as shown in Table II-1-2. The silicified rock (B1017) with quartz veins and sulphide includes chalcopyrite and pyrite.

As the results of ore analysis for silicified rock, the maximum ore grade values are 100.00 g/t of Au, 127.2 g/t of Ag and 3.86 % of Cu.

⑤ Mineral showings B5 (Novo Planeta)

These mineral showings are located in the Novo Planeta area outside of the eastern block and include three primary garimpos. The sketches of three garimpos are shown in Fig. II-2-8, Fig. II-2-9 and Fig. II-2-10. Their locations and dispositions are shown in Fig. II-2-11.

Host rock is potassium feldspar porphyritic biotite granite. Open-pits are within weathered granite in each garimpo. The sheared granite in the sheared zone is altered by potassium alteration and silicification and includes thin concentration zone of biotite and magnetite.

Ores mined are piled in southeastern part. The ores are quartz veins, granites with pyrite dissemination and saprolite. The quartz veins piled are hosted in the sheared zone. The gold mineralization present three directions as shown in Fig. II-2-11. The main directions are mainly N35W and N30E and other directions are N80W and EW.

The results of laboratory test in garimpo shown in Fig. II-2-8 are as follows:

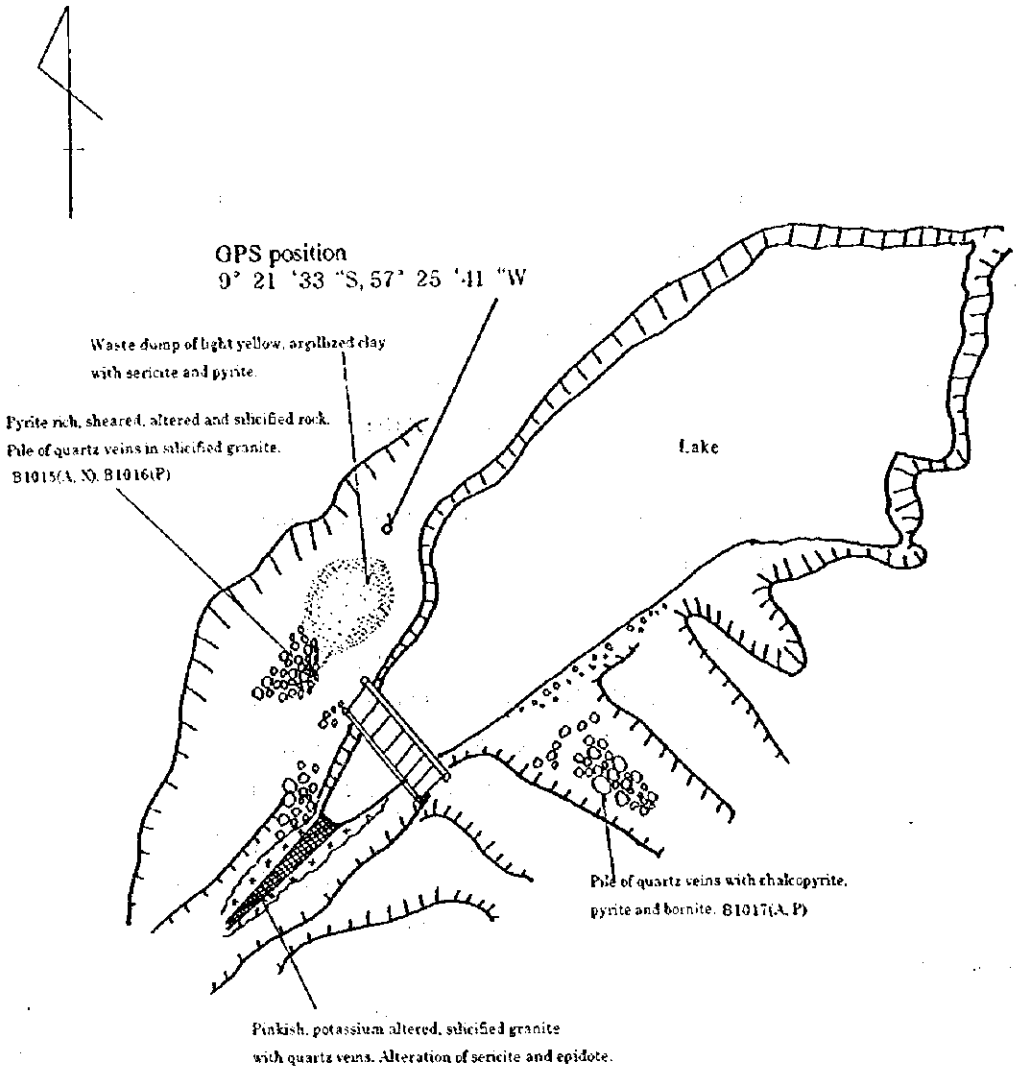
According to the X-ray diffraction tests, quartz, plagioclase, potassium feldspar and albite are detected as shown in Table II-1-3 (A1057). Quartz, albite and potassium feldspar are detected in the sample of A1058.

Ores include gold, chalcopyrite, pyrite and magnetite as shown in Table II-1-2. Ore grade of silicified granite with pyrite dissemination present the values of 11.70 g/t of Au and 1.2 g/t of Ag.

The results of laboratory tests in garimpo shown in Fig. II-2-9 are:

As the results of X-ray diffraction test, quartz, plagioclase, albite and sericite are shown in Table II-1-3 (B1019).

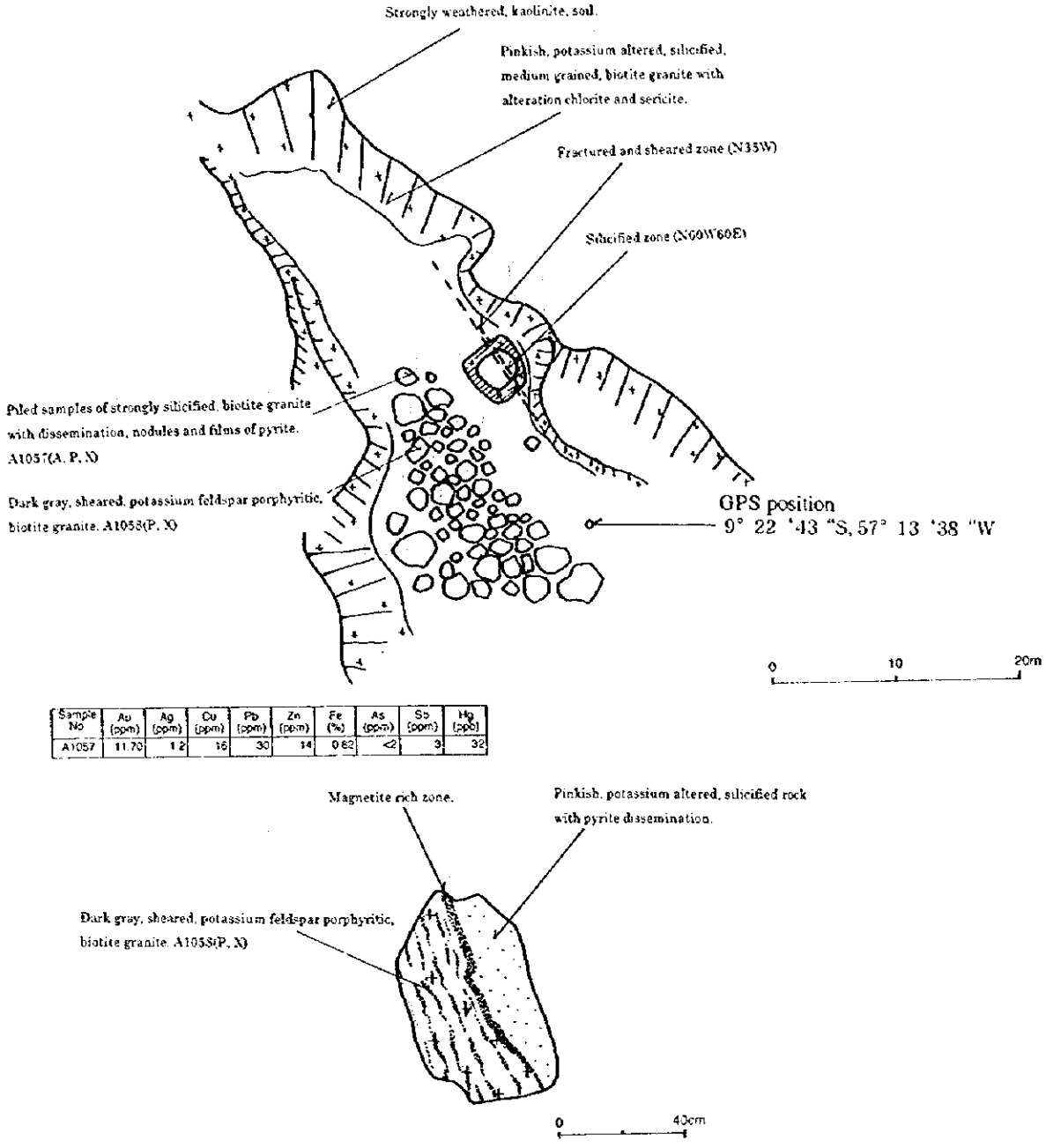
Ore grade of silicified granite with pyrite dissemination is 0.02 g/t to 1.64 g/t of Au and 1.7 g/t



Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
B1015	0.08	2.0	239	32	87	0.95	<2	5	<10
B1017	100.00	127.2	38600	154	411	10.39	<2	<2	13

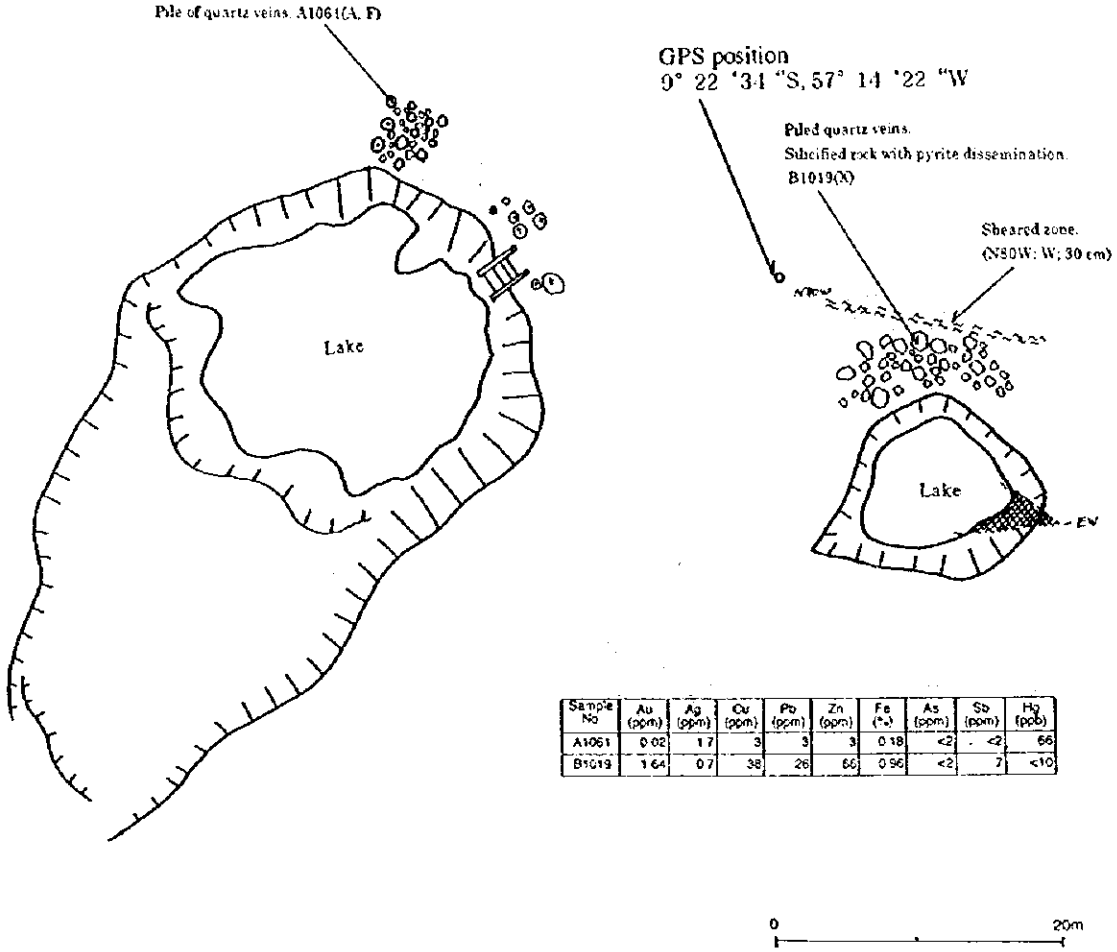
0 25m

Fig. II -2-7 Sketch of Mineral showing B4



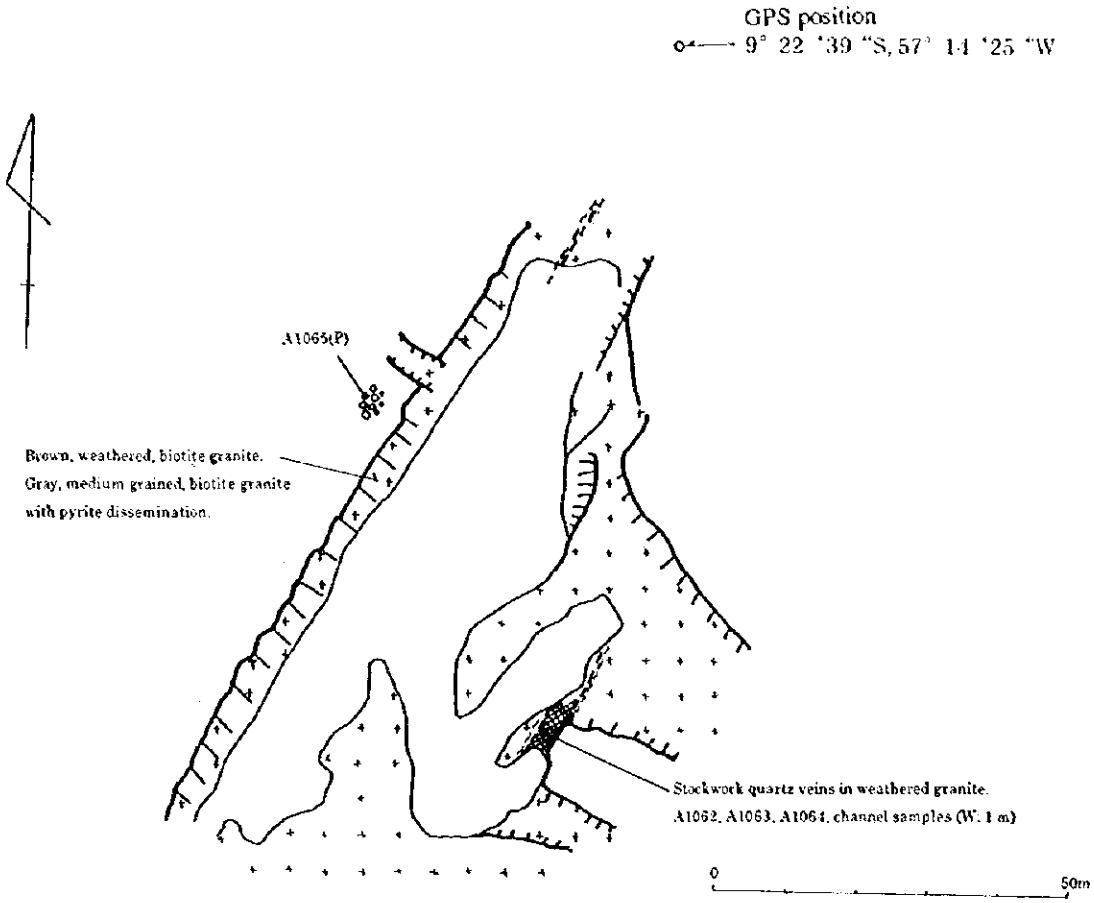
Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
A1057	11.70	1.2	16	30	14	0.82	<2	3	32

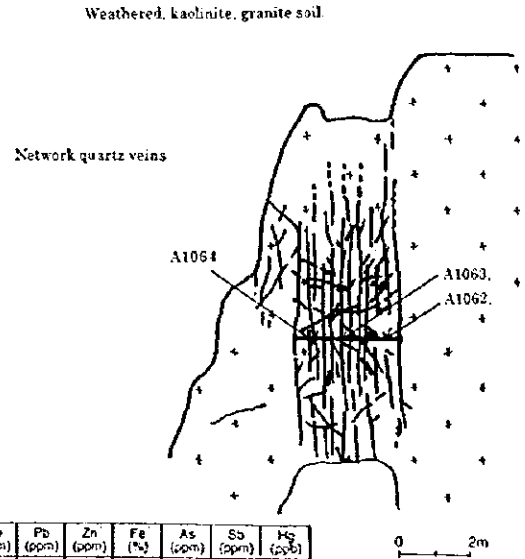
Fig. II-2-8 Sketch of Mineral showing B5a in the Novo Planeta area



Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
A1061	0.02	1.7	3	3	3	0.18	<2	<2	66
B1019	1.64	0.7	38	26	66	0.96	<2	7	<10

Fig. II-2-9 Sketch of Mineral showing B5b in the Novo Planeta area





Sample No	Au (ppm)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Fe (%)	As (ppm)	Sb (ppm)	Hg (ppb)
A1062	0.34	0.8	53	250	102	1.34	<2	2	40
A1063	0.04	0.4	50	103	134	1.54	<2	<2	34
A1064	0.83	1.2	38	157	130	1.51	<2	<2	25

Fig. II-2-10 Sketch of Mineral showing B5c in the Novo Planeta area

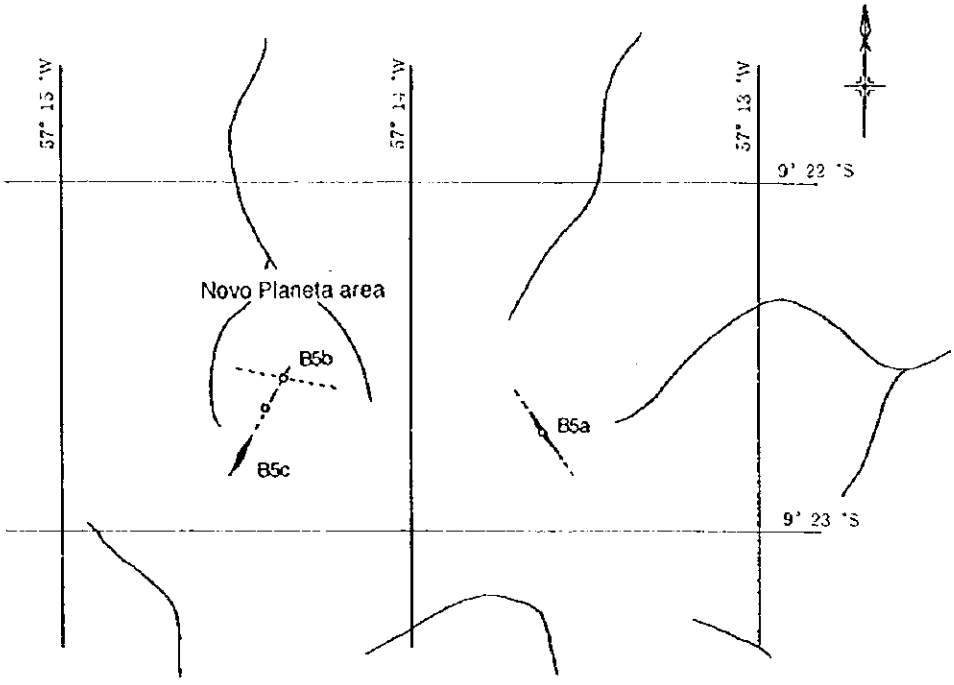


Fig. II -2-11 Vein system in the Novo Planeta area

to 0.7 g/t of Ag.

According to the result of fluid inclusion measurements, homogenization temperatures are maximum 218.4℃ and salinity are more than 6.6%.

The results of laboratory tests in garimpo shown in Fig. II-2-10 are as follows:

Ore from pyrite disseminated granite includes the ore minerals of chalcopyrite and pyrite as shown in Table II-1-2 (A1065).

As for the results of ore analysis, the ore grade gave the following values: 0.04 g/t to 0.83 g/t of Au and 0.4 g/t to 1.2 g/t of Ag.

⑥ Other mineralization

At the mineral locations with floats of altered rocks encountered under surveying, the ore samples including 1.00 g/t of gold are as follows (Appendix 1):

Oxidized gravel (A1038) in the hole of B0404600 include 1.97 g/t of Au and 4.4 g/t of Ag.

Fragments of brecciated quartz veins (A1029) in hole of B0706000 include 2.30 g/t and of gold and 2.8 g/t of Ag. Fragments of brecciated quartz veins (A1032) in hole of B0706400 include 1.11 g/t of gold and 2.5 g/t of Ag.

(iii) Considerations

According to the results of the geological survey, the following points are considered:

a) The relation of the quartz vein system at three garimpos (B5a, B5b and B5c) of the Novo Planeta area indicates that the main direction related to gold quartz veins and open pits in sheared zone are N35W and N30, as shown in Fig. II-2-11. There exist the possibility that this kind of vein system shows the conjugate fault system in the sheared zones which are related to the gold mineralization.

b) It is thought that the area where the sheared zone includes the vein system is consequently important for the exploration of gold mineralization.

The results of the ore analysis are: the ore grade is 4.81 g/t to 3.0 g/t of Au and 2.7 g/t to 3.0 g/t of Ag from the quartz vein at Garimpo Satelite. The sulphide rich quartz veins at garimpo B4 out of the survey area includes maximum 100.00 g/t in gold and 3.86% in copper. The silicified granite with pyrite dissemination in Novo Planeta area includes 11.70 g/t in gold and 1.2 g/t in silver.

The garimpo with maximum 100.00 g/t in gold exists surrounding the survey area, accordingly existence of high-grade gold mineralization is expected in block B.

(2) Analytical Results of the Soil Geochemical Survey

(a) Results of statistical data treatment

The location of the soil samples in block B are shown Fig. II-2-12. The analytical data of collected soil samples are shown Appendix 3 for which statistical data treatment were performed. The results of statistical data treatment are shown Table II-2-1 to Table II-2-3.

Three elements of Ag, As and Sb of nine elements indicated values less than the detection limit for most of the samples.

Correlation coefficients were calculated in order to clarify the relation among elements. The elements showing high correlation coefficient (more than 0,500) are as follows:

Pb - Zn, Pb - Fe

The elements showing high correlation coefficient for Au were not detected and Cu shows low correlation coefficient for Au.

(b) Single element analysis

Based on the results of statistical data treatment (table II-2-1), the threshold values were determined using histogram analysis, EDA methods (Table II-2-3) and cumulative frequencies as shown in Appendix 5. Upper Fence of EDA and Mean+2SD were mainly used for the threshold values. Anomalous maps shown in Appendix 6 were made by using the threshold values and Upper Hinge or Upper Wisker. The distribution found for each element can be summarized as follows:

Au: The threshold values of gold are determined in 31.177 ppb of Upper Fence of EDA, for which values bigger than this value are considered as anomalous. As shown in Fig. II-2-13, in the western block, samples with high values are mainly distributed in the eastern and southeastern parts with WNW-ESE direction and rarely found distributed in the central west part. Other high-values are also found scattered in the north part. In the eastern block, high-values are mainly distributed in northern part and surrounding the Garimpo Satelite.

Ag: The threshold values of gold are determined in 0.645 ppm of Mean+2SD, for which values bigger than this value is anomalous. In the western block, samples with high-values are mainly linearly distributed in the northern to western part and southwestern part with WNW-ESE direction. In the eastern block, high-values are scattered in northern part and central part.

Cu: The threshold values of gold are determined in 160.000 ppm of Upper Fence of EDA for which values of more than this value are anomalous. Three high-value samples are distributed in western block and eastern block.