

2-5 考 察

ラカー鉱床を中心とするB地区に於てもA地区と同様、地質調査、流電電位法による物理探査及びボーリング調査を2年間で実施した。これらの調査結果の詳細は、前述のとおりである。

本調査の結果に基づいて、既存のボーリングを含む調査結果も合わせて解析した結果ラカー鉱床の全貌が解明され (Fig. 2-15)、ラカー鉱床に対し必要と考えられる探鉱作業は完了した。本調査の結果によれば、ラカー鉱床は、前章で述べたハイル・アス・サヒル鉱床と同一の地質環境で同時期に生成したことを示しており、この種の鉱床をオマーン山脈地域で探査する場合ハイル・アス・サヒル鉱床と同様以下の事項が探査指針として重要であることを示す。

- ① 下部噴出岩類Ⅱの発達する地域にこの種の銅鉱床は賦存する。
- ② 鉱床は、サマイル・オフィオライトのオブダクトに伴う構造運動により大規模に、またオブダクト後の構造運動により小規模に転移する。
- ③ 鉱床の形状や鉱質は鉱床生成の場の違いによって異なるので留意することが必要である。

ラカー鉱床とハイル・アス・サヒル鉱床を比較すると、ラカー鉱床には以下の特色がある。

- ① ラカー鉱床の塊状鉱は、ハイル・アス・サヒル鉱床の塊状鉱と比較するとAuが3~4倍濃集する。
- ② ハイル・アス・サヒル鉱床のストックワーク状鉱が著しい珪化により特徴付けられるのに対し、ラカー鉱床のストックワーク状鉱は緑泥石化により特徴付けられる。
- ③ ハイル・アス・サヒル鉱床の鉱化帯と周辺の火山岩類との境界は明瞭であるが、ラカー鉱床の側方部では火山岩類に漸移する。

本調査開始以前の調査結果では、ラカー鉱床のAu品位が高く報告されている。本調査の結果によれば、これまでの調査でAuの分析された試料は主として塊状鉱の分布域及びその周辺で採取されているため、このようにAu品位が高くなったものと考えられる。本調査の結果では、ハイル・アス・サヒル鉱床及びラカー鉱床のストックワーク状鉱はいずれも同程度のAu品位であることを示す。

なお、ラカー鉱床の地表でみられるゴッサン化帯及び古い時代の採掘に伴うゴッサン・ズリ中にはAu 5.0g/t程度の濃集部が認められる。この部分に対する調査は、鉱山開発の時点で考慮することが必要と考えられる。

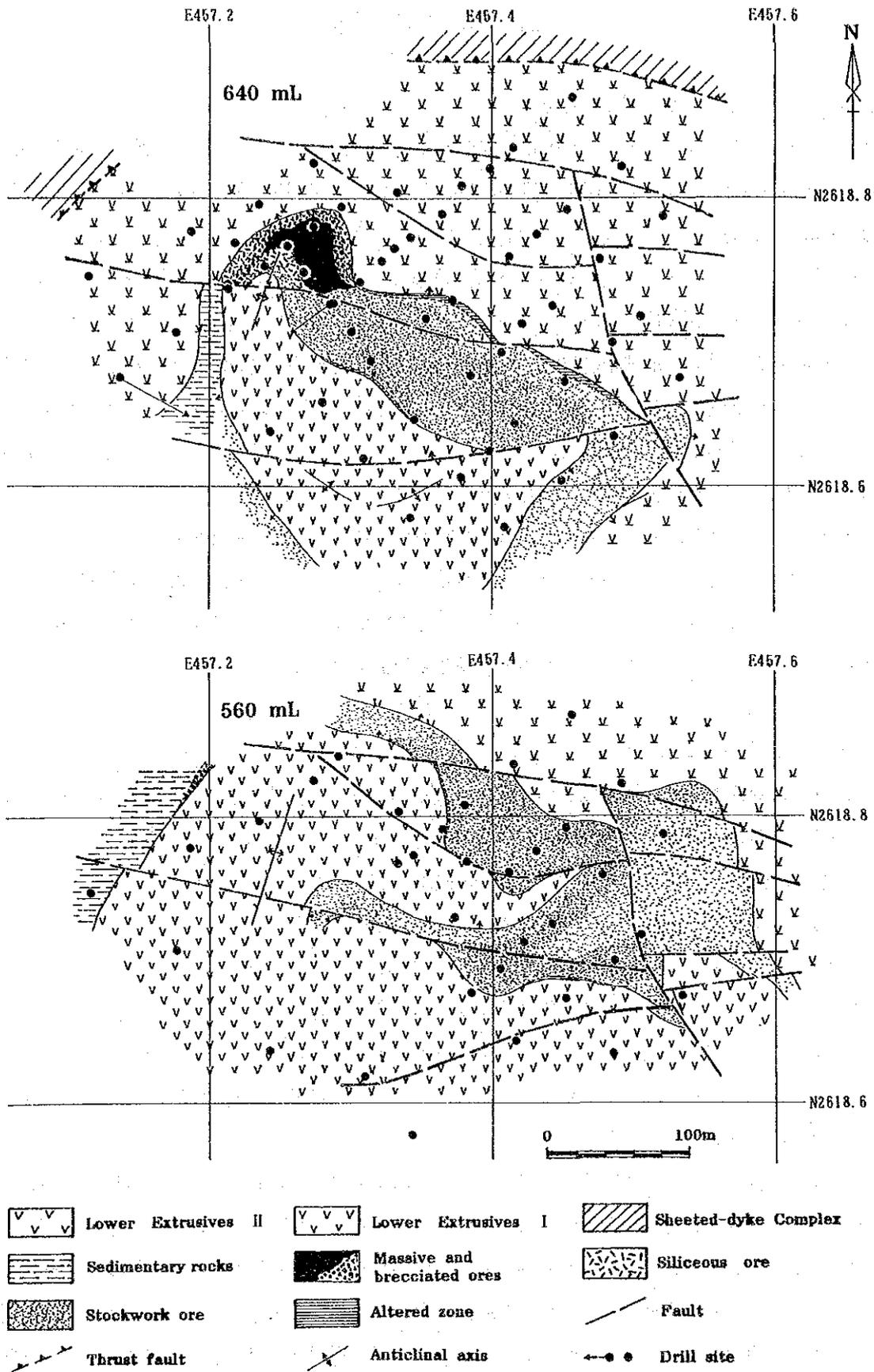


Fig. 2-15 Geologic plan maps of the 560 m and 640 m levels in the Rakah deposit

第3章 鉍量計算

3-1 計算基礎及び計算方法

本調査の結果、ハイル・アス・サヒル及びラカーの両鉍床の形状及び鉍況が解明できたことから、これらの両鉍床に対する地質鉍量の計算を行った。この計算に用いた基礎資料及び計算方法は、以下のとおり。

(1) 計算基礎資料

ハイル・アス・サヒル鉍床に対する鉍量計算には、本調査で行った12本 (Table 1-4) のボーリング調査結果及びMPMがメイン・ゴッサンの東部良り南部の地区で行った30本 (Table 1-5) のボーリング調査結果を使用した。

ラカー鉍床の鉍量計算には、本調査で行った11本 (Table 2-1) のボーリング調査結果及び本調査開始以前に実施されている45本 (Table 2-2) のボーリング調査結果を使用した。

各ボーリング孔で捕捉した鉍化帯に対する鉍石分析結果のうち、鉍山開発計画の対象とならないゴッサン化帯及び火山岩類中の二次富化帯の分析結果は除いた。ハイル・アス・サヒル及びラカーの両鉍床に対する鉍量計算に使用した各孔の分析結果をAppendix 16 に示す。

(2) 計算方法

各鉍床に対する鉍量計算は以下の手順で行った。

- ① 鉍石及びズリ比重の決定。
- ② 鉍画のサイズ (20m × 20m × 10m) の決定。
- ③ 10mごとのレベル・シート作成及び鉍画設定範囲の決定。
- ④ 各鉍画に対する品位割り付け方法の検討及び決定。
- ⑤ コンピューターによる鉍量計算及びレベル別鉍画図の作成。
- ⑥ 鉍体の形状を勘案しブロック容積の一部修正。
- ⑦ コンピューターによる鉍量の再計算及びレベル別修正鉍画図の作成。
- ⑧ 鉍量集計及び鉍量表の作成。

一般に鉍石の比重は、含有するS品位と良い相関を示すが、本調査及び既存の調査ではボーリングで捕捉された鉍化帯に対するS品位の分析がなされていない。一方、MPMはハイル・アス・サヒル鉍床で捕捉した鉍化帯より採取した62個のコア試料に対し比重測定を行っている。この比重の測定結果では比重が2.82~4.73の範囲を示す。これらの測定結果と銅品位との関係を調べた結果、銅品位が10%以上の試料を除くと、比較的良い相関 (相関係数: 0.591) を示すことが明らかとなった。このため銅品位 (Cu) と比重 (S.G.) の関係式を最小自乗法によって求めた結果次式

が得られた。

$$S.G. = 0.146 \times (Cu) + 2.9$$

この関係式によってCu品位より比重を求めることとしたが、鉱石中に粘土を伴うなどの理由で測定した比重の値より実際の採掘時の値は低くなるのが一般的であることから、得られた値に95%を乗じた値を比重とし鉱量の計算を行った。但し、銅品位の著しく低いもの及び高いものについては、2.80及び4.20をそれぞれの最低値及び最高値とした。また、比重を測定した試料は、全てハイル・アス・サヒル鉱床より採取した試料であり、ラカー鉱床はハイル・アス・サヒル鉱床と比較して硫化鉱物の含有が少なく比重も低いと考えられることから、ハイル・アス・サヒル鉱床と同様の計算で求められた値に更に95%を乗じた値を比重した。

鉱画のサイズは、採掘計画（第2巻参照）に合わせ高さ10mとし、平面的な広がりには20m（N-S）×20m（E-W）を採用した。

各レベルの鉱画範囲は、ボーリング結果より鉱体の分布を示すレベル・シートを各レベル毎に作成し、これより良好部の分布を推定して設定した。

設定された各鉱画に対する品位の割り付けにはクリーニング法を試みたが、データを処理した結果では、この手法を適用できるようなセミ・バリオグラムが得られなかったため、重み係数を付けた2次曲面近似によってランダム・データから格子点の値を内挿及び外挿する方法で割り付けた。本計算では、ボーリング孔の存在するブロックの中心座標とその品位をランダム・データとみなし、 $1 / (\text{距離の2乗})$ を重みとして各ブロックの品位を割り付けた。

上述の方法で計算し、鉱量表及びレベル別鉱画図を作成した。しかしながら、鉱体の形状が複雑な部分では、各ブロックに予想される容積と計算された容積との間に差が認められたことからこれらのブロックに対する容積の補正を行った。また、Cu 0.20%をカット・オフ品位としこれ未満の品位を示すブロックは切り捨てた。この補正の結果得られたハイル・アス・サヒル鉱床のレベル別鉱画図及びブロック別・レベル別鉱量表を、Appendix 17 及び18に示す。更に、ラカー鉱床のレベル別鉱画図及びブロック別・レベル別鉱量表をAppendix 19 及び20にそれぞれ示す。

このブロック別・レベル別鉱量表を基に鉱量の集計を行った。ハイル・アス・サヒル鉱床及びラカー鉱床のレベル別鉱量集計表をそれぞれTable 3-1 及びTable 3-2 に示す。

3-2 ハイル・アス・サヒル鉱床

本調査の鉱量計算では、メイン・ゴッサンの南半部の東及び南側の一帯でこれまでのボーリング調査によりその形状及び鉱況が明らかとなった区域に対して行った。計算の結果得られた高品位のブロックの大部分は本鉱床南東部の塊状鉱の分布域に見られ、ストックワーク状鉱の分布域では低品位を示すブロックが多い。レベル別に見ると上部ではCuの鉱況は良好であるが、下部ブロックのCu品位はいずれも低い値を示す。Auの鉱況についてもCuの鉱況と同様で塊状鉱の分布域

Table 3-1 Geologic ore reserves for each level in the Hayl as Safil deposit

Level	Tonnage (t)	Grade				Contents			
		Cu %	Zn %	Au g/t	Ag g/t	Cu (t)	Zn (t)	Au (kg)	Ag (kg)
670 mL	107,400	1.54	0.01	0.16	1.44	1,649.18	10.74	17.64	154.44
660 mL	481,190	1.13	0.16	0.59	3.67	5,424.66	775.16	285.15	1,768.25
650 mL	672,786	1.62	0.13	0.73	4.78	10,896.35	904.97	490.12	3,217.21
640 mL	731,264	1.15	0.10	0.60	4.50	8,402.76	761.18	437.95	3,285.13
630 mL	931,714	1.53	0.12	0.84	6.09	14,261.97	1,149.19	786.46	5,673.25
620 mL	862,313	1.86	0.22	0.48	3.97	16,059.30	1,936.14	412.04	3,426.34
610 mL	823,918	0.82	0.22	0.42	2.46	6,726.55	1,784.45	350.16	2,029.95
600 mL	758,520	0.77	0.18	0.47	2.41	5,836.21	1,340.75	354.05	1,830.98
590 mL	726,651	1.24	0.16	0.67	4.22	8,992.08	1,187.17	487.18	3,065.58
580 mL	617,390	1.03	0.15	0.29	1.29	6,355.17	925.94	178.96	798.68
570 mL	624,068	0.79	0.13	0.14	0.84	4,951.49	815.55	85.82	522.16
560 mL	483,944	0.75	0.08	0.11	0.90	3,618.67	396.36	55.25	435.21
550 mL	462,926	0.47	0.08	0.07	0.40	2,187.98	356.52	32.95	183.97
540 mL	445,793	0.49	0.04	0.05	0.48	2,179.57	165.23	22.99	215.21
530 mL	424,705	0.48	0.02	0.04	0.21	2,043.84	103.35	15.94	89.24
520 mL	378,937	0.42	0.03	0.05	0.32	1,600.78	117.30	19.65	122.54
510 mL	458,349	0.30	0.03	0.11	0.66	1,372.36	149.67	52.53	302.05
500 mL	360,733	0.54	0.05	0.27	0.73	1,945.26	198.03	98.33	264.62
490 mL	200,490	0.33	0.07	—	—	663.11	130.42	0.00	0.00
Total	10,553,091	1.00	0.13	0.40	2.59	105,167.29	13,208.12	4,183.17	27,384.82

Table 3-2 Geologic ore reserves for each level in the Rakah deposit

Level	Tonnage (t)	Grade				Contents			
		Cu %	Zn %	Au g/t	Ag g/t	Cu (t)	Zn (t)	Au (kg)	Ag (kg)
660 mL	13,914	0.84	0.08	1.53	2.13	116.68	10.67	21.34	29.57
650 mL	224,471	1.56	0.15	1.35	3.94	3,491.90	328.58	302.95	883.41
640 mL	392,263	1.93	0.23	1.63	4.78	7,574.31	895.65	639.46	1,874.98
630 mL	460,536	1.18	0.15	0.75	2.21	5,451.56	691.83	343.19	1,019.94
620 mL	467,445	0.89	0.89	0.67	2.85	4,141.25	906.36	313.50	1,331.69
610 mL	430,384	1.51	0.32	1.39	4.53	6,515.44	1,384.26	599.87	1,948.81
600 mL	362,060	1.20	0.23	0.45	1.57	4,362.65	841.83	163.87	568.18
590 mL	301,027	0.70	0.27	0.30	1.65	2,116.16	814.21	89.76	497.74
580 mL	218,634	0.38	0.22	1.22	1.25	830.66	476.17	266.75	273.29
570 mL	294,507	0.69	0.15	0.62	1.50	2,026.84	448.53	181.84	441.76
560 mL	381,503	0.80	0.11	1.03	1.08	3,059.89	435.62	393.01	412.59
550 mL	210,157	0.49	0.09	0.69	0.95	1,022.45	198.91	144.93	199.86
540 mL	231,188	0.50	0.23	0.82	1.21	1,161.04	538.97	190.70	279.74
530 mL	257,865	0.75	0.05	1.23	0.54	1,946.87	124.80	319.17	139.45
520 mL	175,445	0.66	0.05	0.34	0.68	1,158.44	82.34	59.65	119.30
510 mL	101,391	0.56	0.10	0.42	—	567.77	104.74	42.58	0.00
500 mL	147,089	0.65	0.10	0.62	—	950.65	151.70	91.20	0.00
490 mL	50,411	0.24	0.11	—	—	119.42	54.38	0.00	0.00
480 mL	30,446	0.69	0.07	—	—	210.38	21.63	0.00	0.00
Total	4,750,736	0.99	0.18	0.88	2.11	46,824.39	8,511.18	4,163.77	10,020.31

及び上部で高い値が見られる。Znの比較的高いブロックは、塊状鉱及び鉱体の周辺部のブロックで見られる。また、Agは、Auと同様の傾向を示す。

本調査により大幅な鉱量が獲得されたが、本調査開始以前にMPMが行った鉱量計算結果と本調査による鉱量計算結果を比較すると以下のとおりである。

	鉱量	Cu %	Au g/t	Cu (t)	Au (kg)
MPM計算結果	2,086,000	2.09	0.97	43,597	2,023
本調査計算結果	10,553,000	1.00	0.40	105,167	4,183
差	8,467,000	0.73	0.26	61,570	2,160

従って、本調査により約8,500千トンの鉱量が獲得されたことになる。なお、獲得された鉱量の大部分はストックワーク状鉱である。

3-3 ラカー鉱床

ラカー鉱床に対する鉱量計算は、上部鉱化帯及び下部鉱化帯の両鉱化帯に対して行った。Cu及びAuの良好なブロックは、塊状鉱及び角礫状鉱を含むブロックである。これらのブロックは、いずれも上部に位置することから、上位のレベルの方が鉱況は良好である。また、ストックワーク状鉱より成るブロックも上位の方がCu品位が高い。本調査開始以前に行われたラカー鉱床に対するボーリング調査では、Au及びAgの分析があまりなされていないので、得られたAu及びAg品位の内ストックワーク状鉱の品位は、実際より若干高い値が得られている可能性が推定される。

本調査で行った顕微鏡の観察結果では、塊状鉱中の銅鉱物は、いずれも二次富化鉱物であり、また金も黄鉄鉱中に混在すると推定され鏡下では確認できなかった。鉱山開発計画（第3巻）に伴う選鉱試験結果では、この塊状鉱中の銅及び金の分離が困難であることが明らかとなり、この種の鉱石は別処理することとした。この塊状鉱及び塊状鉱と同質の角礫状鉱の鉱量と全体の鉱量との関係は、以下のとおりである。

	鉱量	Cu %	Au g/t	Cu (t)	Au (kg)
塊状鉱及び角礫状鉱	280,006	2.51	3.67	7,022.62	1,027.62
ストックワーク状鉱	4,470,730	0.89	0.70	39,801.77	3,136.15
合計	4,750,736	0.99	0.88	46,824.39	4,163.77

3-4 考 察

ハイル・アス・サヒル鉱床に対する本調査での鉱量計算は、ボーリングのデータが得られるメイン・ゴッサンの南半部より南側の範囲に対して行った。しかしながら、鉱化帯は更にその北側まで連続しているので、この部分に対しボーリング調査による鉱況の確認が必要と考えられる。

ただし、MPMがメイン・ゴッサンの中心部に対して行ったHS-39 孔の鉱況はCu 1.0% 以下の値しか示さず、また鉱体が深部に賦存することから開発の対象となる可能性が少ないと判断される。ハイル・アス・サヒル鉱床の南東端で行ったMJ0-A12 孔で捕捉した塊状鉱は、さらに東方へ連続する可能性があり今後の調査により若干の鉱量の増加が期待される。この様に鉱画を設定した範囲の外側でも今後の調査により発見鉱量の期待出来る部分もあるが、全体的に見ると本調査によって期待される鉱量の大部分は計上されたものと考えられる。スモール・ゴッサンの北側では、BRGMの行ったHS-7孔で塊状鉱を捕捉しているが、その後のボーリング調査でその広がりの確認されていないことから、期待できる鉱量は限られると推定される。

ハイル・アス・サヒル鉱床の塊状鉱分布域ではかなりのボーリング調査がなされているが、ストックワーク状鉱の分布域では各ボーリング孔の間隔が粗くなっているため、この鉱量の精度は若干低くなっている。もし鉱山開発に着手するのであれば、工事開始前に既存のボーリング孔の間に50mグリッド程度の追加ボーリングを行い、この結果により鉱量の再計算を行うことが望ましいと考えられる。

本調査の結果ラカー鉱床の広がりほぼ確認されたので、本鉱量計算結果はラカー鉱床で期待される鉱量のほとんどを計上できたと考えられる。ただし、Au品位のデータが少ないことから、計算されたAu品位の精度は低いと考えられる。また、本調査開始以前に行ったボーリング調査では上部のコア採取率が悪いことから、実際に開発した場合に鉱量及び品位が異なる可能性が推定される。しかしながら、全体的に見ると大きな差はないものと予想される。

以上の鉱量に加え、ラカー鉱床ではゴッサン化帯及びゴッサン・ズリ中にAu品位の高い部分がありその鉱量及び品位は、300 千トン、Au 5.0g/t、Ag 10.0 g/t程度と見積もられる。この鉱量の正確な計算を行うためには、かなりの本数の浅いボーリングを行うことが必要である。しかし、ラカー鉱床を開発するのであれば、この部分を採掘することが必要となるのでこの折に試料を組織的に採取し鉱石分析を行うとともに、この部分を別処理することが望ましい。

第4章 調査結果の総合検討

4-1 鉍化作用の特性と鉍床生成モデル

本調査で行ったハイル・アス・サヒル及びラカーの両鉍床に対する調査結果を総合すると、これら両鉍床の特性として以下があげられる。

- ① ラカー地域のサマイル火山岩類は、下部火山岩類及び中部火山岩類に区分され、さらに下部火山岩類は下位より下部噴出岩類Ⅰ及びⅡに細分される。鉍床は下部噴出岩類Ⅰの最上部に賦存する。
- ② 鉍体はレンズ状の形態を示し、下位よりストックワーク状鉍、塊状鉍及び珪質鉍より構成される。ストックワーク状鉍は鉍体の大部分を構成し、下部噴出岩類Ⅰの最上部に賦存する。塊状鉍及び珪質鉍は、下部噴出岩類Ⅰの頂部に堆積し下部噴出岩類Ⅱに覆われる。
- ③ スtockワーク状鉍は硫化鉍物の網状脈及び鉍染を伴い、その母岩は珪化、緑泥石化及び角礫化を受けている。このうちハイル・アス・サヒル鉍床は著しい珪化と角礫化の繰り返しで、またラカー鉍床は著しい緑泥石化で特徴付けられる。このほか全般に鉄石英（ジャスパー）が認められる。
- ④ 塊状鉍は鉍体の端末部に主とし分布し、角礫化した鉍化鉍物とこの角礫の間を充填する細粒の硫化鉍物より構成される。この硫化鉍物の主要鉍物である黄鉄鉍中には、フランボイダル組織やコロホーム組織が観察される。
- ⑤ 珪質鉍は、不規則な形状を示し鉍体の側方部で発達する。鉍石は、強度の珪化及び角礫化を受けた母岩の基質を白色～灰色の粘土及び硫化鉍物が充填する。
- ⑥ 鉍石鉍物は、黄銅鉍、黄鉄鉍及び少量の閃亜鉛鉍より構成される。このほか鉍体が地表に近い部分では、銅藍、輝銅鉍及び斑銅鉍などの二次富化鉍物が認められる。
- ⑦ 鉍石分析結果では、Au品位はCu品位に相関する傾向が見られ、塊状鉍中で特に高い値を示す。Znは、鉍体の上部及び側方部で高い傾向が認められる。

これらの特徴のうち鉍床の賦存する地質層準は、ソハール地域で知られているラセイル鉍床及びベイダ鉍床と同一であり、鉍床を構成する鉍質や構成鉍物も類似点が多いことから、本地域のハイル・アス・サヒル及びラカーの両鉍床はソハール地域の既知鉍床と同じ時期に同じような生成機構で形成したものと考えられる。さらに、これらの鉍床はその地質状況より大洋底で生成したと考えられ、下盤側に塩基性火山岩類を伴う含銅硫化鉄鉍床であることからキプロス型の銅鉍床に分類するのが最も妥当と考えられる。

ラカー地域を含む北部オマーン山脈地域の構造発達史と鉍床との関係を考察すると、以下のよう生成及び変遷のモデルにより本地域の鉍床が形成されたと推定される。

- ① 古テチス海にあった拡大軸での玄武岩質火山活動に伴う下部噴出岩類Ⅰの噴出及び堆積。
- ② 拡大軸での下部噴出岩類Ⅰの火成活動に関連し下部噴出岩類Ⅰ中での拡大軸に平行な深部割れ目及び角礫化帯の形成。これに引き続く下部噴出岩類Ⅱに関連した鉍化溶液の上昇及び沈殿。角礫化帯でのストックワーク状鉍の生成及び海底面に達した鉍化溶液による塊状鉍及び珪質鉍の生成。
- ③ 上昇熱水による角礫化の繰り返しと鉍化帯の拡大。
- ④ 拡大軸での下部噴出岩類Ⅱの噴出及び堆積。これによる海底風化からの保護。
- ⑤ サマイル・ナップのオブダクト。これによる鉍体の大規模な転移。
- ⑥ サマイル・ナップ定置後の構造運動による小規模な鉍体の転移。
- ⑦ 浸食及び風化作用による地表部のゴッサン化。
- ⑧ 第4紀堆積物による鉍化帯及び上盤火山岩類の被覆。

ラカー地域の鉍床も含めオマーン山脈地域のこの種の銅鉍床の伸長方向は、シート・コンプレックス中の岩脈の走向などより推定される拡大軸の方向に近似する傾向が見られるので、拡大軸でこの軸に平行し中軸谷を形成した断層群が鉍化溶液の通路として重要な役割をはたしたことが推定される。また鉍床の生成時の火成活動としては、下部噴出岩類Ⅱの活動が最も顕著であり、その発達する地域と鉍床の分布が良く一致しておりその関連性が充分予想される。

4-2 ラカー地域のポテンシャルと今後の探査指針

本調査の結果ハイル・アス・サヒル及びラカー鉍床の全貌がほぼ解明されたので、これらの両鉍床ではハイル・アス・サヒル鉍床の北方及び南東方への連続がわずかに期待されるのみである。これらの両鉍床を除くと、本調査で実施したA及びB地区では、鉍床の賦存する可能性を示すような兆候は認められなかったのでそのポテンシャルは低いと考えられる。

しかしながら、本調査ではラカー地域の限定された範囲を調査したのみであり、これらの既知の両鉍床と同様の地質を示す範囲はかなりの広がりを見せている。さらに、ラカー鉍床の南東方4 kmでは下部噴出岩類Ⅰ及びⅡの分布域にタウイ・ラカーと呼ばれる銅の鉍兆地が知られている。従って、本調査の範囲を除くラカー地域のポテンシャルはかなり有るものと予想される。また、これまでの地質調査の結果では、ラカー地域の南部に分布する堆積岩類は、サマイル・ナップの下位に位置するハワシナ・ナップ中のハワシナ堆積物と解釈されていた。本調査の結果では、これらの堆積物はオフィオライト上部堆積物と解釈されている。この解釈によれば、ラカー地域南部で見られる堆積岩類の下位には鉍床母岩であるサマイル火山岩類が分布していることになるので、この堆積岩類（オリストストローム層）の分布域においても今後の探査が必要である。

今後ラカー地域でハイル・アス・サヒル鉍床やラカー鉍床と同一の銅鉍床の探査を実施するのであれば以下がその探査指針として重要であると考えられる。

- ① 下部噴出岩類Ⅱの分布域を明らかにし、これの発達する区域で下部噴出岩類Ⅰとの境界部を探查する。
- ② 鉍体は、サマイル・ナップのオブダクトに伴う衝上断層及びオブダクト後の構造運動によって転移しているので、鉍化帯の連続部の探查にはこれらの解析が必要である。
- ③ キプロス型の鉍床としても鉍体は塊状鉍のみで構成されているのではなく鉍床生成の場の違いによって生成する鉍石の鉍質は異なってくるのでこの点を考慮して探鉍することが必要である。
- ④ 低品位の鉍石であっても鉍量によっては開発の対象となり得るので探鉍段階では鉍化帯の全貌を解明するような探查手法を用いることが重要である。

なお、これらの探查指針はオマーン山脈地域においてこの種の銅鉍床を探查する場合にも有効であると考えられる。

第5章 結 論

本調査ではラカー地域で知られていたハイル・アス・サヒル鉱床（A地区）及びラカー鉱床（B地区）に対しそのポテンシャルを解明するため地質調査、流電電位法による物理探査及びボーリング調査を2年間で実施した。これらの調査結果により両鉱床の全貌が解明され約8,500千トンの銅鉱石を発見することができ、両鉱床を合わせた地質鉱量が約15,300千トンであることが確認された。本調査ではさらに、これらの成果に基づいて本報告書の第3巻で述べる鉱山開発のためのプレリミナリー・フィジビリティ・スタディを行った。

ラカー地域に対し本調査で行った探査の結果及び地質鉱量の計算結果により以下の結論が得られた。

- ① ラカー地域はスマイル・ナップの分布域に位置し、その地質はスマイル・オフィオライト及びオフィオライト上部堆積物より構成される。スマイル・オフィオライトは、下位よりテクトナイト、層状岩体、ハイレベル斑れい岩、シート・コンプレックス及びスマイル火山岩類より構成される。スマイル火山岩類は、下部火山岩類及び中部火山岩類に区分される。このうち下部火山岩類は、さらに下位より下部噴出岩類Ⅰ及び下部噴出岩類Ⅱに細分される。既知の両鉱床はいずれも下部噴出岩類Ⅰの最上部に賦存する同生鉱床で、下部噴出岩類Ⅱにより覆われる。オマーン山脈地域におけるこの種の鉱床は、この下部噴出岩類Ⅱの発達する地域に見られ、この噴出岩類と成因的に関係する可能性を示唆している。従って、この鉱床賦存位置と下部噴出岩類Ⅱの分布に着目することは、この種の鉱床の探査にとって現時点では重要な要素である。
- ② ラカー地域の構造は、スマイル・オフィオライトのオブダクトに従う衝上断層群によってその大構造が規制されている。この衝上断層群によって形成された各スラスト・シートは正常な層序を示すが、層序的に下位の岩相が上位に載っており見かけ上逆転した構造を示す。オブダクト後の構造としては、NW-SE系を主とする断層及び弱い褶曲構造が見られ、これらが小構造を規制する。既知の両鉱体ともこれらの構造運動によって規制されている。特に、ハイル・アス・サヒル鉱床では、副次的な衝上断層によって鉱体が大きく規制されているのでこの断層の解析が重要である。
- ③ ラカー地域の両鉱床の鉱石は、下位よりストックワーク状鉱、塊状鉱及び珪質鉱より構成される。このうち塊状鉱及び珪質鉱はいずれも下部噴出岩類ⅠとⅡの境界部に位置する。ハイル・アス・サヒル鉱床は、珪化及び角礫化の顕著な厚いストックワーク状鉱により特徴付けられる。また全般に石英-赤鉄鉱（ジャスパー）を特徴的に伴う。ラカー鉱床のストックワーク状鉱は顕著な緑泥石化により特徴付けられる。また、塊状鉱及び珪質鉱は下部噴出岩類ⅠとⅡの境界部に挟まれた堆積岩類中及びその延長部に位置し密

接な関係を示す。鉱石鉱物は、両鉱床とも黄鉄鉱、黄銅鉱、閃亜鉛鉱、銅藍、輝銅鉱及び斑銅鉱が見られる。これらの鉱石鉱物のうち銅藍、輝銅鉱及び斑銅鉱はいずれも浅所で見られ、その大部分は二次富化により生成したものである。

④ A地区及びB地区で行った流電電位法による物理探査の結果に基づいてボーリング調査を行ったが、この結果では物理探査により推定された鉱化帯の広がり方が正確であることを示した。この調査結果からすれば、鉱化帯を捕捉したボーリング孔を用いて流電電位法による物理探査を行えば、捕捉した鉱化帯の広がり方を正確に押さえることができ非常に有効な手法であることを示す。

⑤ 両鉱床に対する鉱量計算の結果確認された地質鉱量は、以下のとおりである。

	鉱量 (t)	Cu %	Au g/t	Cu (t)	Au (kg)
ハイル・アス・サヒル鉱床	10,553,091	1.00	0.40	105,167.29	4,183.17
ラカー鉱床	4,750,736	0.99	0.88	46,824.39	4,163.77
合計	15,303,827	0.99	0.55	151,991.68	8,346.94

このうち本調査によって発見された地質鉱量は、約8,500千トンCu 0.73%、Au 0.26g/tである。なお、ハイル・アス・サヒル鉱床のストックワーク状鉱に対する鉱量計算結果は、ボーリングの本数が少ないことから若干その精度が低い。また、ラカー鉱床の鉱量計算結果では、Au及びAg品位の分析結果が少ないことからその精度が若干低いと考えられる。

⑥ Au品位の比較的高いラカー鉱床のゴッサン化帯及びゴッサン・ズリの量は約300千トンと見積もられ、その品位はAu 5.0 g/t、Ag 10.0 g/t程度と推定される。この鉱石は、鉱山を開発する場合には採掘の範囲に含まれるので、この折に鉱石分析資料を採取しその品位及び量を明らかにすることが必要である。

⑦ ハイル・アス・サヒル鉱床では、鉱画設定範囲の北側及び南東方で発見鉱量の計上が可能と推定されるが、期待される鉱量の大部分は本調査による鉱量計算によって計上されたと考えられる。

本調査は、2年間と短期間であったがハイル・アス・サヒル及びラカー両鉱床の全貌を解明することができ、鉱山開発計画の作成に必要なデータが得られその目的を達成することができた。なお、本調査結果は、ラカー地域の周辺や北部オマーン山脈地域でこの種の銅鉱床の探査を行う場合有用な参考資料になると考える。

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Appendix 1

**Descriptions for thin sections of
typical rock facies in the Rakah area**

Geologic unit : Tectonites
Rock name : Harzburgite (Hz)
Sample number : M008
Texture : Porphyroclastic and mesh textures
Descriptions : Rock consists of olivine and subordinate orthopyroxene and chromite. Olivine is completely altered to serpentine and magnetite, and exhibits mesh texture. Subhedral and anhedral orthopyroxene (enstatite) is 0.4 to 3 m/m in grain size and presents exsolution lamellae of clinopyroxene. Orthopyroxene is mostly altered to serpentine, chlorite and small amounts of magnetite and tremolite.

Geologic unit : Cumulate Sequence (Cg)
Rock name : Clinopyroxene gabbro
Sample number : M017
Texture : Orthocumulus texture
Descriptions : Cumulus phase consists of euhedral to subhedral plagioclase and augite. Augite is 1 to 1.5 m/m in grain size and is slightly altered to amphibole and chlorite. Post-cumulus phase consists of anhedral plagioclase, augite and subordinate olivine, apatite and opaque minerals. Augite exhibits locally poikilitic texture. Plagioclase is altered locally to sericite and calcite. Olivine is decomposed to serpentine and magnetite.

Geologic unit : High-level Gabbro (Hg)
Rock name : Clinopyroxene gabbro
Sample number : N011
Texture : Porphyritic texture
Descriptions : Rock consists of plagioclase, hornblende, augite and subordinate apatite and opaque minerals. Numerous euhedral to subhedral plagioclase grains are 0.2 to 1.5 m/m in size and are marked by sericitization. Green euhedral to subhedral hornblende, 0.3 to 2.5 m/m in grain size, is partially altered to chlorite. The rock is strongly altered and presents chlorite, amphibole, sericite, epidote, sphene, hematite and limonite.

Geologic unit : Sheeted-dyke Complex (Sd)
Rock name : Dolerite (dyke)
Sample number : M016
Texture : Glomeroporphyritic texture
Descriptions : Rock is mainly composed of plagioclase and mafic minerals with minor opaque minerals. Plagioclase is euhedral to subhedral, 0.3 to 1.2 m/m in grain size, and shows zoning structure. Mafic minerals are altered completely to chlorite, epidote and calcite. Alteration minerals are epidote, chlorite, calcite and subordinate sphene.

Geologic unit : Lower Volcanic Rocks (Lower Extrusives I)
Rock name : Pillow lava
Sample number : M032
Texture : Intersertal texture
Descriptions : Rock is altered completely and the original structure is not clear. Phenocrysts consist of plagioclase and mafic minerals. Plagioclase is altered mostly to quartz and epidote. Mafic minerals are mostly replaced with smectite, chlorite, epidote calcite and opaque minerals.

Geologic unit : Lower Volcanic Rocks (Lower Extrusives II)
Rock name : Andesitic pillow lava
Sample number : M015
Texture : Glomeroporphyritic texture
Descriptions : Phenocrysts consist of augite and subordinate plagioclase. Euhedral to subhedral and prismatic augite, 0.4 to 0.6 m/m in grain size, shows undulatory extinction and is altered to chlorite and epidote. Euhedral plagioclase is 0.4 m/m in grain size. Groundmass consists mainly of laths of plagioclase, augite, glass and opaque minerals. Glass is altered to chlorite, epidote, albite and smectite. Opaque minerals are probably iron oxide minerals and are partially oxidized to hematite.

Geologic unit : Middle Volcanic Rocks (M)
Rock name : Doleritic massive lava
Sample number : M005
Texture : Subophitic texture
Descriptions : Phenocrysts consist of euhedral plagioclase, 0.5 to 2.0 m/m in grain size, and subordinate euhedral to subhedral augite, 1.0 m/m in grain size. Plagioclase is altered to calcite and chlorite. Groundmass is composed of lath of plagioclase, augite and subordinate opaque minerals. Carbonates, smectite, chlorite, sphene and epidote are the secondary minerals.

Geologic unit : Middle Volcanic Rocks (M)
Rock name : Basaltic pillow lava
Sample number : M003
Texture : Intersertal texture
Descriptions : Phenocrysts consist of plagioclase and augite. Euhedral plagioclase, 0.5 to 1.5 m/m in grain size, is prismatic. Small amounts of euhedral to subhedral augite are 0.5 m/m in grain size. Groundmass includes plagioclase, augite and subordinate titan-augite, hyperthene and iron oxide minerals. Carbonates and subordinate chlorite, epidote and smectite are the secondary minerals.

Geologic unit : Intrusive Rocks (I)
Rock name : Dolerite
Sample number : M031
Texture : Ophitic texture
Descriptions : Phenocrysts consist of euhedral plagioclase, 0.2 to 2.0 m/m in grain size, and subhedral augite, 0.4 to 0.6 m/m in grain size. Augite exhibits undulatory extinction. Groundmass is intensely altered and iron minerals are partially oxidized to hematite.

Appendix 2

**Results of chemical analyses for petrochemical
studies and C. I. P. W. norm calculation**

Results of whole rock chemical analyses

Ser. No.	Sample No.	Coordinates		Geol. Unit	Rock Name	MAJOR COMPONENTS (%)														Remarks
		N (km)	E (km)			SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃ *2	MnO	MgO	CaO	Na ₂ O	K ₂ O	BaO*3	P ₂ O ₅	LOI**4	CO ₂	Total	
1	M003	2,618,723	453,108	Me	basalt	43.82	0.48	14.83	7.28	0.10	4.59	16.36	3.75	0.08	17	0.05	9017	5.09	100.21	calcareous
2	M005	2,619,150	452,857	Me	dolerite	43.68	1.19	14.34	10.19	0.21	5.65	11.70	4.15	0.12	40	0.11	1089	1.09	100.23	
3	M011	2,618,724	454,245	Hg	hb-cpx gabbro	48.23	0.38	14.92	7.35	0.12	10.44	12.12	2.04	0.39	16	0.02	4034	0.43	100.35	
4	M012	2,618,638	454,222	Sd	dolerite	51.75	0.72	15.77	10.54	0.17	3.71	14.14	0.16	0.03	4	0.05	3017	0.10	100.21	
5	M015	2,619,830	453,344	LII	andesite	54.52	0.31	14.91	9.12	0.08	6.80	5.56	5.39	0.19	13	0.01	3.07	0.00	99.96	
6	M016	2,617,975	457,542	Sd	andesite	52.48	0.83	14.73	9.49	0.16	8.20	5.86	3.34	0.29	3	0.06	4.74	0.16	100.18	
7	M017	2,618,985	457,200	Cg	cpx gabbro	48.28	0.15	14.45	4.85	0.10	11.85	15.45	1.42	0.07	3	0.00	3.77	0.23	100.29	
8	M018	2,618,950	457,236	L'	andesite	54.77	0.48	14.57	11.64	0.15	6.04	6.49	1.01	0.95	2	0.05	4.72	0.06	99.97	
9	M020	2,618,365	457,172	LII	basalt	50.16	0.21	10.68	6.64	0.27	6.16	13.29	2.75	0.55	29	0.02	9.12	6.33	99.85	
10	M022	2,618,938	458,642	Me	andesite	55.32	0.72	14.88	9.11	0.10	4.90	6.85	3.32	0.11	8	0.05	4.87	0.15	99.99	
11	M023	2,618,440	458,925	Me	basalt	51.21	0.66	14.80	8.32	0.16	7.40	7.09	4.56	0.29	22	0.05	5.42	1.35	99.96	
12	M024	2,618,314	458,596	LI	basalt	50.11	1.23	16.13	10.29	0.19	5.15	7.57	4.18	0.58	34	0.12	4.34	0.20	99.89	
13	M031	2,618,249	457,534	L'	dolerite	50.32	1.11	15.42	9.91	0.22	4.75	8.97	4.52	0.69	45	0.10	4.48	1.58	100.49	
14	M032	2,617,977	457,502	LI	andesite	53.18	0.84	14.42	10.22	0.18	7.35	6.04	2.13	0.76	18	0.06	5.33	0.17	100.02	
15	M034	2,619,127	453,186	LI	andesite	61.46	0.61	9.92	12.82	0.04	8.06	0.87	0.24	0.07	12	0.01	6.14	0.24	100.04	altered, silicified
16	MJO-A4 44.20	2,618,576	453,458	LII	andesite	52.71	0.50	15.77	7.98	0.09	6.78	5.58	5.61	0.07	14	0.05	4.59	0.36	99.83	
17	MJO-A4 143.70	2,618,576	453,458	LI	basalt	47.12	0.45	16.02	6.75	0.13	9.50	9.03	2.22	1.36	42	0.03	7.16	0.60	99.77	
18	MJO-A1 83.70	2,618,742	453,434	LII	basalt	51.92	0.52	16.91	7.73	0.08	6.10	7.13	5.26	0.41	30	0.06	4.26	0.23	100.38	
19	MJO-A1 172.00	2,618,742	453,434	LI	basalt	46.55	0.26	12.77	8.49	0.09	12.35	11.71	0.49	0.11	6	0.01	7.22	0.62	100.05	
20	MJO-B5 23.50	2,618,700	457,404	LII	basalt	49.01	0.27	14.05	7.84	0.11	8.04	11.43	2.22	0.96	30	0.04	6.01	2.09	99.98	
21	MJO-B5 79.20	2,618,700	457,404	LI	basalt	45.64	0.33	15.49	9.47	0.10	8.97	8.28	1.78	1.22	22	0.03	8.29	0.30	99.60	
22	MJO-B5 136.10	2,618,700	457,404	LI	basalt	50.77	1.09	15.22	9.64	0.26	6.66	6.51	4.84	0.16	18	0.10	4.40	0.36	99.29	
23	MJO-B3 55.20	2,618,764	457,536	LII	basalt	51.91	0.45	15.54	8.33	0.09	4.79	9.33	4.25	0.17	15	0.04	4.39	0.30	99.79	
24	MJO-B3 147.76	2,618,784	457,526	LI	basalt	50.05	1.19	16.08	10.06	0.17	5.21	4.94	3.81	0.92	27	0.11	4.37	0.43	99.91	
25	MJO-B4 101.20	2,618,723	457,358	LI	basalt	49.49	0.30	13.42	8.20	0.09	10.09	8.93	1.50	0.94	22	0.01	6.87	0.39	99.84	
26	MJO-B6 93.90	2,618,631	457,405	LI	basalt	49.22	0.76	16.83	9.27	0.18	5.95	7.64	5.10	0.11	16	0.10	5.09	0.68	100.25	
27	N011	2,618,782	453,194	LII	andesite	57.48	0.21	12.67	8.96	0.07	7.02	6.09	3.51	0.51	18	0.01	3.82	0.50	100.16	
28	MJO-B2 52.20	2,618,772	457,385	LII	andesite	57.07	0.28	12.13	7.22	0.10	6.05	9.66	3.02	0.48	19	0.04	3.90	0.95	99.95	
29	MJO-A2 136.00	2,618,698	455,296	LI	basalt	51.85	10.64	15.92	10.58	0.17	6.47	3.29	5.81	0.13	38	0.15	4.33	0.16	100.35	
30	MJO-A5 17.50	2,618,792	453,296	LII	basalt	47.60	0.25	11.89	8.36	0.19	15.45	7.81	0.40	0.08	99	0.01	7.91	0.10	99.95	

*1 : Abbreviations are shown in Fig. II-3-1. *2 : Total iron as Fe₂O₃ *3 : PPM *4 : Ignition loss

Results of C.I.P.W. norm calculation

Ser. No.	Sample No.	Geol. Unit	q	c	or	ab	an	ne	ac	ns	ks	wo	diwo	dien	difs	hyen	olfs	mt	hm	il	tn	pf	ru	ep	ec	pr	Total FeO	S.I.*	F.M.I.**
1	M003	Me	0.00	0.00	0.47	30.30	22.58	0.77	0.00	0.00	0.00	0.00	9.54	5.43	3.71	0.00	4.21	3.17	2.12	0.00	0.91	0.00	0.00	0.12	11.58	0.00	6.55	30.65	1.43
2	M005	Me	0.00	0.00	0.71	31.31	20.15	2.06	0.00	0.00	0.00	0.00	12.36	6.88	4.99	0.00	5.04	4.03	2.96	0.00	2.25	0.00	0.00	0.25	2.48	0.00	9.18	29.59	4.62
3	M011	Hg	0.00	0.00	2.30	17.26	30.40	0.00	0.00	0.00	0.00	0.00	11.11	7.76	2.42	2.84	2.11	2.13	0.00	0.72	0.00	0.00	0.00	0.05	0.96	0.00	6.61	63.59	0.63
4	M012	Sd	0.00	0.00	0.47	30.30	22.58	0.77	0.00	0.00	0.00	0.00	9.54	5.43	3.71	0.00	4.21	3.17	2.12	0.00	0.91	0.00	0.00	0.12	11.58	0.00	9.49	27.71	2.56
5	M015	LII	0.00	0.00	1.12	46.61	15.93	0.00	0.00	0.00	0.00	0.00	4.84	2.84	1.73	6.09	2.77	1.84	2.64	0.00	0.59	0.00	0.00	0.02	0.00	0.00	8.21	33.03	1.21
6	M016	Sd	0.00	0.00	0.71	31.31	20.15	2.06	0.00	0.00	0.00	0.00	12.36	6.88	4.99	0.00	5.04	4.03	2.96	0.00	2.26	0.00	0.00	0.25	2.48	0.00	8.54	40.26	1.04
7	M017	Cg	0.00	0.00	0.41	12.02	32.85	0.00	0.00	0.00	0.00	0.00	17.62	13.22	2.50	0.99	7.66	1.59	1.41	0.00	0.28	0.00	0.00	0.00	0.52	0.00	4.36	66.94	0.37
8	M018	L'	0.00	0.00	0.47	30.30	22.58	0.77	0.00	0.00	0.00	0.00	9.54	5.43	3.71	0.00	4.21	3.17	2.12	0.00	0.91	0.00	0.00	0.12	11.58	0.00	10.48	34.36	1.73
9	M020	LII	0.00	0.00	2.30	17.26	30.40	0.00	0.00	0.00	0.00	0.00	11.11	7.76	2.42	2.84	2.11	2.13	0.00	0.72	0.00	0.00	0.00	0.05	0.98	0.00	5.98	39.9	0.97
10	M022	Me	0.00	0.00	0.71	31.31	20.15	2.06	0.00	0.00	0.00	0.00	12.36	6.88	4.99	0.00	5.04	4.03	2.96	0.00	2.26	0.00	0.00	0.25	2.48	0.00	8.20	29.65	1.57
11	M023	Me	0.00	0.00	0.47	30.30	22.58	0.77	0.00	0.00	0.00	0.00	9.54	5.43	3.71	0.00	4.21	3.17	2.12	0.00	0.91	0.00	0.00	0.12	11.58	0.00	7.48	37.50	1.01
12	M024	L1	0.00	0.00	0.71	31.31	20.15	2.06	0.00	0.00	0.00	0.00	12.36	6.88	4.99	0.00	5.04	4.03	2.96	0.00	2.26	0.00	0.00	0.25	2.48	0.00	9.29	26.86	1.80
13	M031	L'	0.00	0.00	2.30	17.26	30.40	0.00	0.00	0.00	0.00	0.00	11.11	7.76	2.42	2.84	2.11	2.13	0.00	0.72	0.00	0.00	0.00	0.05	0.98	0.00	8.91	25.17	1.88
14	M032	L1	0.00	0.00	0.47	30.30	22.58	0.77	0.00	0.00	0.00	0.00	9.54	5.43	3.71	0.00	4.21	3.17	2.12	0.00	0.91	0.00	0.00	0.12	11.58	0.00	9.20	37.28	1.25
15	M034	L1	0.00	0.00	1.12	46.61	15.93	0.00	0.00	0.00	0.00	0.00	4.84	2.84	1.73	6.09	2.77	1.84	2.64	0.00	0.59	0.00	0.00	0.02	0.00	0.00	11.53	40.59	1.43
16	MJO-A4 44.20	LII	0.00	0.00	0.41	47.47	17.64	0.00	0.00	0.00	0.00	3.10	1.88	0.95	3.49	5.70	3.18	2.32	0.00	0.95	0.00	0.00	0.12	0.82	0.00	7.18	34.52	1.06	
17	MJO-A4 143.70	L1	0.00	0.00	8.04	18.79	29.73	0.00	0.00	0.00	0.00	0.00	4.47	3.13	0.97	3.30	6.90	2.35	1.96	0.00	0.85	0.00	0.00	0.07	1.36	0.00	6.07	49.80	0.64
18	MJO-A1 63.70	LII	0.00	0.00	2.42	44.51	21.32	0.00	0.00	0.00	0.00	0.00	5.04	3.08	1.67	0.23	3.12	4.84	2.25	0.00	0.99	0.00	0.00	0.40	0.52	0.00	6.95	32.58	1.14
19	MJO-A1 172.00	L1	1.94	0.00	0.65	4.15	32.32	0.00	0.00	0.00	0.00	0.00	3.93	6.24	1.94	7.75	0.00	0.00	2.46	0.00	0.49	0.00	0.00	0.02	1.41	0.00	7.64	59.98	0.62
20	MJO-B5 23.50	LII	1.86	0.00	5.67	18.79	25.54	0.00	0.00	0.00	0.00	6.84	4.42	1.95	7.00	0.00	0.00	2.28	0.00	0.51	0.00	0.00	0.00	0.09	4.75	0.00	7.05	44.00	0.88
21	MJO-B5 79.20	L1	0.00	0.00	7.21	15.06	30.67	0.00	0.00	0.00	0.00	0.00	3.39	2.15	1.02	6.57	4.45	2.23	2.74	0.00	0.53	0.00	0.00	0.07	0.63	0.00	8.52	43.78	0.95
22	MJO-B5 338.10	L1	0.00	0.00	0.95	40.95	19.33	0.00	0.00	0.00	0.00	0.00	4.10	2.44	1.45	4.47	4.63	3.02	2.80	0.00	2.07	0.00	0.00	0.23	0.32	0.00	8.68	32.75	1.30
23	MJO-B3 35.20	LII	0.32	0.00	1.00	35.96	22.92	0.00	0.00	0.00	0.00	0.00	9.85	5.40	4.10	5.10	0.00	0.00	2.42	0.00	0.85	0.00	0.00	0.09	0.68	0.00	7.50	28.66	1.57
24	MJO-B3 147.70	L1	0.00	0.00	5.46	32.24	24.06	0.00	0.00	0.00	0.00	0.00	4.65	2.53	1.95	6.83	1.09	0.38	2.91	0.00	2.26	0.00	0.00	0.25	0.38	0.00	9.05	27.44	1.74
25	MJO-B4 101.30	L1	3.14	0.00	5.55	12.69	27.11	0.00	0.00	0.00	0.00	6.02	4.07	4.07	1.48	7.80	0.00	0.00	2.38	0.00	0.57	0.00	0.00	0.02	0.89	0.00	7.38	50.69	0.73
26	MJO-B6 85.90	L1	0.00	0.00	0.68	42.93	22.70	0.00	0.00	0.00	0.00	4.10	2.56	1.56	1.56	0.00	8.73	5.38	2.63	0.00	1.44	0.00	0.00	0.23	1.55	0.00	8.33	30.52	1.40
27	N011	LII	0.00	0.00	0.41	47.47	17.64	0.00	0.00	0.00	0.00	6.01	1.88	0.95	3.49	5.70	3.18	2.32	0.00	0.95	0.00	0.00	0.12	0.82	0.00	8.06	36.56	1.15	
28	MJO-B2 52.20	LII	12.19	0.00	2.84	25.55	18.12	0.00	0.00	0.00	0.00	9.52	5.88	3.15	5.05	0.00	0.00	2.09	0.00	0.53	0.00	0.00	0.00	0.09	2.16	0.00	5.50	37.70	1.07
29	MJO-A2 136.00	L1	0.00	1.03	0.77	49.16	14.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.10	4.30	2.89	3.07	0.00	3.11	0.00	0.00	0.37	0.36	0.00	9.52	29.49	1.47
30	MJO-A3 17.50	LII	2.79	0.00	0.47	3.38	30.41	0.00	0.00	0.00	0.00	3.16	2.50	0.57	1.16	0.00	0.00	2.42	0.00	0.47	0.00	0.00	0.00	0.02	0.23	0.00	7.52	65.88	0.49

*1 S.I.: Abbreviations are shown in Fig. II-3-1. *2 S.I.: Solidification Index = MgOx100/(MgO + Total FeO + Na2O + K2O) *3 F.M.I.: Total FeO - MgO Index = Total FeO/MgO (FeO3; FeO was estimated to be 1:4).

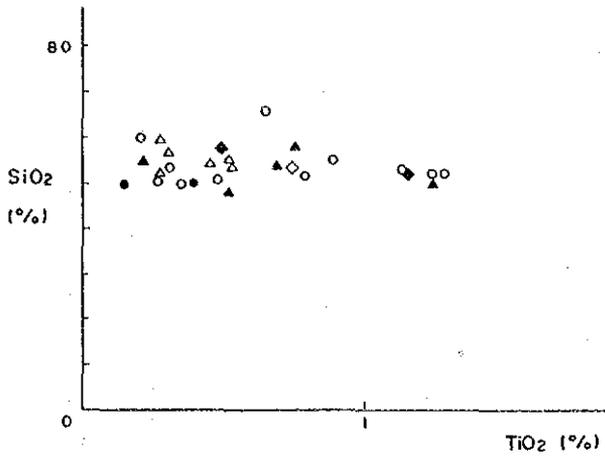
Results of chemical analyses for minor elements

Ser. No.	Sample No.	Geol. Unit	Al	Ba	Be	Bi	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	P	K	Ag	Na	Sr	Ti	W	V	Zn
1	M003	Me	75900	15	1	<3	<1	117000	58	29	67	50900	6	27700	774	<2	37	235	640	2.2	27800	89	2700	<10	214	54
2	M005	Me	45900	35	3	<3	<1	55600	156	45	54	71300	7	34100	1680	<2	78	450	1000	1.0	30800	132	7020	<10	267	71
3	M011	Hg	79000	15	1	<3	<1	86600	322	36	87	51400	6	63000	906	<2	130	76	3200	0.7	15100	134	2290	<10	190	55
4	M012	Sd	83400	3	2	<3	<1	101000	166	22	7	73800	5	22400	1300	<2	25	238	270	0.2	1200	383	4320	33	317	38
5	M015	LH	78900	11	1	<3	<1	39700	322	31	53	63800	5	41000	612	<2	149	58	1550	0.1	40000	151	1850	<10	243	72
6	M016	Sd	78000	3	1	<3	<1	41900	81	35	5	66300	4	49500	1250	<2	45	261	2400	0.1	24500	73	4990	<10	105	28
7	M017	Cg	76500	3	<1	3	<1	110000	463	28	134	33900	4	71500	743	<2	14	12	550	0.6	10500	108	911	27	74	30
8	M018	L'	77100	1	2	<3	<1	46400	177	33	34	81400	5	36400	1140	<2	42	225	450	<0.1	7500	127	2860	<10	190	60
9	M020	LH	56500	26	1	3	<1	95000	359	29	45	46400	9	73100	2070	<2	192	71	4600	1.3	20400	124	1270	34	158	55
10	M022	Me	75500	7	2	<3	<1	47500	98	29	220	63700	<3	29600	805	<2	31	278	910	0.7	24600	55	4330	<10	224	65
11	M023	Me	76200	20	1	<3	<1	50700	43	32	31	59200	7	44600	1240	<2	39	202	2400	0.4	32800	128	3970	<10	220	73
12	M024	Li	85400	30	3	<3	<1	54100	70	35	75	72000	6	31100	1470	<2	42	507	4800	0.6	31000	148	7340	<10	291	83
13	M031	L'	81500	40	3	<3	<1	64100	56	35	27	69300	7	28600	1730	<2	26	419	5800	0.4	33500	197	6660	30	283	75
14	M032	Li	76300	16	2	<3	<1	43200	56	35	46	71500	3	44400	1430	<2	31	257	6300	0.3	13800	253	5040	<10	285	87
15	M034	Li	52500	11	1	<3	<1	47300	93	33	1830	89700	<3	49800	297	<2	35	57	550	0.1	1800	22	3670	35	156	282
16	MJO-A4 34.20	LH	83500	13	2	<3	<1	39800	165	124	13	55800	5	40900	666	<2	46	224	550	0.9	41600	87	2980	<10	196	185
17	MJO-A4 143.70	Li	84800	37	1	<3	<1	64500	263	31	12	47200	8	57300	976	<2	93	128	11500	0.6	16500	186	2690	18	186	58
18	MJO-A1 63.70	LH	89500	27	2	<3	<1	51000	113	34	8	54100	10	36800	602	<2	44	250	3400	0.5	39000	155	3120	20	197	90
19	MJO-A1 172.00	Li	57600	6	1	<3	<1	52700	457	25	22	39400	6	74500	724	<2	211	65	910	0.9	3600	40	1540	54	231	67
20	MJO-B5 23.50	LH	74400	27	1	<3	<1	81700	312	39	37	54800	<3	48500	843	<2	137	166	8000	0.8	16500	86	1610	48	207	71
21	MJO-B5 79.20	Li	82000	20	1	<3	<1	63100	305	50	8	66200	4	54100	905	<2	106	111	10100	0.5	13200	80	1950	<10	244	85
22	MJO-B5 136.10	Li	80600	16	2	<3	<1	46600	76	45	26	67400	3	40200	2000	<2	49	416	1350	0.3	35900	104	6550	<10	249	37
23	MJO-B3 55.20	LH	82200	13	3	<3	<1	70800	127	36	18	59300	5	29900	720	<2	54	179	1450	0.7	31500	67	2710	49	287	59
24	MJO-B3 147.70	Li	85160	33	3	<3	<1	56000	61	28	15	70400	<3	31400	1280	<2	38	488	7600	0.2	28300	154	7150	10	291	83
25	MJO-B4 101.20	Li	71000	20	1	<3	<1	63800	367	33	101	57300	6	60900	685	<2	174	32	7800	0.2	11100	147	1800	29	220	70
26	MJO-B6 85.90	Li	89100	15	3	<3	<1	54600	41	37	25	64800	9	35900	1400	<2	31	413	910	0.6	3800	107	4560	<10	272	72
27	N011	LH	67100	16	1	<3	<1	42800	396	30	34	62700	6	42300	546	<2	137	33	4200	0.1	26800	133	1260	32	228	65
28	MJO-B2 32.20	LH	64200	17	2	<3	<1	69000	464	34	26	50600	6	36500	787	<2	186	154	4000	0.6	22400	85	1690	30	207	54
29	MJO-A2 136.00	Li	84300	34	6	<3	<1	23500	65	45	40	74000	15	39000	1350	<2	25	698	1100	0.2	43100	121	9830	<10	321	540
30	MJO-A5 17.50	LH	62900	28	2	<3	<1	54800	655	100	2310	58500	6	92200	1460	<2	419	<3	700	0.4	3000	89	1500	16	200	472
31	MJO-A1 106.90	Li	63300	2	1	<3	<1	3650	209	128	653	123700	4	54600	349	2	70	68	910	<0.1	7600	16	3260	34	195	601
32	N010*	ORE	4380	8	1	<3	<1	4750	769	40	36	38700	<3	2370	84	5	36	45	450	0.6	1700	40	181	28	33	60
33	MJO-B1*	ORE	4340	<1	<1	<3	<1	423	94	14	7070	408200	511	2710	1914	2	20	99	180	20.2	500	2	229	35	31	641

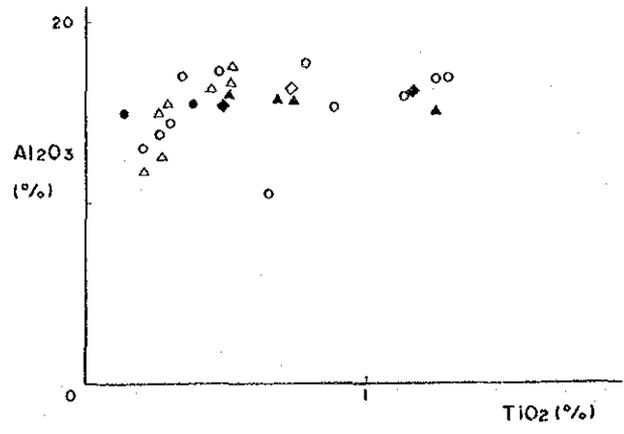
*1. Abbreviations are shown in Fig. II-3-1. *2. Coordinates: N 2,618,845, E 453,168 *3. Coordinates: N 2,618,796, E 457,278

Appendix 3

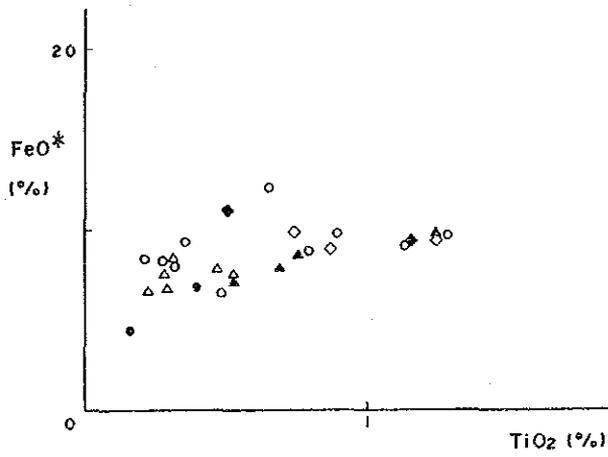
TiO₂ diagrams



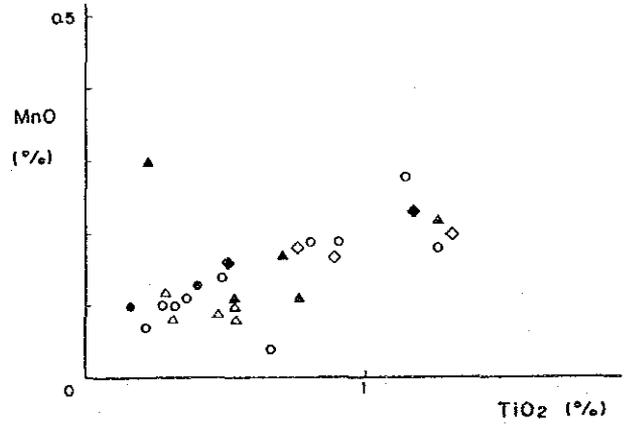
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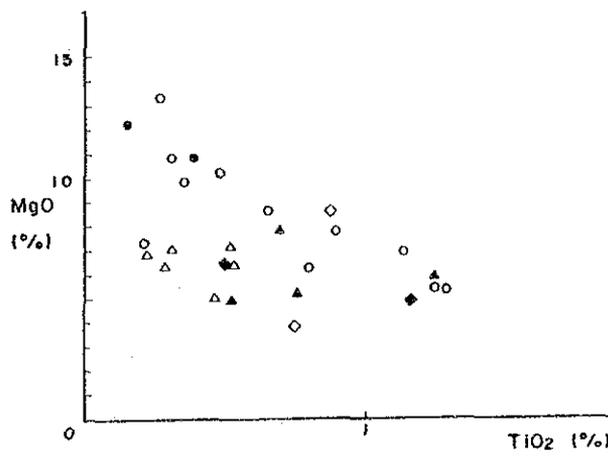
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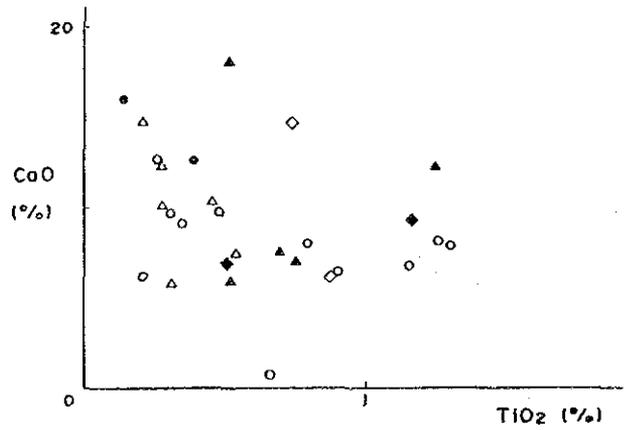
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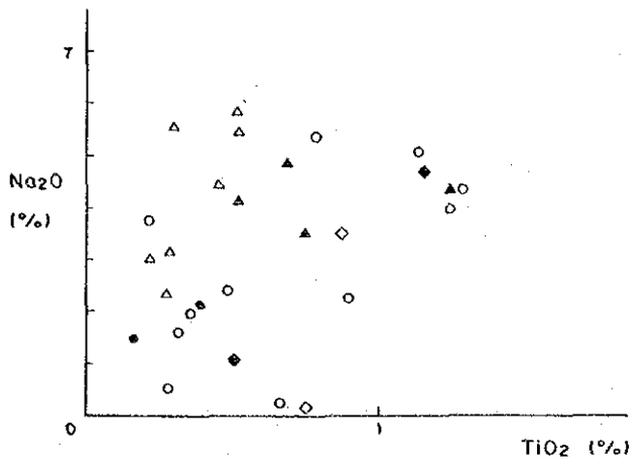
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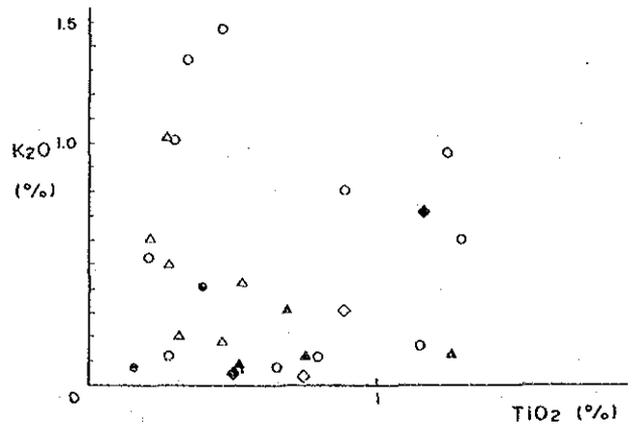
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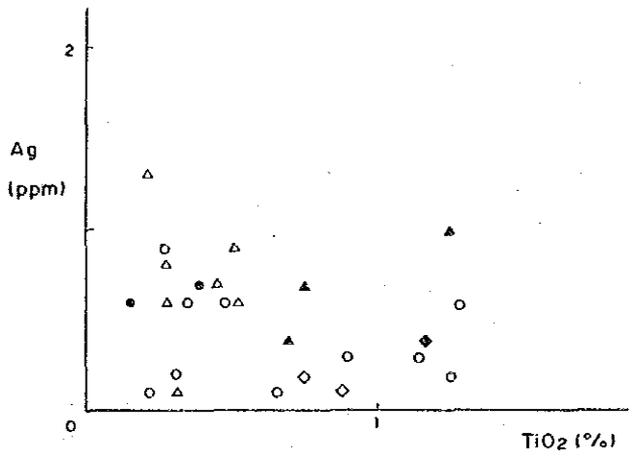
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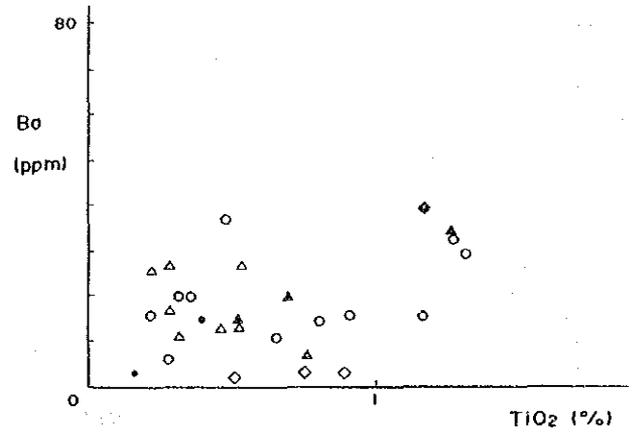
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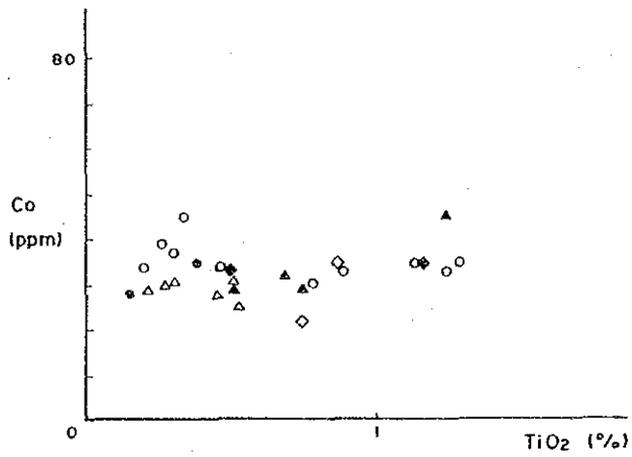
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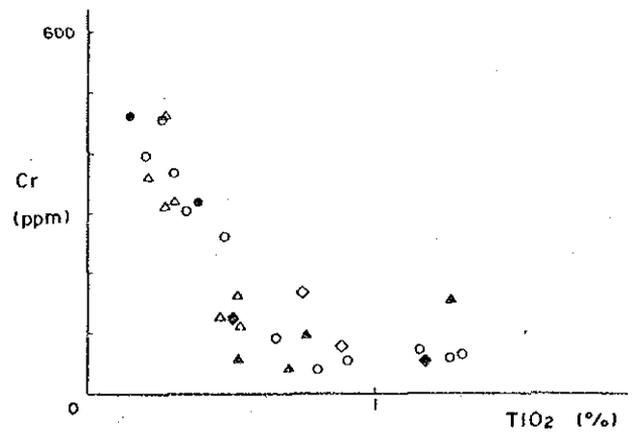
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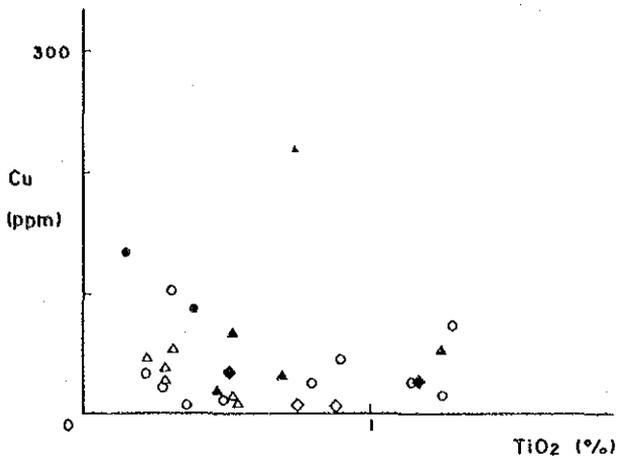
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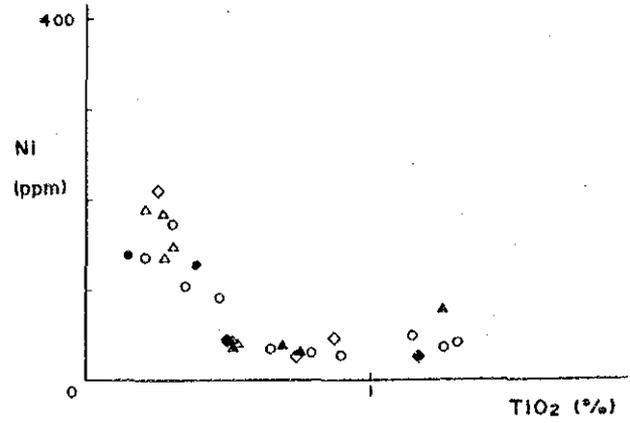
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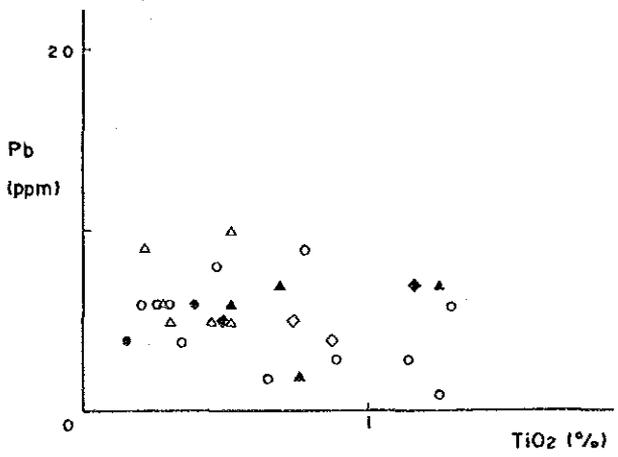
(l)



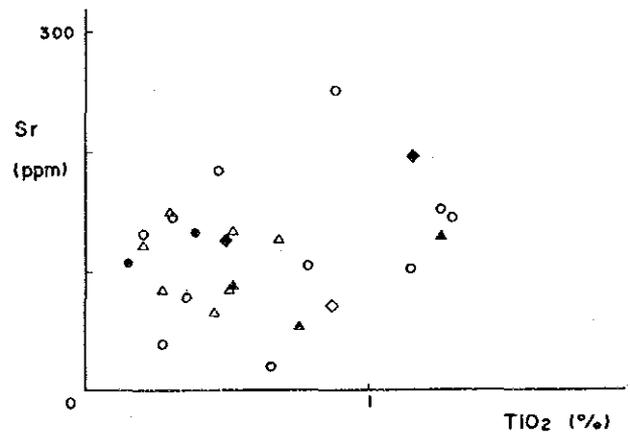
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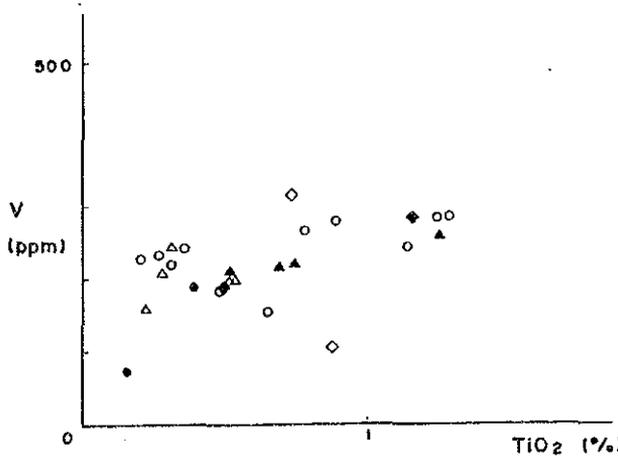
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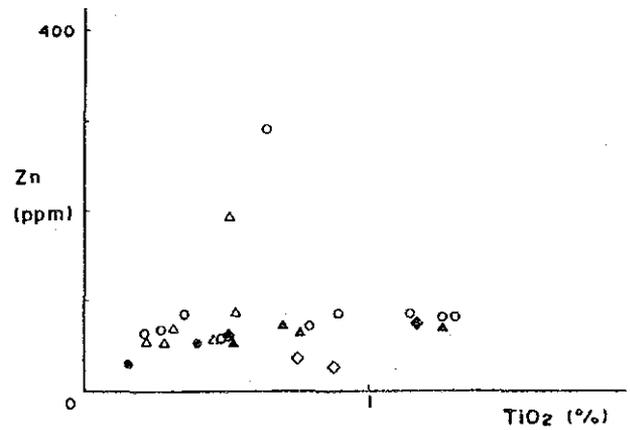
(o)



(p)



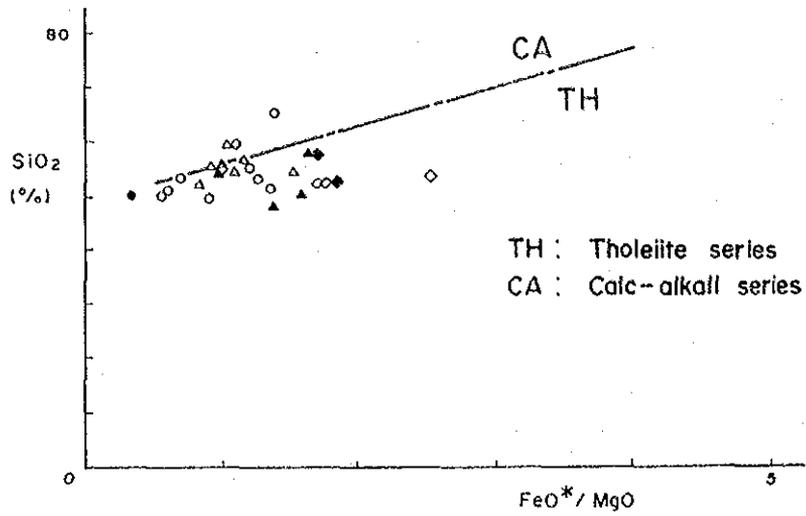
(q)



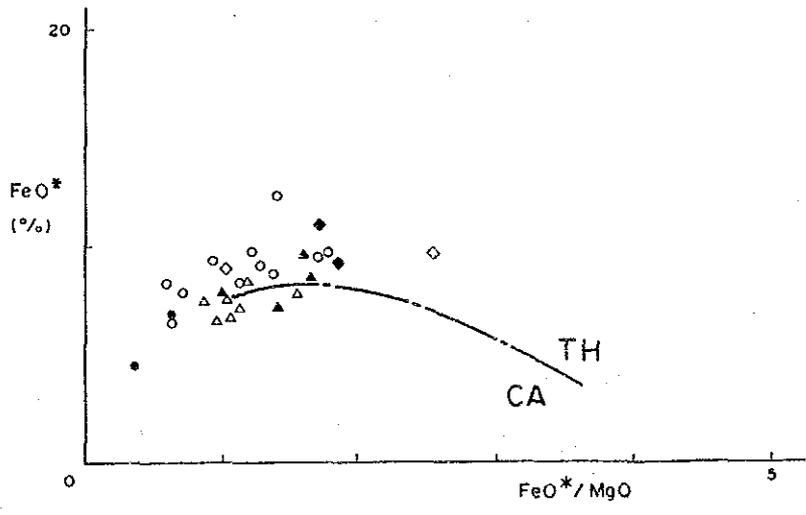
(r)

Appendix 4

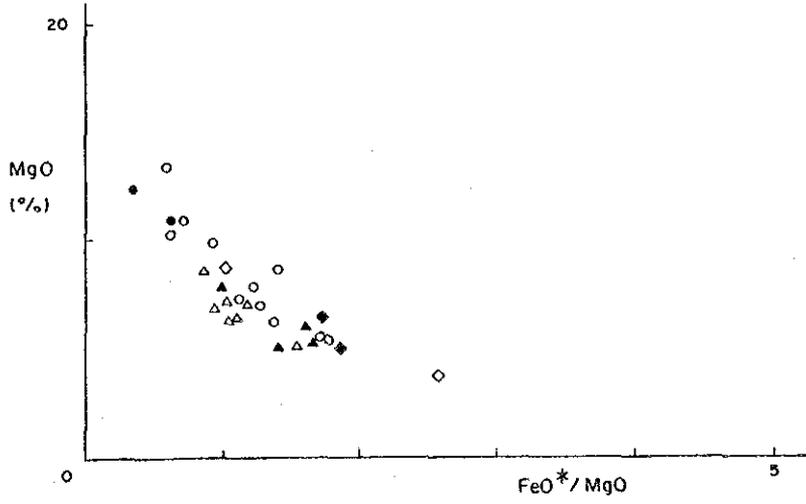
FeO* / MgO diagrams



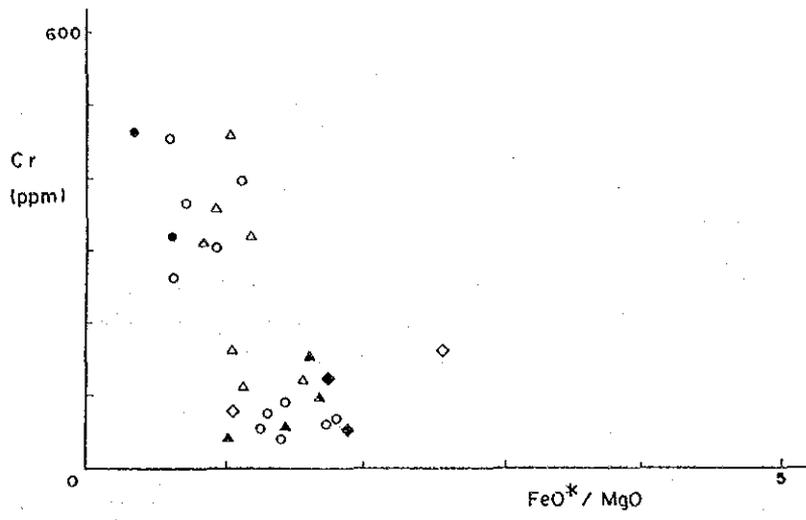
(a)



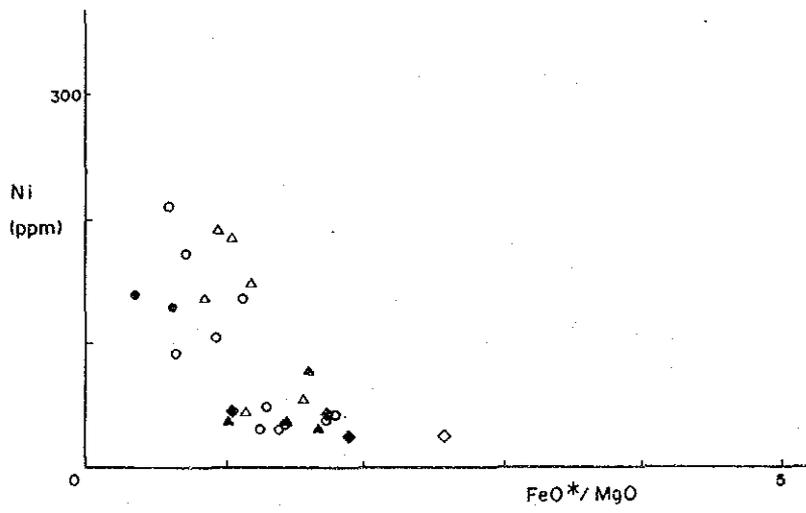
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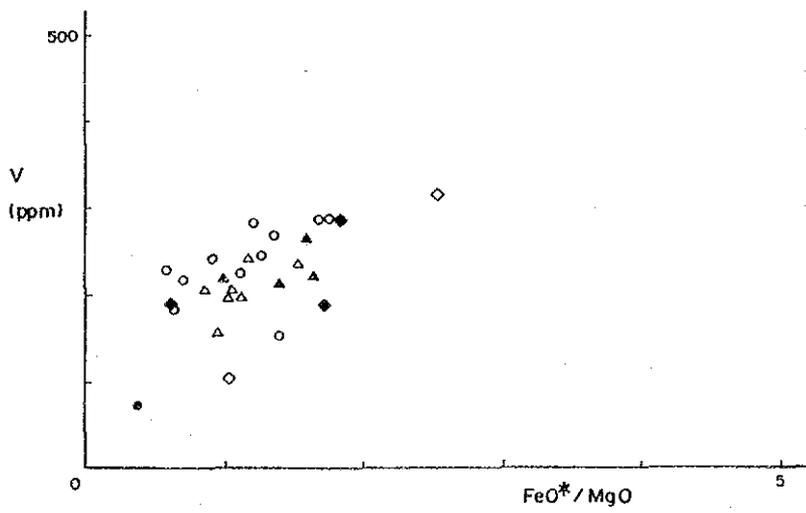
(c)



(d)



(e)



(f)

Appendix 5

Charged potential in area A

X Y Potential (mV/A)				X Y Potential (mV/A)				X Y Potential (mV/A)			
(m)	(m)	HS-14	HS-7	(m)	(m)	HS-14	HS-7	(m)	(m)	HS-14	HS-7
550	300	60.3	11.8	350	250	59.9	13.2	650	800	8.9	4.3
500	300	64.8	12.7	300	200	56.2	14.6	700	800	9.1	4.3
550	250	54.3	13.1	250	200	50.3	14.7	550	800	10.0	5.5
500	250	59.4	13.0	350	150	58.2	15.5	500	800	10.5	5.8
550	200	48.1	13.2	400	150	58.3	13.9	450	800	10.3	4.9
500	200	54.8	14.0	250	450	18.5	11.7	250	700	13.5	7.2
550	150	40.7	13.1	250	500	14.1	8.6	250	650	14.3	7.6
500	150	47.7	13.7	300	500	19.2	7.9	350	750	10.0	5.5
550	100	32.6	15.0	250	550	9.9	6.7	350	700	8.3	4.9
500	100	35.8	14.4	300	450	20.5	10.4	350	650	16.5	8.4
550	50	25.5	15.7	400	450	43.4	10.4	300	650	15.7	8.0
500	50	26.8	15.7	350	450	34.5	10.2	300	700	14.2	7.8
550	0	20.8	17.2	400	500	25.4	7.9	300	750	10.8	6.1
500	0	23.2	21.2	350	500	23.3	8.6	250	750	11.4	6.1
550	-50	16.6	21.7	400	550	14.5	7.2	300	900	7.6	5.0
500	-50	17.6	18.8	350	550	14.4	7.3	400	850	8.6	4.3
550	-100	12.7	22.3	400	600	10.6	6.5	400	900	7.6	4.6
500	-100	13.8	24.3	350	600	9.3	6.8	500	850	7.1	4.1
550	-150	8.9	26.6	300	600	9.2	7.4	450	850	9.0	4.2
500	-150	9.7	26.5	300	550	13.3	7.8	500	900	7.3	4.2
550	-200	7.1	34.4	250	600	9.4	6.9	450	900	6.0	3.3
500	-200	7.1	34.1	200	600	7.2	8.6	600	900	7.0	4.0
650	-200	5.9	20.2	150	600	7.0	7.2	700	900	5.0	2.6
650	-150	8.5	18.8	100	600	5.8	7.4	800	900	5.1	2.5
700	-150	7.1	16.3	100	500	11.0	8.8	600	1000	5.1	3.0
600	300	49.4	11.8	150	500	12.0	8.0	700	1000	4.0	2.2
650	300	43.3	10.5	200	500	13.4	8.6	800	1000	3.4	2.4
700	300	33.5	9.9	600	450	37.6	8.7	500	1000	5.7	3.7
750	300	24.1	8.6	650	450	36.0	8.3	400	1000	6.0	4.1
550	350	59.9	11.4	700	450	29.9	7.6	300	1000	5.1	3.6
500	350	64.9	13.7	550	450	49.2	9.9	600	1100	3.4	2.4
600	400	47.5	10.0	500	450	42.4	9.4	700	1100	3.4	2.5
650	400	43.1	11.6	450	450	44.0	9.9	800	1100	3.1	2.3
700	400	31.7	10.4	600	500	27.3	6.2	500	1100	3.8	2.9
550	400	53.4	10.2	650	500	28.4	7.4	400	1100	2.6	2.4
500	400	57.5	10.6	700	500	21.2	6.4	300	1100	2.6	2.1
600	350	51.5	12.0	750	500	17.6	5.7	600	1200	2.3	2.4
650	350	41.5	10.3	550	500	33.0	7.6	500	1200	2.8	2.1
700	350	34.4	9.8	500	500	34.4	8.6	400	1200	3.1	2.4
750	350	20.7	7.7	450	500	30.2	8.6	700	1200	1.9	1.8
750	400	20.0	7.1	600	550	26.5	7.5	800	1200	1.1	1.1
400	400	67.3	12.4	650	550	21.6	6.6	600	1300	1.5	1.3
450	400	62.7	11.3	700	550	17.4	5.9	700	1300	1.3	1.2
400	350	72.9	13.6	750	550	15.4	5.7	800	1300	1.3	1.1
450	350	73.0	12.2	550	550	26.4	7.8	500	1300	1.6	1.7
450	300	72.4	12.5	500	550	23.9	7.9	600	1400	1.1	.9
400	250	69.9	13.5	450	550	22.5	8.2	700	1400	.9	.8
450	250	69.3	13.4	600	600	20.1	6.3	800	1400	.8	.7
350	200	57.6	13.8	650	600	17.9	5.8	700	1500	.6	.5
400	200	60.1	13.3	700	600	15.7	5.3	800	800	8.3	3.8
450	200	62.0	12.5	750	600	14.4	5.1	900	800	6.0	3.1
450	150	50.4	14.6	550	600	18.4	6.8	1000	800	4.2	2.5
400	100	37.8	19.3	500	600	19.3	7.5	1100	800	3.0	1.9
350	100	34.5	21.1	450	600	18.9	7.6	900	900	4.7	2.6
450	100	37.3	16.4	600	650	14.2	5.6	1000	900	2.9	2.0
400	50	26.1	22.6	650	650	13.5	4.7	1100	900	2.6	1.6
350	50	21.9	29.0	700	650	13.5	5.0	900	1000	3.8	2.1
450	50	26.5	19.2	750	650	11.6	4.5	1000	1000	2.7	1.7
400	0	19.6	25.6	550	650	15.8	7.0	1100	1000	2.1	1.4
450	0	19.5	23.1	500	650	15.3	8.8	900	1100	2.3	1.7
400	-50	14.5	27.1	450	650	16.2	7.9	1000	1100	1.9	1.3
450	-50	13.4	26.9	600	700	9.7	4.4	1100	1100	1.5	.9
400	-100	10.8	32.3	650	700	11.0	4.8	900	1200	1.8	1.2
400	300	71.2	11.9	700	700	10.2	4.6	1000	1200	1.5	1.0
300	400	34.1	13.2	750	700	8.8	3.8	900	1300	1.2	1.2
350	400	50.2	11.8	550	700	9.5	4.3	1200	1000	2.7	1.6
250	400	19.0	12.0	500	700	12.0	6.2	1200	900	2.9	1.5
300	350	45.1	11.4	450	700	14.0	6.3	1300	900	2.2	1.2
250	350	32.0	12.1	600	750	10.5	5.5	1200	800	2.5	1.2
350	350	57.1	11.9	650	750	9.7	4.5	1300	800	2.4	1.2
300	300	52.6	12.9	700	750	9.3	4.5	1400	800	2.2	1.1
250	300	39.3	12.6	550	750	6.8	3.0	1200	700	4.8	2.8
350	300	63.2	12.8	500	750	12.0	6.1	1300	700	3.0	2.2
300	250	54.3	14.2	450	750	13.3	5.9	1400	700	2.5	1.4
250	250	43.9	13.7	600	800	10.3	4.9	1500	700	1.3	1.2

X Y Potential (mV/A)				X Y Potential (mV/A)				X Y Potential (mV/A)			
X (m)	Y (m)	HS-14	HS-7	X (m)	Y (m)	HS-14	HS-7	X (m)	Y (m)	HS-14	HS-7
1100	700	5.8	3.9	650	-50	14.2	15.2	0	200	20.4	21.8
1000	700	9.5	5.9	700	-50	10.2	15.3	50	200	25.5	21.9
1200	600	6.2	3.6	600	0	18.9	15.0	100	200	31.7	21.9
1300	600	5.2	2.9	650	0	13.5	16.0	150	200	42.5	21.6
1400	600	3.6	2.1	700	0	12.7	12.3	200	200	40.2	20.5
1500	600	2.4	1.5	750	0	9.5	10.9	-50	250	15.8	15.2
1100	600	6.9	3.5	600	50	22.1	14.6	0	250	20.0	16.9
1000	600	8.9	4.4	650	50	20.0	15.4	50	250	25.2	15.9
1200	500	6.7	4.4	700	50	16.2	13.9	100	250	32.8	16.4
1300	500	5.1	3.3	750	50	11.3	11.8	150	250	41.3	18.3
1400	500	3.7	2.2	600	100	28.2	12.8	200	250	44.3	17.8
1500	500	2.5	1.9	650	100	24.6	12.4	-50	300	12.9	12.2
1100	500	9.5	4.7	700	100	21.1	11.2	0	300	18.6	14.0
1000	500	12.6	5.7	750	100	14.2	11.8	50	300	23.9	13.2
1200	400	7.7	5.1	600	150	34.7	11.4	100	300	28.9	13.3
1300	400	6.0	3.4	650	150	28.9	13.0	150	300	32.2	15.0
1400	400	3.8	2.7	700	150	26.2	12.3	200	300	39.1	14.1
1100	400	9.2	5.0	750	150	16.1	11.0	-50	350	12.5	13.4
1200	300	7.8	5.5	600	200	41.1	12.4	0	350	16.4	12.7
1300	300	5.8	4.4	650	200	32.5	11.8	50	350	21.7	13.7
1200	200	8.7	6.3	700	200	28.8	10.9	150	350	29.4	13.9
1100	200	9.8	7.1	750	200	15.3	7.1	200	350	33.3	12.5
900	700	7.4	4.1	600	250	45.4	12.4	100	350	23.7	17.6
800	700	8.0	3.7	650	250	36.3	12.2	0	400	13.2	9.9
900	600	10.8	6.0	700	250	30.5	10.2	50	400	17.7	13.4
800	600	14.0	8.1	750	250	25.2	9.4	100	400	21.5	12.9
800	550	17.2	8.2	350	-150	12.1	48.3	150	400	23.9	13.1
900	500	13.4	7.8	350	-100	15.9	41.8	200	400	28.2	13.2
850	500	15.5	7.0	350	-50	17.7	40.1	-50	450	9.5	11.8
800	500	17.3	7.5	350	0	23.1	34.3	0	450	11.1	11.0
900	450	11.7	5.9	300	-150	15.0	54.7	50	450	13.0	13.8
800	450	19.1	8.2	300	-100	18.1	45.4	100	450	16.6	11.2
750	450	18.8	7.5	300	-50	19.4	41.2	150	450	17.3	11.3
900	400	14.6	6.8	250	-150	16.1	51.1	200	450	18.9	12.6
850	400	14.6	7.3	250	-100	18.6	43.6	50	500	12.4	11.5
950	400	13.3	6.7	250	-50	19.6	42.1	0	500	8.1	10.4
1000	400	12.1	6.6	200	-150	14.7	56.9	-100	600	3.3	6.7
900	350	12.6	6.4	150	-150	14.3	76.0	0	600	5.6	6.2
950	350	11.8	8.0	150	-100	17.7	56.1	100	550	11.3	8.1
1000	350	10.2	6.6	100	-150	13.2	82.5	150	550	11.8	7.8
850	450	16.0	6.9	100	-100	17.1	54.0	200	550	14.9	8.7
800	400	19.0	9.0	100	-50	18.7	49.6	200	650	7.8	6.7
850	350	16.6	7.9	100	0	22.1	40.9	200	700	6.5	6.1
800	350	19.4	8.3	50	-150	10.8	72.1	-100	700	1.1	5.6
900	300	13.9	8.6	50	-100	13.7	64.3	0	700	3.0	5.2
950	300	12.5	8.0	50	-50	15.4	51.6	100	700	4.5	6.2
1000	300	10.6	7.7	150	-50	20.0	46.6	0	800	1.0	4.9
1050	300	9.9	6.7	250	100	34.2	29.1	100	800	1.5	5.2
1100	300	8.9	6.1	0	-150	10.2	79.3	100	900	1.2	3.4
850	300	17.7	8.9	0	-100	11.3	64.3	200	800	3.5	7.4
800	300	19.5	8.4	0	-50	13.4	52.4	200	900	2.6	3.6
900	250	15.7	8.7	-50	-150	8.1	72.4	-200	600	1.6	8.6
950	250	13.1	8.3	-50	-100	9.7	64.0	200	1000	1.5	3.4
1000	250	11.8	7.8	-50	-50	12.1	52.0	-200	500	2.2	8.1
850	250	17.6	9.0	-50	0	11.8	36.4	-300	500	1.9	8.3
800	250	21.2	10.4	0	0	15.6	39.7	-200	400	2.7	10.1
900	200	15.2	8.7	50	0	18.7	39.2	-300	400	1.8	8.5
950	200	13.3	8.5	-50	50	13.5	30.8	-200	300	5.4	13.0
1000	200	12.1	8.3	0	50	18.7	30.7	-300	300	2.5	9.1
850	200	17.6	8.6	100	50	27.7	31.1	-150	200	8.9	18.4
800	200	20.5	10.9	150	50	30.8	30.8	-150	250	8.9	18.4
900	150	13.8	9.1	200	50	33.8	31.3	-150	300	8.7	12.7
850	150	15.8	9.2	200	100	32.3	31.3	-200	200	6.8	17.7
800	150	17.9	11.6	250	50	29.4	33.2	-200	250	6.4	12.8
850	100	14.7	10.8	250	0	22.8	40.0	-250	200	4.5	14.8
800	100	13.5	11.8	50	50	23.3	30.7	-300	200	2.5	13.1
800	50	13.0	11.5	-50	100	15.1	29.4	-150	150	9.3	22.0
600	-250	7.2	27.3	0	100	19.4	30.3	-200	150	7.1	21.4
700	-200	7.8	15.5	50	100	26.2	30.5	-250	150	5.5	20.9
600	-200	9.7	28.1	100	100	29.7	29.6	-300	150	3.2	18.0
600	-150	11.5	21.0	-50	150	15.2	24.6	-150	100	9.1	26.7
600	-100	12.7	21.6	0	150	20.2	24.3	-200	100	7.0	23.2
650	-100	10.7	15.3	50	150	27.4	25.1	-250	100	5.3	23.1
700	-100	10.1	14.3	100	150	34.3	27.3	-300	100	3.5	18.5
600	-50	14.6	16.6	-50	200	16.4	18.3	-350	100	.9	13.4

X (m)	Y (m)	Potential (mV/A)	
		HS-14	HS-7
-150	50	8.9	32.6
-200	50	6.8	29.6
-250	50	4.8	27.1
-300	50	3.6	30.8
-350	50	1.9	27.6
-150	0	7.5	34.2
-200	0	5.1	35.1
-250	0	3.6	32.4
-300	0	3.3	29.8
-350	0	1.7	30.8
-150	-50	7.0	44.0
-200	-50	4.5	39.2
-250	-50	3.6	38.8
-300	-50	2.1	34.4
-350	-50	1.8	30.8
-150	-100	5.3	53.1
-200	-100	4.2	45.2
-250	-100	3.1	43.0
-300	-100	1.6	40.3
-150	-150	4.3	62.1
-200	-150	3.1	56.8
-250	-150	2.4	51.9
-150	-200	3.3	79.9
-200	-200	3.8	72.1
-300	-200	1.5	53.5
-400	-100	1.1	30.6
-400	0	1.5	25.2
-500	0	.9	17.4
-400	50	1.4	16.3
-400	100	1.1	10.6
-500	100	.9	8.3
-600	100	.8	6.9
-400	200	1.1	6.4
-500	200	1.0	8.8
-600	200	.9	4.7
-400	300	1.2	5.6
-500	300	1.0	4.9
-400	400	1.3	4.8
-300	-300	.8	62.3
-200	-300	1.6	82.4
-200	-400	3.4	87.4
-100	-250	3.2	94.0
-150	-250	2.3	87.6
-100	-300	2.4	106.0
-100	-400	1.2	139.4
-100	-500	.9	117.2
400	800	10.7	6.2
400	700	14.5	7.6
400	750	13.6	6.9
350	800	11.0	6.7
300	800	10.6	6.4
450	-200	9.6	35.2
400	-200	12.3	46.6
350	-200	9.2	52.2
300	-200	12.2	58.5
250	-200	13.0	69.1
200	-200	11.1	89.7
150	-200	9.6	116.2
100	-200	9.3	120.4
50	-200	9.1	112.5
0	-200	7.7	104.5
-50	-200	6.0	98.0
-100	-200	4.4	87.7
-100	500	6.5	8.8
-100	450	7.7	10.7
-100	400	8.5	10.0
-100	350	10.7	11.3
-100	300	12.1	11.4
-100	250	12.0	15.0
-100	200	11.9	17.7
-100	150	12.0	20.4
-100	100	11.5	26.6
-100	50	10.6	32.0
-100	0	10.6	37.7
-100	-50	7.5	53.7

X (m)	Y (m)	Potential (mV/A)	
		HS-14	HS-7
-100	-100	6.1	63.0
-100	-150	5.5	67.3
0	-250	4.7	143.9
-50	-250	3.6	125.6
0	-300	4.0	213.4
-50	-300	3.0	134.3
0	-350	2.7	232.3
-50	-350	1.7	151.4
0	-400	1.6	220.8
50	-250	5.6	136.5
100	-250	5.6	200.1
200	-250	8.7	114.9
150	-250	6.5	152.7
250	-250	8.6	83.0
200	-300	5.8	106.3
150	-300	5.6	203.3
200	-350	3.7	118.1
150	-350	3.8	213.2
200	-400	2.8	157.8
300	-250	7.5	62.4
360	-250	6.5	55.0
300	-300	6.0	68.3
250	-300	6.4	109.0
350	-300	5.7	61.6
300	-350	4.8	79.6
250	-350	4.5	88.8
350	-350	3.8	68.0
300	-400	3.2	76.8
250	-400	3.2	98.0
350	-400	3.0	65.0
400	-250	6.1	44.4
450	-250	7.8	38.1
400	-300	5.1	46.2
450	-300	5.7	41.9
500	-300	6.9	36.1
400	-350	4.4	50.3
500	-250	9.3	35.4
600	-300	5.3	24.2
600	-400	3.6	29.4
500	-400	1.7	29.8
400	-400	4.7	58.0
600	-500	.6	31.6
500	-500	.7	37.0
500	-600	.6	33.8
400	-500	.8	55.7
400	-600	.6	45.5
400	-700	.5	33.5
300	-500	2.7	75.5
300	-450	3.5	75.5
300	-600	.8	60.7
300	-700	.9	41.0
300	-800	.6	30.4
250	-500	2.8	87.2
250	-450	3.9	85.8
200	-500	3.2	109.5
200	-450	4.1	107.0
200	-550	1.3	88.5
200	-600	1.2	63.8
200	-700	.7	49.4
200	-800	.6	37.9
150	-500	2.5	106.9
150	-450	4.4	181.6
150	-400	4.5	174.5
100	-500	3.3	185.3
100	-600	2.6	90.8
100	-700	2.5	49.8
100	-450	3.9	237.3
100	-400	4.4	281.3
100	-350	4.7	295.8
100	-300	4.9	234.4
50	-450	4.1	245.8
50	-400	4.4	281.3
50	-350	4.5	281.8
50	-300	4.8	218.1
0	-500	3.1	177.3

X (m)	Y (m)	Potential (mV/A)	
		HS-14	HS-7
0	-600	.6	80.8
700	-400	2.6	11.2
900	100	12.8	10.6
1000	100	9.6	8.0
900	0	10.7	10.5
1000	0	9.0	10.6
800	0	12.0	13.3
900	-100	10.0	14.1
800	-100	11.2	12.4
1000	-100	8.0	8.9
900	-200	8.6	13.3
800	-200	9.5	15.4
800	-300	6.9	14.0
700	-300	7.7	19.4
400	650	15.7	7.6
-50	400	10.1	13.9
450	-100	13.0	29.4
400	-150	9.9	38.8
450	-150	9.6	36.4

Appendix 6

Electric field in area A

X		Y		HS-14		HS-7		X		Y		HS-14		HS-7		X		Y		HS-14		HS-7			
(m)	(m)	E	φ	E	φ	(m)	(m)	E	φ	E	φ	(m)	(m)	E	φ	(m)	(m)	E	φ	E	φ	(m)	(m)	E	φ
325	575	37	92	2	179	275	375	36	288	2	222	850	675	3	198	0	189								
325	525	15	89	5	39	225	325	8	218	3	118	850	750	7	168	3	166								
275	575	44	62	7	132	225	275	30	222	3	176	850	575	4	195	4	149								
275	525	25	44	1	202	175	375	2	182	8	137	825	525	12	171	6	169								
225	575	38	57	5	94	175	425	27	77	3	222	825	475	5	188	4	230								
225	525	28	55	4	143	475	275	17	204	12	158	725	275	8	197	4	208								
175	575	28	28	4	84	525	275	22	231	7	161	675	275	5	239	2	232								
175	525	34	45	2	65	525	325	25	215	2	263	775	375	12	286	6	309								
125	575	29	18	8	143	575	275	12	262	4	278	725	375	22	286	10	283								
125	525	42	15	3	225	475	325	48	265	9	174	675	375	28	175	12	167								
75	575	25	16	3	159	475	425	61	182	9	170	675	325	6	207	2	248								
75	525	31	9	5	182	475	375	49	218	5	187	725	325	23	120	12	120								
25	575	16	9	7	139	525	425	40	204	3	228	775	325	3	103	2	62								
25	525	15	34	23	144	525	375	31	193	5	151	825	275	4	151	1	175								
-25	575	16	26	23	132	575	425	30	244	4	234	950	350	4	179	2	166								
-25	525	20	9	13	309	575	375	17	181	1	173	875	425	4	200	1	11								
-75	575	14	359	3	131	625	425	33	302	5	317	950	425	6	117	5	102								
-75	525	13	18	20	160	625	375	25	350	6	13	875	550	6	275	1	280								
-125	575	15	325	24	128	625	325	22	360	3	45	875	475	12	147	3	174								
-125	525	14	11	7	183	575	325	14	195	2	126	950	550	3	172	1	161								
-175	575	11	305	34	141	625	275	17	2	3	322	950	475	5	238	3	253								
-175	525	9	1	26	182	625	225	8	286	8	137	950	650	5	134	3	126								
-175	675	11	324	16	106	650	175	1	213	6	228	950	750	2	183	1	164								
-125	675	9	32	15	144	650	125	5	240	2	161	950	850	3	166	0	223								
-125	750	11	333	7	184	525	125	3	285	3	133	1050	650	4	146	2	127								
325	625	22	71	5	83	525	175	5	262	2	245	1050	750	1	136	1	339								
325	675	34	101	2	106	525	225	5	336	0	43	1050	850	1	236	0	100								
325	725	32	85	5	95	475	625	35	171	8	172	1050	550	3	162	2	138								
325	775	12	162	5	236	475	675	33	141	4	141	1050	450	6	175	3	166								
375	575	36	128	4	208	475	725	40	138	6	227	1050	350	5	200	3	196								
375	525	30	146	13	143	475	575	68	144	9	153	1150	650	2	177	0	279								
425	625	37	156	7	231	475	525	36	220	3	216	1150	750	3	169	1	162								
425	675	46	122	12	159	475	475	47	174	5	158	1150	850	4	158	2	155								
425	725	40	99	14	131	525	625	5	236	6	318	1150	550	2	159	2	149								
425	575	25	126	1	145	525	675	34	133	4	128	1150	450	2	292	1	264								
425	525	53	165	4	164	525	725	18	137	3	128	1250	650	2	153	2	149								
375	625	37	112	9	140	525	775	8	172	6	267	1250	550	2	158	1	216								
375	675	25	77	5	22	525	575	30	139	5	81	1250	750	2	128	2	132								
375	725	47	101	7	75	525	525	36	172	4	124	1250	850	1	281	0	280								
375	775	8	252	7	254	525	475	30	209	1	188	1350	650	1	155	1	156								
425	775	11	312	13	296	575	625	27	143	5	143	1350	750	1	176	1	173								
425	425	63	169	8	151	575	675	19	131	4	137	1350	850	1	168	1	190								
425	475	66	165	5	152	575	725	9	129	2	158	1450	750	1	161	1	160								
375	425	19	181	6	130	575	775	4	221	7	255	850	850	7	145	3	150								
375	475	45	142	6	239	575	575	27	181	3	167	850	950	4	128	1	131								
325	475	26	86	1	226	575	525	18	207	2	162	850	1050	3	137	1	129								
275	425	5	23	6	177	575	475	13	202	2	155	850	1150	1	169	1	119								
275	475	35	73	4	157	625	625	22	160	3	145	950	950	3	116	1	131								
225	375	11	313	3	140	625	675	17	154	4	155	950	1050	1	117	1	130								
225	425	34	349	3	72	625	725	9	149	1	147	950	1150	1	211	0	142								
225	475	35	45	6	301	625	775	11	156	9	256	1050	950	3	145	1	130								
175	475	41	13	7	157	625	575	11	213	2	74	1050	1050	2	140	1	144								
125	425	69	1	20	152	625	525	14	168	3	135	1050	1150	1	228	1	201								
125	375	81	352	20	162	625	475	9	188	1	20	1150	950	1	143	1	139								
125	475	45	7	10	132	675	625	16	172	5	145	1150	1050	1	132	1	128								
75	425	40	358	16	135	675	675	8	180	1	286	1250	950	1	156	0	105								
75	375	45	342	35	141	675	725	13	149	2	122	950	1250	1	105	0	59								
75	475	37	358	15	128	675	825	10	168	2	182	850	1250	0	100	0	330								
25	425	22	1	13	140	675	575	22	165	10	153	850	1350	1	161	0	151								
25	475	27	332	15	153	675	525	11	190	2	193	750	1250	6	141	4	159								
-25	425	18	13	5	174	675	475	8	156	7	146	750	1350	1	140	3	141								
-25	475	25	326	31	115	725	625	6	302	4	338	750	1450	3	103	1	140								
-75	425	15	329	20	151	725	675	5	149	1	155	750	1150	7	162	5	155								
325	425	7	324	6	341	725	725	6	123	3	102	750	1050	14	148	8	153								
425	325	72	230	11	153	750	775	4	110	1	72	650	1250	4	144	2	136								
425	375	79	227	6	201	725	575	9	182	4	182	650	1350	5	144	2	132								
425	275	51	268	4	259	725	525	8	90	6	94	650	1450	3	133	2	137								
375	325	55	228	6	344	725	475	7	111	1	163	650	1150	3	148	1	356								
375	275	63	225	2	100	775	625	3	106	4	120	650	1050	4	74	3	28								
375	375	59	247	6	267	775	675	3	154	1	177	550	1250	3	107	3	126								
325	325	44	234	5	177	775	750																		

X (m)	Y (m)	HS-14		HS-7		X (m)	Y (m)	HS-14		HS-7		X (m)	Y (m)	HS-14		HS-7	
		E	φ	E	φ			E	φ	E	φ			E	φ	E	φ
450	1350	5	112	2	100	225	625	31	63	2	91	375	25	21	240	10	199
450	1150	3	77	1	200	225	675	17	43	3	60	375	75	15	206	13	266
350	1250	4	93	2	106	225	725	44	83	12	101	375	175	23	215	5	120
250	1150	3	130	3	141	225	775	46	314	22	289	375	225	18	166	3	29
750	950	7	257	5	255	275	625	37	52	1	43	375	125	21	249	20	141
750	850	2	40	1	314	275	675	36	31	7	118	425	25	17	245	12	287
650	950	5	186	3	163	275	725	23	46	3	66	425	75	20	219	2	49
650	850	11	152	8	155	275	775	4	285	12	266	425	125	18	206	6	184
575	850	11	154	3	94	-125	375	15	31	39	124	425	175	27	214	6	185
550	950	6	203	4	153	-75	375	18	70	33	100	425	225	44	135	5	118
550	875	9	128	5	218	-25	375	25	25	49	114	525	-25	8	228	7	157
525	825	7	122	2	69	25	375	19	118	35	121	475	25	12	212	10	257
475	950	6	338	7	16	-125	325	17	48	47	136	475	75	12	260	12	132
475	825	21	145	9	145	-75	325	12	68	26	126	475	125	19	188	8	183
475	775	15	185	11	195	0	325	12	53	22	148	475	175	19	197	12	200
425	925	19	164	8	174	-125	275	10	26	30	206	475	225	19	176	14	168
425	875	6	2	3	131	-75	275	4	29	8	230	550	75	10	152	10	104
450	975	5	78	2	164	-25	275	7	7	16	168	550	25	15	253	8	208
450	1050	6	81	4	118	-100	225	8	319	26	128	650	-50	5	227	2	157
375	925	9	23	7	286	-125	175	12	354	99	136	650	50	4	185	3	226
375	975	9	47	8	133	-75	200	5	338	49	153	675	125	19	185	3	156
375	1050	10	37	3	90	-125	125	12	326	126	169	675	175	19	213	4	238
475	875	27	115	9	117	-75	125	10	300	32	244	675	225	31	147	7	95
425	825	17	89	7	116	-25	125	13	323	28	180	675	225	23	259	4	230
375	875	18	116	7	111	25	150	26	336	25	181	750	225	24	258	5	300
375	825	11	98	3	25	-125	75	14	312	71	249	750	50	4	218	2	255
325	925	7	132	9	166	-75	75	12	297	52	141	750	150	6	215	2	170
325	975	8	111	1	94	-25	75	18	323	33	168	850	150	3	262	5	233
325	1025	4	122	6	139	0	200	18	356	27	173	850	250	12	263	7	165
350	1075	4	81	3	130	150	300	27	359	28	151	950	250	9	257	2	262
350	1150	2	73	2	150	-125	25	4	3	64	143	550	-150	7	262	2	302
325	875	16	106	4	164	-75	25	9	323	43	162	450	-150	10	265	4	177
325	825	7	95	2	255	-25	25	8	333	45	163	450	-250	2	275	3	263
275	925	12	125	2	106	-125	-25	9	308	37	220	350	-175	12	248	5	168
275	975	6	115	2	115	-75	-25	10	327	41	182	350	-250	5	257	7	261
275	1050	8	126	2	102	-25	-25	4	254	53	182	225	-125	10	272	2	90
275	875	8	88	1	114	25	-25	14	295	22	210	275	-125	11	265	23	149
275	825	16	115	10	144	25	25	15	316	31	176	350	-125	12	250	8	146
225	925	8	75	1	81	25	75	18	335	29	175	225	-175	7	258	17	189
225	975	5	98	1	137	75	-25	18	286	5	176	275	-175	9	249	19	273
225	1050	5	105	3	129	75	25	16	279	1	182	250	-225	8	253	13	231
225	875	10	91	2	343	75	125	12	302	5	170	250	-275	7	269	9	221
225	825	12	78	9	101	100	175	15	317	5	199	175	-125	9	261	13	156
175	950	8	49	2	149	75	225	16	109	7	270	175	-175	7	262	13	188
175	875	11	46	2	169	150	225	15	335	20	158	175	-225	7	241	21	185
175	825	14	38	10	107	75	300	21	38	16	153	175	-275	8	254	19	211
125	875	9	60	6	173	25	300	23	353	25	157	125	-125	8	274	16	178
125	825	18	344	4	97	75	75	18	303	2	241	125	-175	7	273	13	243
75	850	2	32	3	69	125	-25	15	272	17	191	125	-225	6	276	7	183
-225	650	9	21	22	82	125	25	23	276	20	182	125	-275	6	262	16	264
-175	750	6	249	5	301	125	75	13	289	19	171	150	-325	9	260	19	242
-175	625	14	65	36	132	125	150	16	344	8	201	75	-125	6	276	20	174
-125	625	11	68	8	76	175	-25	18	284	22	177	75	-175	7	275	24	205
-75	625	9	47	27	128	175	25	24	272	9	198	75	-225	7	282	16	213
-75	675	12	10	3	95	175	75	24	255	13	215	75	-275	4	261	44	163
-75	750	6	294	7	356	175	150	12	139	19	172	75	-325	7	241	49	193
-25	625	18	5	5	117	225	-25	14	262	16	229	25	-125	12	295	13	246
-25	675	12	88	7	329	225	25	18	265	17	181	25	-175	10	306	19	171
-25	750	9	353	12	202	225	75	21	266	20	180	25	-225	7	310	20	207
25	625	23	59	4	246	225	125	37	276	19	177	25	-275	2	319	9	291
25	675	24	7	13	99	225	175	9	118	12	162	25	-325	5	275	11	163
25	725	17	43	8	42	225	225	37	292	22	115	-25	-125	3	315	47	225
25	775	15	295	14	283	275	-25	17	235	12	211	-25	-175	9	284	22	230
75	625	23	19	7	205	275	25	18	255	11	160	-25	-225	3	269	22	184
75	675	22	40	12	153	275	75	26	261	9	192	-25	-275	7	309	21	224
75	725	25	45	12	142	275	125	32	246	12	211	-25	-325	1	248	12	270
75	775	15	313	4	273	275	175	33	198	11	171	-75	-125	6	334	46	228
125	625	27	29	5	164	275	225	17	176	19	133	-75	-175	4	284	34	233
125	675	16	53	5	99	325	-25	19	266	7	304	-75	-225	4	296	16	207
125	725	26	73	3	306	325	25	20	247	5	149	-75	-275	5	287	22	204
125	775	3	276	9	210	325	75	19	246	2	351	-125	-125	6	310	35	210
175	625	27	76	3	246	325	125	21	212	16	338	-125	-175	6	314	43	205
175	675	16	69	7	162	325	175	26	248	5	140	-125	-225	3	314	35	209
175	725	33	75	10	136	325	225	20	181	7	137	-175	-125	5	311	66	203
175	775	20	263	17	223	375	-25	15	238	3	56	-175	-175	3	145	59	207

|E| : Intensity (unit; mV/A·100m) of Electric Field
φ : Azimuth (unit; Degree) of Electric Field

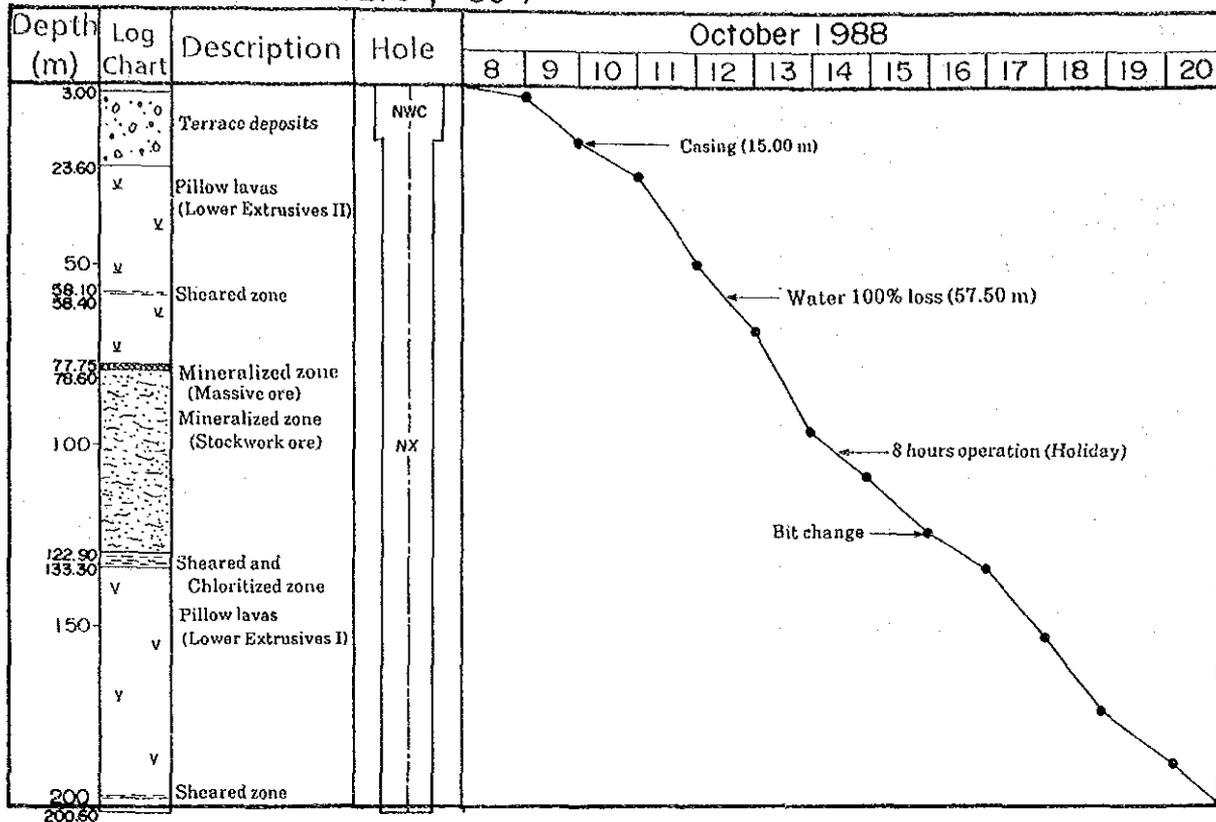
X (m)	Y (m)	HS-14		HS-7		X (m)	Y (m)	HS-14		HS-7		X (m)	Y (m)	HS-14		HS-7	
		E	φ	E	φ			E	φ	E	φ			E	φ	E	φ
-150	-250	4	274	39	235	-375	325	6	4	41	76						
-50	-350	1	306	19	241	-375	275	4	2	79	114						
25	-375	1	248	36	212	-375	375	9	287	15	313						
50	-450	1	270	20	220	-225	425	22	344	23	71						
75	-375	2	239	43	244	-225	475	8	321	14	137						
150	-375	1	95	12	234	-275	425	4	330	16	113						
150	-450	1	303	4	282	-275	475	8	330	24	124						
150	-550	0	321	5	212	-275	550	8	19	20	97						
250	-350	3	277	11	262	-325	450	4	307	22	129						
250	-450	□	257	8	149	-225	550	8	154	15	108						
350	-350	2	274	6	268	-275	650	9	316	11	12						
-250	-250	2	311	37	246	-350	650	3	33	32	106						
-250	-150	4	338	44	246	-350	550	9	342	10	79						
-350	-150	5	130	89	265	-375	450	7	123	83	137						
-225	-75	5	340	109	259	-450	550	2	3	18	143						
-225	-125	4	319	34	220	-450	450	8	1	38	83						
-275	-75	3	320	105	247	-550	450	0	4	31	49						
-350	-50	2	341	212	255	-475	350	5	50	40	90						
-450	-50	5	276	160	284	-425	350	5	232	43	161						
825	425	7	171	8	146	-550	350	4	5	43	46						
725	425	3	155	5	118	-650	350	1	95	42	21						
775	425	10	174	4	125	-475	275	4	6	47	97						
850	375	7	169	4	157	-425	275	5	161	42	103						
850	325	5	195	3	199	-475	225	4	25	90	96						
-175	475	8	89	6	42	-425	225	7	174	220	23						
-175	425	13	131	47	124	-525	250	8	8	108	39						
-175	375	14	313	23	125	-575	250	1	73	99	4						
-175	325	16	40	22	95	-650	250	1	343	33	31						
-175	275	14	10	62	145	-750	250	0	34	28	33						
-175	225	16	337	122	145	-475	175	8	339	299	358						
-175	175	20	345	151	143	-425	175	1	65	300	95						
-175	125	13	356	113	173	-375	175	10	121	168	23						
-175	75	4	349	154	190	-475	125	4	52	376	57						
-175	25	10	331	90	198	-550	150	3	66	197	16						
-175	-25	9	322	90	194	-650	150	4	86	82	0						
-175	-75	6	305	78	207	-425	125	3	316	284	52						
550	-50	6	206	4	215	-375	125	1	332	431	82						
475	-75	7	235	7	213	-325	125	6	81	411	127						
425	-75	6	246	13	279	-275	125	1	135	286	154						
375	-75	10	220	8	240	-425	75	2	37	146	13						
325	-75	6	209	3	261	-375	75	0	56	2	0						
275	-75	13	271	12	182	-325	75	1	327	261	192						
225	-75	15	272	9	191	-275	75	0	286	413	189						
175	-75	11	269	17	237	-450	50	3	187	89	349						
125	-75	12	277	23	205	-550	50	6	320	194	354						
75	-75	11	288	19	167	125	950	8	59	8	140						
25	-75	4	269	20	167	150	1100	6	34	2	76						
-25	-75	19	304	55	174	50	950	6	39	0	304						
-75	-75	13	291	32	186	25	850	5	36	9	142						
-125	-75	9	283	23	230	-50	950	4	70	13	125						
-225	25	11	342	136	169	-50	850	3	56	4	299						
-225	-25	9	335	113	214	-150	850	4	28	7	145						
-275	25	6	294	365	183	-250	750	3	144	16	139						
-275	-25	4	301	398	266	675	425	5	204	1	268						
-325	25	10	297	212	249	425	-25	11	258	15	117						
-325	-25	6	322	418	262	-75	475	3	293	19	116						
-375	25	13	287	246	281	-125	425	3	19	24	159						
-225	75	12	0	231	249	-125	475	12	359	41	125						
-225	125	13	346	315	149												
-225	225	8	3	138	128												
-225	175	13	324	179	134												
-225	275	15	15	85	124												
-275	225	10	350	31	342												
-275	175	3	347	539	123												
-325	225	8	341	107	112												
-325	175	6	1	453	95												
-375	225	4	336	376	128												
-225	325	17	11	28	118												
-225	375	9	8	37	105												
-275	325	5	12	30	131												
-275	275	8	8	164	123												
-275	375	4	38	57	113												
-325	325	5	41	55	134												
-325	275	6	349	75	24												
-325	375	7	343	64	110												

|E| : Intensity(unit; mV/A·100m) of Electric Field
φ : Azimuth(unit; Degree) of Electric Field

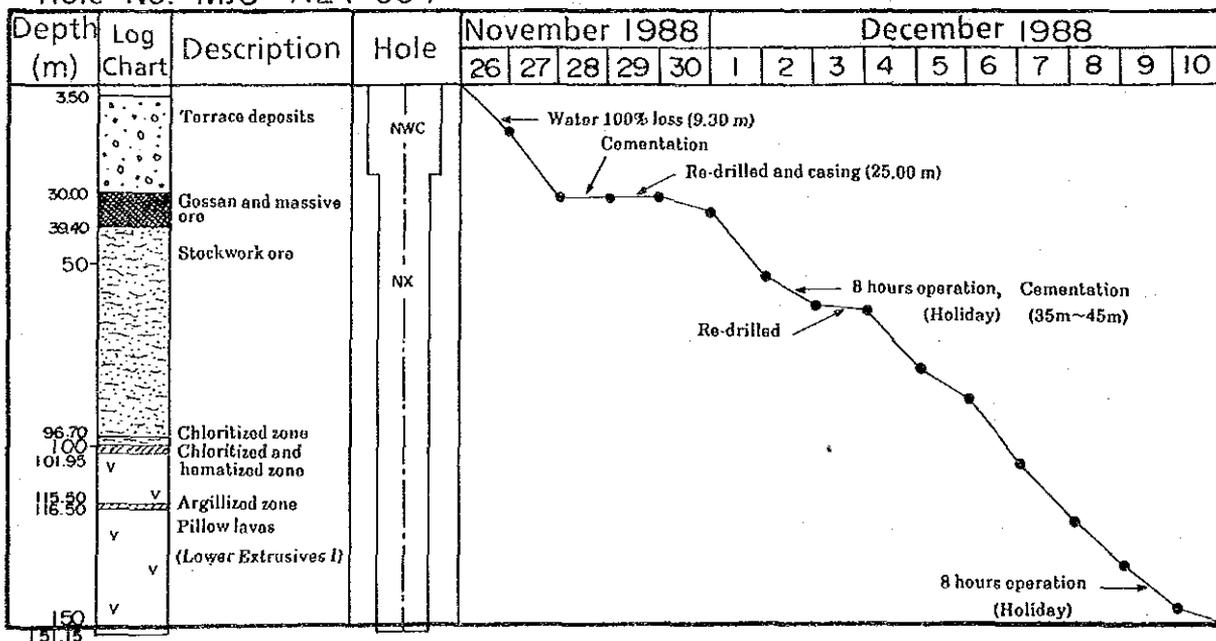
Appendix 7

Progress of the each drill hole in area A

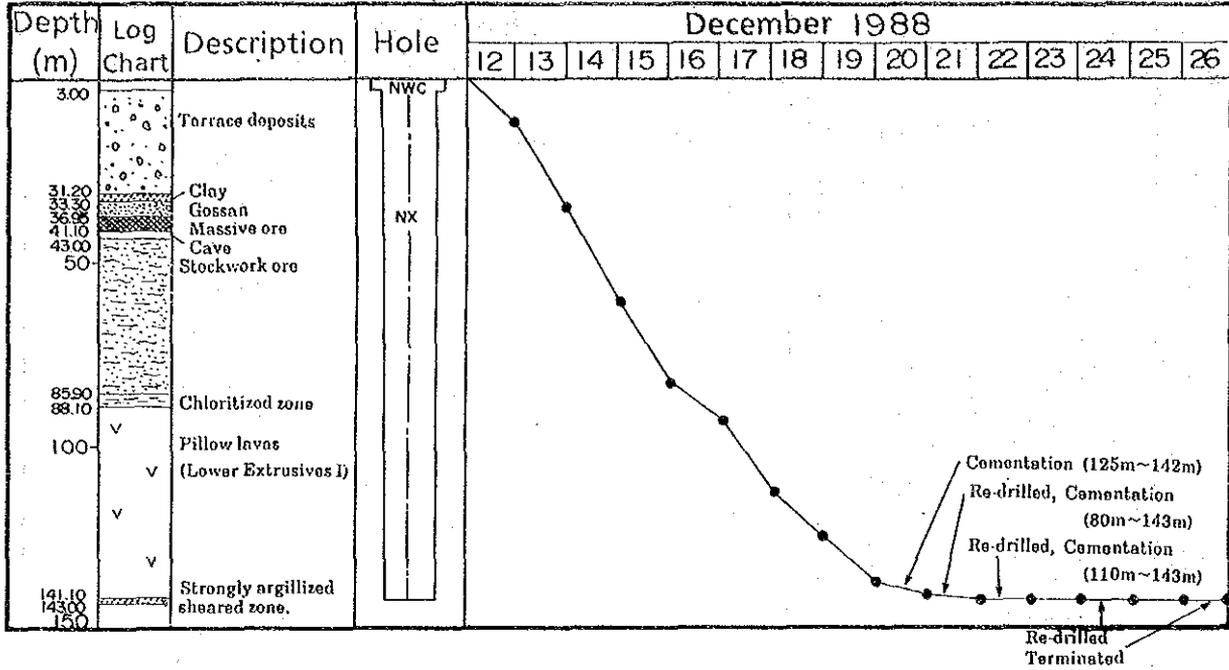
Hole No. MJO-A1 (270°, -50°)



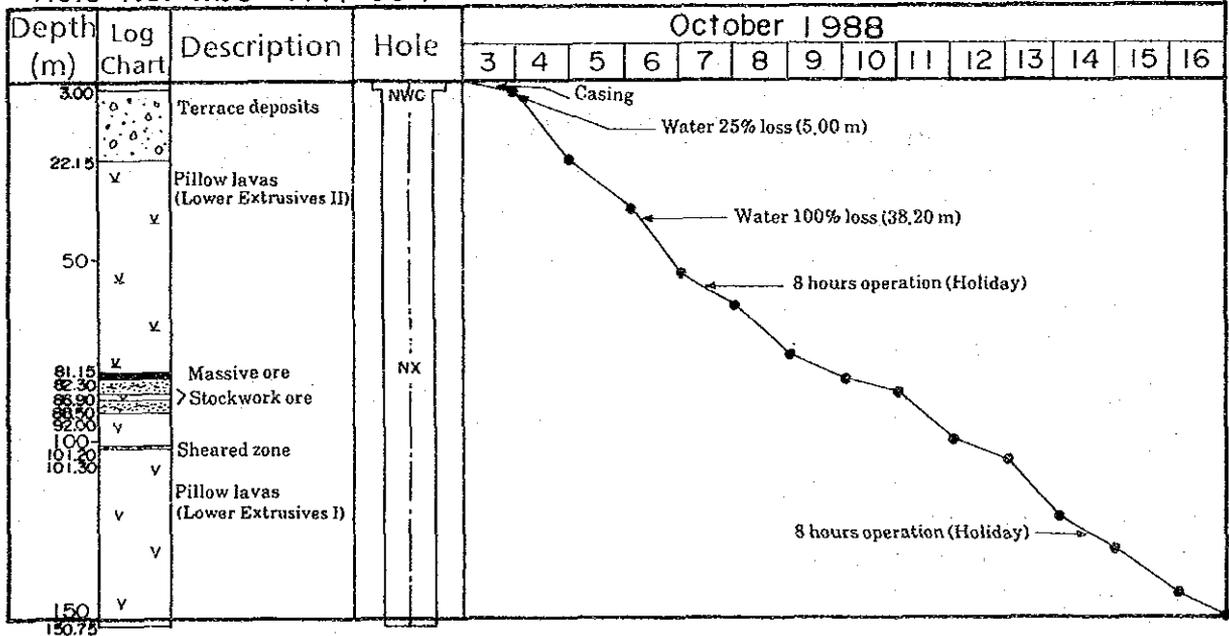
Hole No. MJO-A2 (-90°)



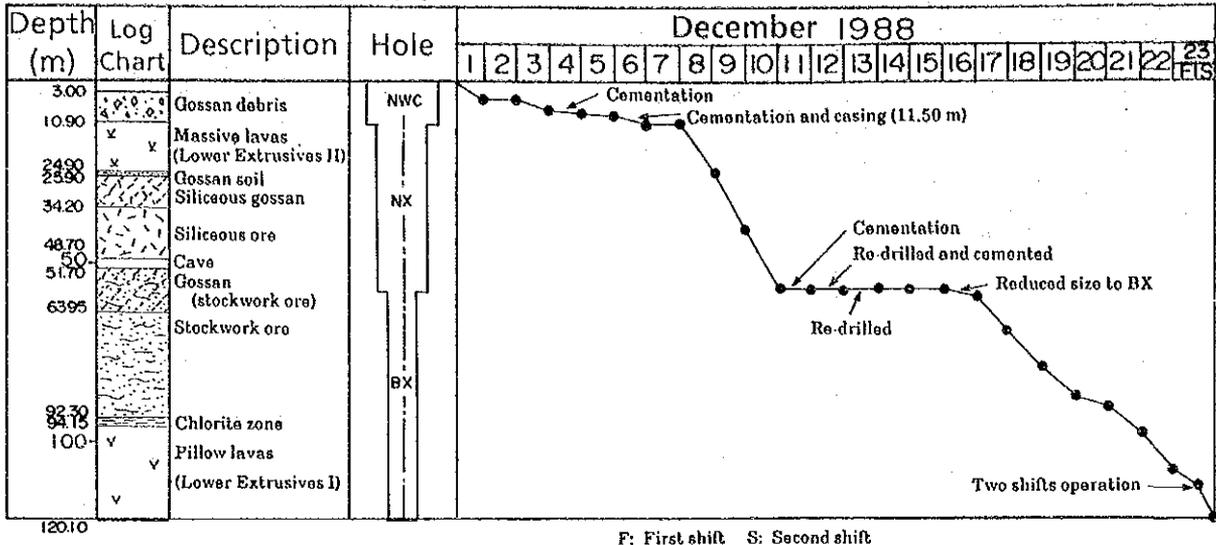
Hole No. MJO - A3 (270°, -50°)



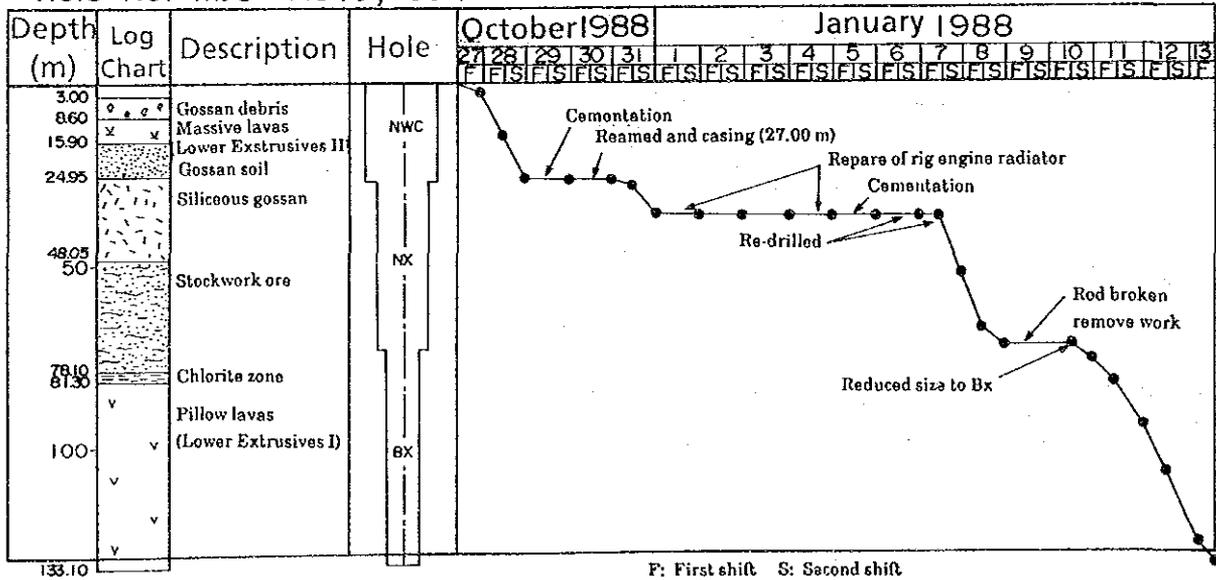
Hole No. MJO - A4 (-90°)



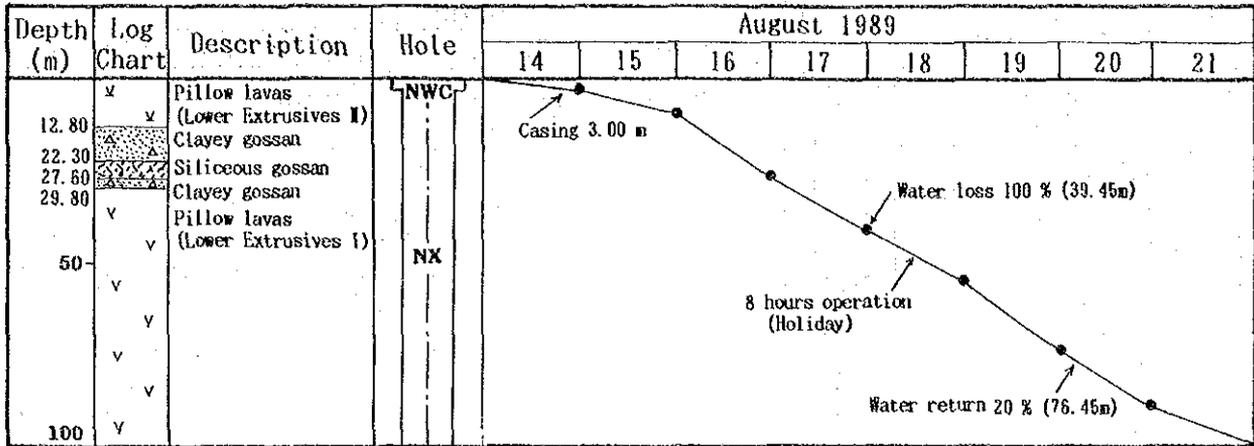
Hole No. MJO - A5 (-90°)



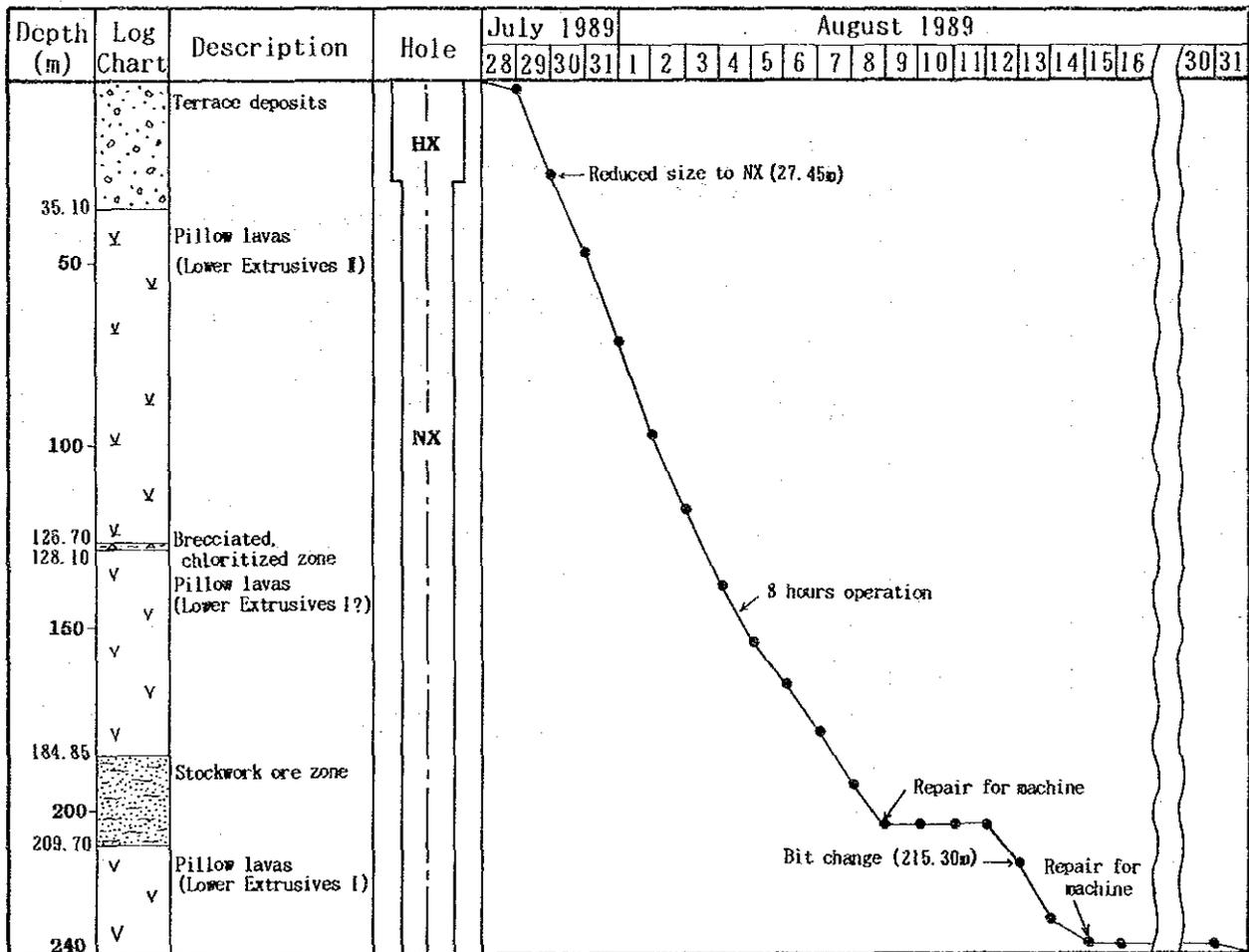
Hole No. MJO - A6 (0°, -50°)



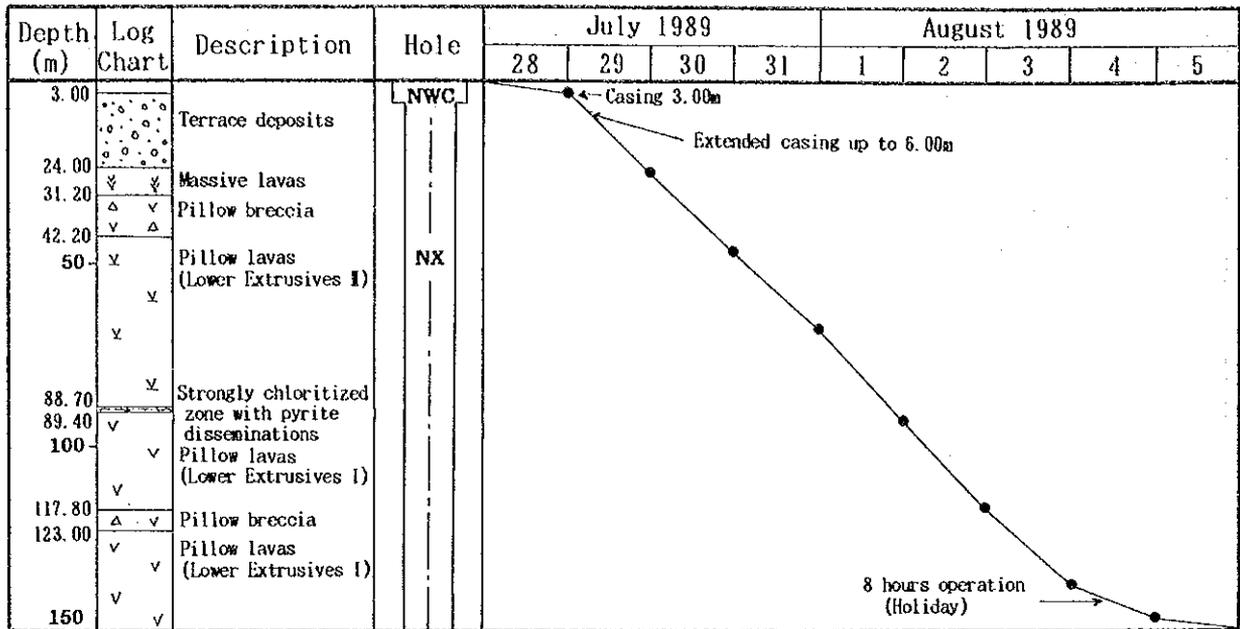
Hole No. MJO-A7 (-90°)



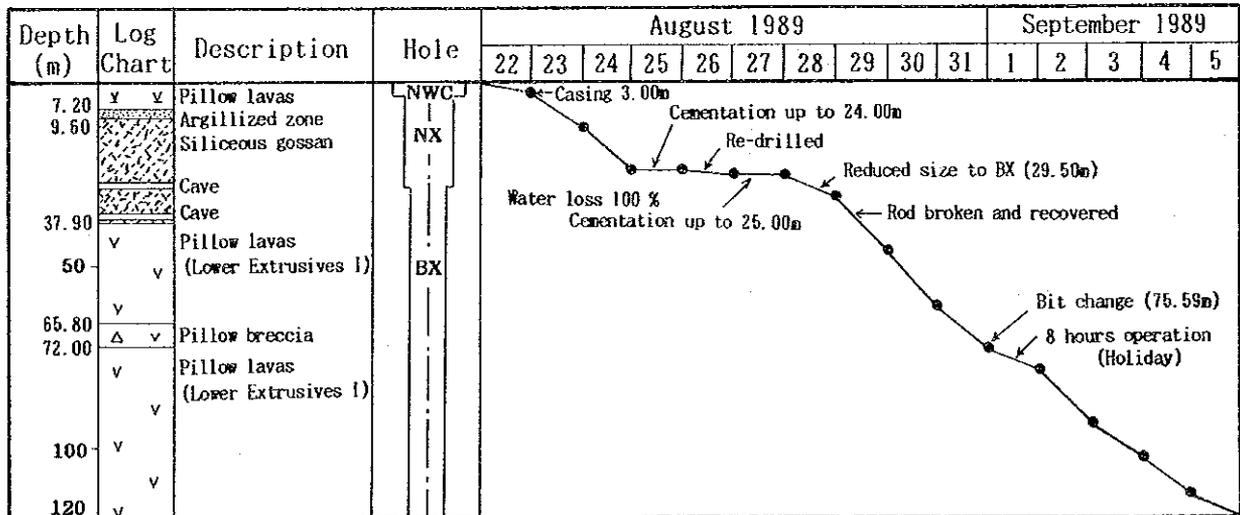
Hole No. MJO-A8 (-90°)



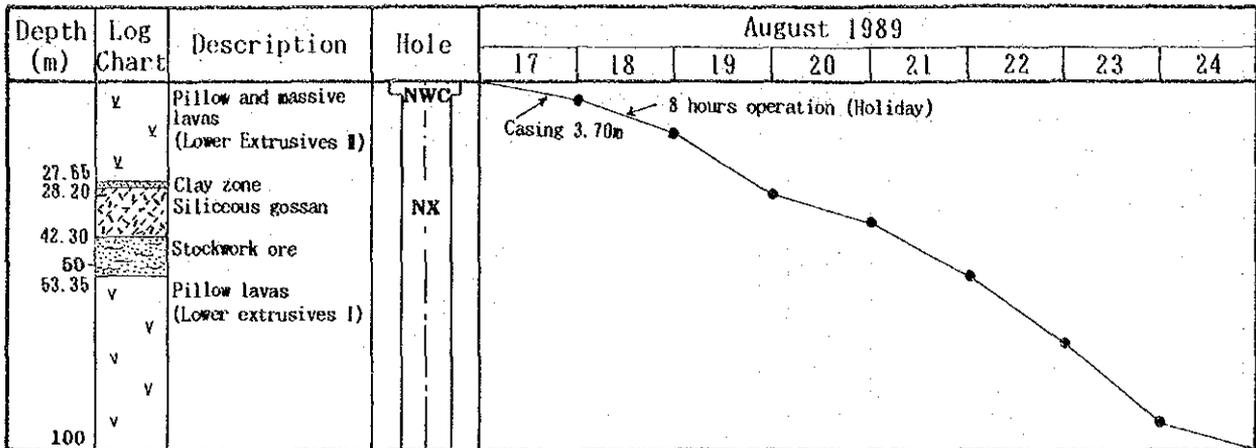
Hole No. MJO-A9 (-90°)



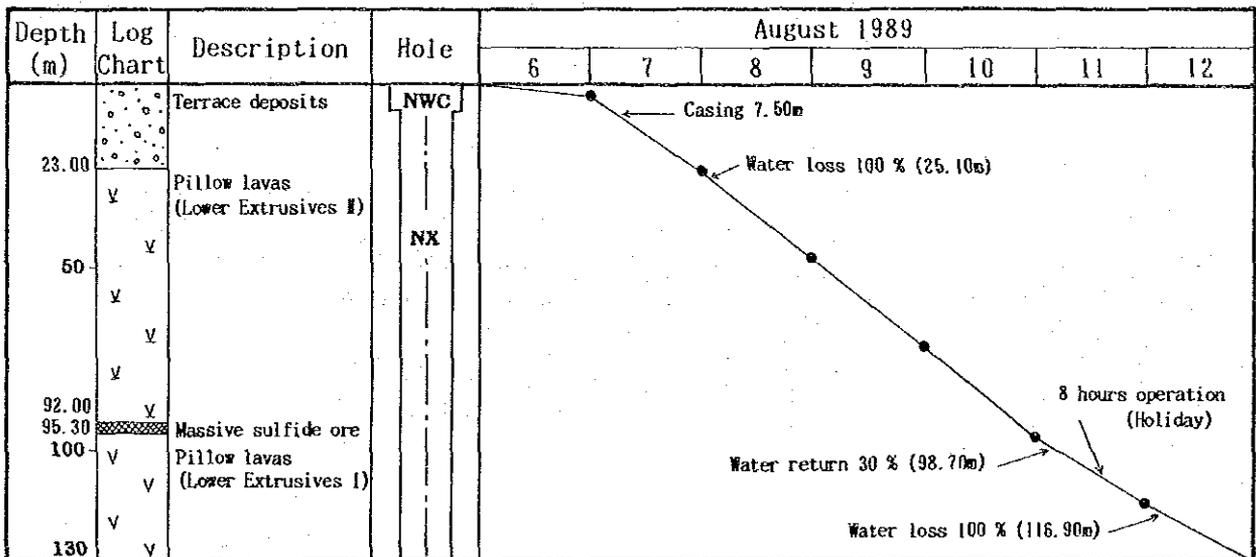
Hole No. MJO-A10 (0°, -50°)



Hole No. MJO-A11 (-90°)



Hole No. MJO-A12 (-90°)



Appendix 8

Geologic core log for the drill holes in area A

Hole No. MJO - A 1 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
3.00		Terrace deposits. Gravel and sand Rounded to subrounded Pebble to granule in size.								
10		Locally cemented with calcite.								
20		Completely cemented with calcite.								
23.60		Light brownish green brecciated Pillow lava. Fractures filled with hematite and calcite. Weakly weathered.								
27.40		Light green pillow breccia. Hematite dominant in matrix.								
28.60		Light brownish green pillow lava weakly brecciated. Vesicles filled with calcite.								
30										
34.70~35.00		34.70~35.00 Sheared zone with calcite, hematite and clay								
38.40~39.40		38.40~39.40 Dominant hematite zone								
39.40		Green chloritized massive lava with calcite stringers.								
40										
43.15		Dark green and light green pillow lava. Chloritized.								
45.70		47.60~48.70 Brecciated								
50										

Hole No. MJO - A 1 (From 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
	Qtz-cal									
58.10		Sheared zone with quartz and hematite veinlets. Chloritized.								
58.40										
60		Dark green chloritized pillow lava. 58.70 Sheared 3 cm 58.90 Sheared 2 cm 62.10~70.00 Green in color								
70		Dark green~dark brownish green brecciated strongly chloritized pillow lava. Hematite in matrix and along fractures.								
76.70		Light yellowish green brecciated strongly argillized pillow lava.								
77.60		Hematite-clay zone.		77.75						
77.75		Massive sulfide zone.	Pyrite >> chalcopyrite massive ore with angular hematite and silicified rocks fragment.	78.60	0.85	2.0	2.6	1.08	<0.01	0.06
78.60		Stockwork zone with sulfides. Fragment : strongly silicified.	Stockwork ore. Sulfide 30~80 Vol. % in strongly silicified rocks.	80.60	2.00	2.2	5.1	0.68	<0.01	0.07
80				82.60	2.00	1.9	8.0	0.64	<0.01	0.29
85.30		Light green strongly silicified and brecciated zone with stockwork mineralization. Argillized in part.	Pyrite > chalcopyrite with quartz veinlets and disseminations. Stockwork zone. Minor hematite fragment in places.	84.60	2.00	1.1	8.5	0.76	<0.01	0.50
90		90.50~90.70 Clay zone		86.60	2.00	1.0	3.1	0.33	<0.01	0.27
				88.60	2.00	0.1	0.7	0.40	<0.01	0.06
				90.80	2.00	Tr	1.1	0.53	<0.01	0.40
				92.60	2.00	0.1	1.2	0.90	<0.01	0.27
				94.60	2.00	Tr	Tr	0.89	<0.01	0.15
				96.60	2.00	Tr	Tr	0.69	<0.01	0.13
				98.60	2.00	Tr	Tr	0.36	<0.01	0.18
100				98.60	2.00	Tr	Tr	0.38	<0.01	0.10

Hole No. MJO - A1 (From 100.00 m to 150.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Au (g/t)	Cu (%)	Pb (%)	Zn (%)
	△			100.60						
	△			102.60	2.00	Tr	Tr	0.51	<0.01	0.11
	△			104.60	2.00	Tr	Tr	0.66	<0.01	0.14
	△			106.60	2.00	Tr	0.3	0.36	<0.01	0.18
	△			108.60	2.00	Tr	Tr	0.41	<0.01	0.16
110	△			110.60	2.00	0.8	1.6	0.52	<0.01	0.30
	△			112.60	2.00	0.2	4.1	0.29	<0.01	0.68
	△			114.60	2.00	0.9	2.3	0.51	<0.01	0.66
	△			116.60	2.00	0.6	3.1	1.38	<0.01	0.69
	△			118.60	2.00	0.3	3.3	0.37	<0.01	1.20
	△			120.60	2.00	0.3	1.6	0.41	<0.01	0.14
	△			122.60	2.00	0.1	1.8	0.64	<0.01	0.21
	△			124.60	2.00	0.5	1.7	0.75	<0.01	0.56
125.00	△	125.00~125.15		126.60	2.00	0.6	3.5	0.69	<0.01	0.73
125.15	△	Dark brown brecciated clay zone		128.60	2.00	1.1	3.0	0.63	<0.01	1.36
126.60	△	126.60~127.20	126.00~127.20	130.15	1.55	0.8	4.3	1.00	<0.01	1.08
127.20	△	Brecciated strongly chloritized zone	Pyrite disseminations	132.30	0.90	1.9	3.2	0.49	<0.01	0.95
129.90	△	Sheared zone with hematite, chlorite and gray clay.	Pyrite disseminations.	133.20						
130	△	Strongly chloritized phyllitic zone.	132.30~133.20							
130.15	△		Siliceous stockwork ore							
133.30	v	Dark green chloritized, weakly brecciated pillow lava.	Quartz-hematite stringers							
136.70	v	Light green aphanitic pillow lava. Weakly chloritized.	No sulfide minerals.							
139.70	v	Fractures filled with hematite and calcite.	Calcite-quartz stringers.							
140	v	Same as 133.30~136.70								
	v	Hematite in fractures								
	v									
	v									
	v									
149.20	v	Dark brownish green pillow lava and pillow breccia.	Calcite stringers.							
150	v	Hematite and chlorite.								

Hole No. MJO - A1 (From 150.00 m to 200.60 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
155.70	v	Gray clay zone								
155.75	v	Light green (fragment) and reddish-brown (matrix) brecciated pillow lava. Chloritized, hematized and weakly sheared.								
160	v	Light green weakly chloritized pillow lava. Fractures and matrix filled with hematite.								
161.60	v									
170	v									
180	v									
182.80	v	Green chloritized and weakly brecciated pillow lava. Fractures filled with hematite								
185.40~185.70	v	Weakly sheared								
187.00	v	Dark green strongly chloritized pillow lava. Fractures filled with hematite. Vesicles filled with chlorite and zeolites.								
190	v									
196.70~197.30	v	Sheared and brecciated zone								
198.20~198.50	v	Chloritized and argillized								
200	v	Brecciated zone								
200.60	v	End of hole								

200.60

Hole No. MJO - A2 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
3.50		Gravel and sand (terrace deposits) Gravel : gabbro dominant (boulder to pebble)								
10										
19.20		Gravel and sand.								
20		Gravel : gabbro dominant Cemented with calcite.								
25.30		Gravel and sand. Cemented with calcite in part								
30		Reddish brown gossan soil.	Mostly hematite	30.00						
30.70		Siliceous ore. Intensely silicified and brecciated rock.	Matrix : coarse-grained pyrite with minor chalcopryite and hematite.	32.00	2.00	1.5	8.4	0.55	<0.01	0.04
32.45		Reddish-brown weathered ore zone.	Hematite and gathite with angular siliceous fragments.	34.00	2.00	2.9	7.7	1.13	<0.01	0.03
34.80		Massive ore zone.		35.50	1.50	2.0	8.8	0.17	<0.01	0.02
35.50		Weathered massive ore zone.	Massive sulfide and hematite-gathite with minor siliceous fragments.	37.50	2.00	1.1	4.3	0.42	<0.01	0.02
38.20		More sulfides.		39.40	1.90	2.5	10.5	1.11	0.01	0.07
39.40		Strongly silicified and brecciated zone with sulfide mineralization (stockwork ore).	Pyrite > chalcopryite stringers, spots and disseminations Quartz veinlet network and bracciated quartz fragments.	41.40	2.00	1.2	11.0	0.77	<0.01	0.38
40				43.40	2.00	0.6	4.0	0.33	<0.01	0.28
39.40~81.50		Matrix of breccia filled with hematite in places	Fructures filled with quartz.	45.40	2.00	Tr	Tr	0.24	<0.01	0.29
				47.40	2.00	0.7	3.5	0.25	<0.01	0.21
				49.40	2.00	0.7	2.0	0.63	<0.01	0.21
50										

Hole No. MJO-A2 (From 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		50.40~62.30 Homatite dominant in matrix	51.70 Sphalerite in spots	51.40	2.00	0.5	1.8	1.03	<0.01	0.06
					2.00	Tr	Tr	1.09	<0.01	0.13
				53.40						
					2.00	0.2	1.0	1.36	<0.01	0.18
				55.40						
					2.00	0.4	0.7	0.72	<0.01	0.09
				57.40						
					2.00	0.4	1.8	2.12	<0.01	0.14
				59.40						
					2.00	0.1	1.3	0.97	<0.01	0.09
60				61.40						
					2.00	0.2	1.5	0.77	<0.01	0.26
				63.40						
					2.00	0.2	2.0	0.67	<0.01	0.35
				65.40						
					2.00	0.1	1.5	0.60	<0.01	0.18
				67.40						
					2.00	0.3	1.2	0.77	<0.01	0.28
70				69.40						
					2.00	0.1	1.5	0.46	<0.01	0.15
				71.40						
					2.00	Tr	Tr	0.33	<0.01	0.11
				73.40						
					2.00	0.2	0.9	0.38	<0.01	0.07
				75.40						
					2.00	Tr	Tr	0.35	<0.01	0.05
				77.40						
					2.00	0.2	0.6	0.56	<0.01	0.20
80				79.40						
					2.00	0.3	0.6	0.40	<0.01	0.06
				81.40						
					2.00	Tr	Tr	0.42	<0.01	0.08
				83.40						
					2.00	0.5	2.1	0.76	<0.01	0.19
				85.40						
					2.00	0.6	3.6	4.92	<0.01	0.33
				87.40						
					2.00	0.3	2.6	1.08	<0.01	0.50
90				89.40						
					2.00	0.3	1.8	0.71	<0.01	0.65
				91.40						
					2.00	0.2	1.8	1.15	<0.01	0.43
				93.40						
					2.00	Tr	Tr	0.24	<0.01	0.17
				95.40						
					0.80	Tr	Tr	0.08	<0.01	0.10
96.20				96.20						
96.70		Light green clay zone. Dark green strongly chloritized rock.	Pyrite disseminations Pyrite stringers and disseminations.							
99.10		Mixture of chloritized and hematized zones.								
100										

Hole No. MJO-A2 (From 100.00 m to 151.15 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
101.95		Light green~green strongly chloritized and brecciated pillow lava. Minor hematite in places. Quartz in matrix and stringers.								
107.00 107.50		Reddish brown hematite zone with quartz stringers.								
110		Green chloritized and weakly brecciated pillow lava. with quartz stringers. Hematite in matrix.								
115.50 116.50		Light green argillized zone. Dark green~dark brown hematized and chloritized pillow lava to pillow breccia with quartz stringers.								
120		116.50~117.90 Strongly brecciated zone 120.00~125.30 Pillow breccia strongly hematized								
130										
134.40		Green chloritized doleritic massive lava. Hematite and quartz stringers and veinlets.								
139.90 140		Dark green~dark brown chloritized pillow lava with quartz stringers.								
143.00		Green massive lava with quartz and calcite stringers. Vesicles filled with calcite.								
147.55		Same as 139.90~143.00								
150		151.15 End of hole								
151.15										

Hole No. MJO - A3 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery								
3.00		Terrace deposits. Gravel and sand. Gabbro boulder dominant.								
7.20		Gravel and sand. Locally cemented with calcite. Mostly cobble to granule in size								
10		Gravel and sand. Cemented with calcite. Gabbro boulder in places.								
13.25		Gravel and sand. Cemented with calcite. Gabbro boulder in places.								
20		Gravel and sand. Cemented with calcite. Gabbro boulder in places.								
30		Gravel and sand. Cemented with calcite. Gabbro boulder in places.								
31.20		Clay zone. Light yellowish gray and locally reddish brown.								
33.30		Dark reddish brown gossan soil.								
34.30		Red siliceous gossan with hematite.								
35.00		Reddish brown gossan, possible massive ore	Brecciated with siliceous fragment.							
36.20		Massive ore.	36.20~36.40 Fine-grained massive ore	36.20	1.70	5.2	18.2	1.89	0.01	0.06
37.90		Brecciated zone with siliceous fragments.	36.95~37.60 Pyrite > chalcopyrite brecciated. Fine-grained.	37.90	1.60	1.8	20.3	9.44	0.01	0.03
39.50		Brecciated massive ore. Lower part: siliceous fragments	37.90~41.10 Pyrite > chalcopyrite. Fine grained.	39.50	1.60	1.1	17.1	12.44	<0.01	0.05
41.10		Cave. No recovery		41.10						
43.00		Gray brecciated clay zone.	Pyrite disseminations.	43.00						
43.70		Light argillized, brecciated zone. Silicified in part. Hematite in matrix locally.	Pyrite disseminations. Chalcopyrite, pyrite fragments in matrix.	43.70	2.00	1.0	8.1	2.37	<0.01	0.04
45.00		Light argillized, brecciated zone. Silicified in part. Hematite in matrix locally.	Pyrite disseminations. Chalcopyrite, pyrite fragments in matrix.	45.00	2.00	0.3	8.5	2.24	<0.01	0.04
46.40-47.00		46.40~47.00 Strongly argillized and brecciated		47.00	2.00	0.9	11.1	2.80	0.01	0.04
49.70		46.40~47.00 Strongly argillized and brecciated		49.00	2.00	2.4	12.1	2.43	<0.01	0.04
50		46.40~47.00 Strongly argillized and brecciated		50	2.00	2.4	12.1	2.43	<0.01	0.04

Hole No. MJO-A3 (From 50.00m to 100.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
51.35		Light gray argillized and hematized zone with siliceous and sulfides fragments.	Sulfide fragment: Pyrite Sulfides: 35 vol%	51.00						
		Light green silicified and brecciated zone with mineralization. Locally argillized. Quartz-hematite fragments in places.	Chalcopyrite-pyrite quartz stockwork zone	53.00	2.00	1.1	17.4	3.39	<0.01	0.05
			59.00 Brinite-chalcopyrite spots	55.00	2.00	0.4	10.6	3.04	<0.01	0.06
			52.60-53.80 Chalcopyrite rich Pyrite: 20 vol% Chalcopyrite: 6 vol%	57.00	2.00	0.5	8.9	1.69	<0.01	0.05
60			62.10-64.90 Sulfides (pyrite): 50 vol%	59.00	2.00	0.3	4.9	1.58	<0.01	0.06
			66.10-68.30 Sulfides (pyrite): 70 vol%	61.00	2.00	0.5	6.5	1.26	<0.01	0.14
			71.60-74.40 Sulfides (pyrite): 50-60 vol%	63.00	2.00	0.4	8.5	0.33	<0.01	0.21
			76.10-77.10 Sulfides (pyrite and chalcopyrite): 75 vol%	65.00	2.00	0.2	8.8	3.26	<0.01	0.09
		reddish brown strongly hematized and brecciated zone with sulfides and siliceous fragments. Matrix: Mostly hematite 70.80-80.30 Hematitic clay		67.00	2.00	0.8	8.6	2.97	<0.01	0.08
77.10		Light green brecciated and strongly silicified zone. Lower part: Strongly brecciated and weakly chloritized	80.60-81.40 Sulfides (pyrite): 60 vol%	69.00	2.00	0.6	5.6	1.61	<0.01	0.12
80		81.60-81.80 Strongly chloritized zone	81.60-81.80 Pyrite disseminations	71.00	2.00	0.3	4.8	1.75	<0.01	0.19
80.60		Strongly chloritized zone with hematite bands. Dark green	Weak pyrite disseminations	73.00	2.00	2.1	7.7	1.14	<0.01	0.79
85.90		Light green-green pillow lavas chloritized with quartz-hematite veinlets and calcite stringers weakly brecciated. Variole like texture visible.		75.00	2.10	1.0	20.7	4.37	0.01	0.18
		Dark green and dark brown weakly brecciated pillow lavas chloritized. Variole-like texture visible. Hematite in fracture and calcite stringers.		77.10	1.80	2.4	12.4	0.43	<0.01	0.02
				78.90	1.70	2.8	4.4	0.82	<0.01	0.01
				80.60	2.00	0.7	11.5	1.98	0.01	0.29
				82.60	2.00	1.0	3.4	0.65	<0.01	0.11
				84.60	1.30	0.7	4.8	0.34	<0.01	0.14
				85.90						
100										

Hole No. MJO-A3 (From 100.00 m to 143.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
107.80	v	Light green chloritized pillow lavas. Hematite in matrix and fractures. Calcite stringers variolo-like texture in places.								
110	v									
	v									
120	v									
122.10	-----	Strongly argillized sheared zone.								
122.30	v	Light green and locally dark green pillow lavas. Hematite dominant in fractures variolo-like texture visible.								
	ht									
130	v									
	ht									
140	v	141.10~141.70 Strongly argillized sheared zone.								
141.10	v	141.70~143.00 Weakly argillized.								
141.70	-----	142.70~142.80 Sheared and fractured.								
143.00	-----	143.00 m End of hole								
150										

Hole No. MJO - A4 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
3.00		Gravel and sand (terrace deposits) Gravel : peridotite > gabbro Matrix : sand and calcite.								
16.20		Terrace deposits. Rounded to subangular pebble to granule. Matrix : completely cemented with calcite								
22.15		Dark green medium-grained basaltic massive lava with epidote. Calcite-hematite stringers.								
25.30		Bottom : argillized and brecciated Light brownish-green argillized and weathered pillow lava. Weakly brecciated.								
29.10		Light green-green pillow lava with closely packed pillows. Zeolite and epidote spots and in vesicles. Weakly weathered								
30		Light green-green pillow lava with closely packed pillows. Zeolite and epidote spots and in vesicles. Weakly weathered								
40		Light green-green pillow lava with closely packed pillows. Zeolite and epidote spots and in vesicles. Weakly weathered								
45.20		Dark bluish-green weakly chloritized and brecciated pillow lava								
49.60-49.80		Sheared zone with calcite								
49.85-50.05		Hyaloclastite with dominant hematite								
50		Hyaloclastite with dominant hematite								

Hole No. MJO - A4 (From 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
50.05	Y									
	Y									
	Y									
59.00	Y	Light bluish-green chloritized pillow breccia. Vesicles filled with zeolite. Calcite stringers.								
60	Δ	60.80~60.85								
	Δ	Sheared zone with chlorite, calcite								
62.10	Y	Light green weakly chloritized and weakly brecciated pillow lava. (same as 45.20~59.00)								
	Y									
	Y									
69.80	Y									
70	Δ	Dark green weakly brecciated and strongly chloritized pillow lava. Upper part : brecciated Lower part : comparatively massive								
	Δ	Quartz, hematite and zeolites stringers. Vesicles filled with zeolites. Bottom part : weakly argillized								
	Y		80.75~81.15 Pyrite in gray clay with hematite							
	Y		81.15~82.20 Massive medium to fine-grained	80.75						
80.75		Pyrite-clay zone.								
81.15		Massive ore.								
82.30		Siliceous ore								
82.50		Pyrite-clay zone								
82.80		Siliceous ore								
83.20	Δ	Stockwork zone: Green~light green brecciated and weakly silicified zone (pillow lava)								
	Δ		82.30~82.50 Dense pyrite and chalcopyrite in siliceous fragment	82.30	1.55	1.2	4.5	3.24	0.01	0.34
	Δ		82.50~82.80 Dense pyrite dissemination in gray clay sheared.	83.20	0.90	2.2	11.6	3.81	<0.01	0.54
86.90		Poor mineralized zone.								
	Δ		85.00 Dense pyrite dissemination in gray clay sheared.	85.00	1.80	0.1	2.6	0.60	<0.01	0.55
88.50		Same as 83.20~86.90.								
90	Δ		82.50~83.20 Same as 82.30~82.50	86.90	1.90	0.4	5.8	1.67	<0.01	0.27
92.00	Δ		83.20~86.90 and 88.50~92.00 Pyrite > chalcopyrite stockwork zone with quartz-hematite	88.50	1.80	0.2	5.2	1.19	<0.01	0.28
	Δ	Green~light green brecciated Chloritized and weakly silicified pillow lava.								
	Δ		92.00~95.30 Pyrite disseminations	90.30	1.70	0.1	2.8	1.17	<0.01	0.09
95.30	V	Brownish-green weakly chloritized and brecciated pillow lava with hematite in matrix.								
	V									
	V									
100	V	96.70~96.80 Quartz and clay zone.								
	V		98.50~101.20 Very weak pyrite disseminations							

Hole No. MJO - A4 (From 100.00 m to 150.75 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
101.20	V	Strongly chloritized sheared and argillized zone.								
101.80	Qtz									
	V	Dark green chloritized and weakly silicified pillow lava. Weakly brecciated. Many quartz, calcite and hematite vein to stringers. Hematite in matrix.								
	Qtz-cal-ht									
	Qtz-cal-ht									
	V									
	Cal									
110	Cal-ht									
	V									
	V									
	Cal									
	Qtz-ht									
	V									
	V									
120	V									
	V									
122.40	V	Strongly chloritized sheared and argillized zone.								
122.60	V									
	V	Dark green~green chloritized and weakly silicified pillow lava. Weakly brecciated.								
	V									
	V	Calcite-quartz with minor hematite veins, veinlets and stringers.								
	Qtz-cal-ht									
	V									
130	V									
	Qtz-ht									
	V									
	Qtz-ht									
	V									
	V									
	V	136.60~126.90								
	V	Hematite dominant zone in matrix								
140	V									
	V									
	V									
	V	145.90								
	V	Hematite-quartz vein 4 cm								
	V									
150	V	150.75 End of hole								
150.75	V									

Hole No. MJO - A5 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
3.00		Gossan debris (Overburden)								
10.90		Light green doleritic massive lavas. Weakly brecciated locally. Hematite band and in fractures. Calcite stringers.								
20.80		19.00~20.80 Weathered Light green argillized and chloritized pillow lavas. Weakly sheared and weathered.	Weak pyrite disseminations.							
24.90		23.00~24.90 Strongly argillized and weathered Reddish brown gossan soil.								
25.90		Hematite, limonite and clay.								
30		Siliceous gossan. Brecciated siliceous fragments with gray clay. Cemented with hematite. Dominant limonite and hematite.								
34.20		Light green~white strongly brecciated, silicified and argillized zone. Quartz stringers and fragments. Hematite dominant in matrix. Weakly weathered.	Pyrite disseminations. Pyrite and chalcopyrite disseminated breccia.	34.20	2.00	0.3	3.7	0.78	<0.01	0.01
				36.20	2.00	0.4	1.4	0.68	<0.01	<0.01
				38.20	2.00	0.3	1.6	0.51	<0.01	0.06
				40.20	2.00	2.2	1.8	0.19	<0.01	0.35
				42.20	2.00	Tr	Tr	0.83	<0.01	0.19
				44.20	2.00	1.9	2.6	2.23	<0.01	0.01
				46.20	2.50	1.8	6.9	5.37	<0.01	0.01
49.70		43.30~44.30 Strongly brecciated and argillized zone Massive sulfides with siliceous fragments.	Pyrite > Chalcopyrite	48.70	1.50	1.8	14.1	10.53	<0.01	0.06
50										

Hole No. MJO-A5 (From 50.00m to 100.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
50.20				50.20						
51.70		White strongly brecciated siliceous zone with quartz-hematite veins and stringers. Weakly weathered.	Pyrite disseminations. Quartz-pyrite veins	51.70	1.50	1.3	8.9	9.56	<0.01	0.04
53.40		Cave		53.40	1.70	1.5	4.6	2.08	<0.01	0.02
56.70		Brecciated silicified zone. Weathered. Hematite and limonite in matrix.	Siliceous gossan. Pyrite disseminations and veins.	56.70	3.50	0.8	1.1	0.29	<0.01	0.01
60				60.20	3.75	1.6	4.5	0.64	<0.01	0.01
63.95		Strongly silicified brecciated zone. Quartz-hematite breccia in places.	Pyrite disseminations and breccia. (Stockwork ore zone) Sulfides: 15-35 vol%	63.95	2.05	1.1	17.0	3.06	<0.01	0.01
66.00			70.00-73.50 Sulfides (pyrite): 30-60 vol%	66.00	2.00	1.4	37.2	3.90	0.01	0.04
68.00				68.00	2.00	0.6	12.9	0.98	<0.01	0.03
70				70.00	2.00	1.5	10.0	0.36	<0.01	0.06
72.00				72.00	2.00	2.2	11.8	0.79	0.01	0.05
74.00				74.00	2.00	2.9	16.1	0.65	<0.01	0.12
76.00				76.00	2.00	0.4	2.6	0.44	<0.01	0.09
78.00				78.00	2.00	0.3	2.2	0.16	<0.01	0.08
80				80.00	2.00	0.1	2.0	0.98	<0.01	0.48
82.00				82.00	2.00	0.4	3.3	0.13	<0.01	0.67
83.90		Dark green strongly brecciated and chloritized zone.	Pyrite disseminations and stringers.	84.00	2.00	0.2	3.1	0.66	<0.01	0.53
84.90		Same as 63.95-83.90		86.00	2.00	0.4	4.5	0.68	<0.01	0.99
87.00		Light green strongly silicified and brecciated volcanic.	Pyrite disseminations. Pyrite-chalcopyrite-quartz boxwork.	88.00	2.00	0.4	1.6	0.31	<0.01	0.43
89.00				90.00	2.30	0.4	0.8	0.10	<0.01	0.07
92.30		Dark brown (upper) and dark green (lower) homatized and chloritized zone with quartz stringers.		92.30						
94.15		Dark green chloritized pillow lavas with quartz-hematite and calcite stringers.								
96.70										
100										

Hole No. MJO-A5 (From 100.00m to 120.10m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
	∇	Light green~green massive lavas with quartz-calcite stringers and veinlets.								
	∇	101.00, 102.80								
	v v	Quartz-calcite veinlets								
		103.40~104.20								
	∇	Pillow lavas weakly brecciated								
	∇									
	∇	107.25, 108.40								
	∇	Quartz-calcite veinlets								
110	∇									
110.70	∇	Green argillized, chloritized and brecciated zone with hematite in matrix.								
111.00	v									
	v	Green~brownish green weakly chloritized pillow lavas.								
	v	Hematite in fractures and matrix. Varicose-like structure in part.								
	v									
	v	118.60~118.75								
	v	Strongly chloritized								
120	v									
120.10		120.10 m End of hole								

Hole No. MJO - A6 (From 0.00 m to 50.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
300		Gossan debris. (Overburden)								
860		Green-yellowish green doleritic massive lavas. Weathered and argillized.								
10										
11.20		10.80 Hematite-calcite vein.								
12.60		10.60-11.20 Hematized.								
		11.20-12.60 Strongly argillized, chloritized and sheared.								
15.90										
20										
24.95		Brecciated siliceous gossan.	Limonite and hematite.							
25.50		Many cavities. Poor core recovery.								
26.00		25.50-26.00 Cave.								
30										
36.70		Light brown and dark brown gossan soil with angular siliceous breccia.	Limonite and goethite							
37.70		Brecciated siliceous gossan.	Limonite.							
39.20		Many cavities								
40		39.20-40.70 Cave.								
40.70										
43.10		Light brown gossan soil with siliceous breccia.	Goethite and limonite.							
45.30		Dark brown-reddish brown silicified, brecciated gossan.	Limonite and hematite.							
48.05		Strongly silicified, chloritized and brecciated zone. (stockwork ore)	Pyrite disseminations and veinlets. Pyrite: 10 vol.%							
50										

Hole No. MJO - A6 (From 50.00m to 100.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
51.60 52.00		Gray brecciated and strongly argillized zone.		52.00						
		Light green silicified, chloritized and brecciated zone. (Stockwork ore) Homatite in matrix.	Pyrite disseminations. Pyrite-chalcopyrite disseminated breccia. Pyrite: 6~7 vol.%	54.00	2.00	0.7	2.3	0.54	<0.01	0.41
		54.50~57.10 Homatite dominant in matrix.		56.00	2.00	0.3	3.7	0.44	<0.01	0.22
60				58.00	2.00	0.3	2.1	0.42	<0.01	0.24
				60.00	2.00	0.4	1.8	0.44	<0.01	0.38
				62.00	2.00	0.3	1.9	0.37	<0.01	0.37
				64.00	2.00	0.7	2.2	1.14	<0.01	0.15
64.50 65.00		64.50~65.00 Argillized zone.		66.00	2.00	0.8	2.3	0.91	<0.01	0.31
				68.00	2.00	0.1	1.7	0.74	<0.01	0.13
70				70.00	2.00	Tr	Tr	0.58	<0.01	0.11
				72.65	2.65	Tr	Tr	0.36	<0.01	0.08
		72.65 Reduced the size to BX.		74.65	2.00	0.1	1.0	0.43	<0.01	0.05
				76.65	2.00	0.1	0.7	0.31	<0.01	0.06
78.10 78.80 79.30		Dark green strongly chloritized and brecciated zone with quartz and hematite breccia. Silicified stockwork ore.	Pyrite disseminations.	79.30	2.65	Tr	Tr	0.37	<0.01	0.06
80		Dark reddish brown strongly hematized volcanics.	Pyrite disseminations and stringers.							
81.30		81.30~82.80 and 83.60~85.30 Brecciated and argillized. Dark green strongly chloritized zone.								
85.60		Dark brownish green hematized pillow lavas. Matrix: strongly chloritized. A few calcite and quartz stringers.								
90										
95.40 95.70		Gray clay zone.								
		96.70 Sheared zone 5 cm.								
100		97.70~104.60 Quartz-calcite veinlets and stringers. Homatite stringers.								

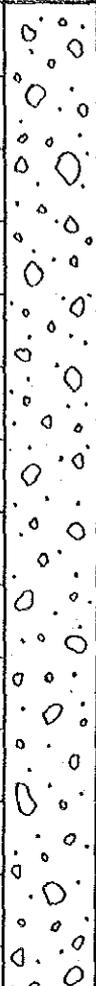
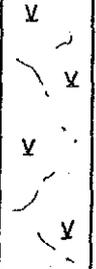
Hole No. MJO-A6 (From 100.00m to 133.10m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
104.60	v	Light green~light greenish blue massive lava with quartz and calcite stringers.								
	v	104.80 Quartz veins.								
	v	109.30 Quartz vein.								
110	v									
	v									
	v									
	v									
119.00	v	Dark green~dark brownish green chloritized pillow lava.								
120	v	Hematite in matrix and fractures.								
	v	Quartz-calcite-hematite stringers and veinlets.								
	v	124.90~125.35 Brecciated weakly argillized zone.								
	v									
	v									
130	v	130.20 Quartz-hematite vein.								
133.10	v	133.10m. End of hole.								
140										
150										

Hole No. MJO - A 7 (From 50.00 m to 100.30 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Hematite in matrix. Quartz stringers.								
53.00		Pillow lavas, light yellowish to brownish green. Alternation of aphanitic and medium-grained lavas. Brecciated in places. Fractures and matrix are filled with hematite. Variole like texture in places								
		57.60 - 57.90 Pillow breccia.								
60		58.00 Sheared zone with chlorite 0.05m.								
		60.30 - 62.80 Pillow breccia, chlorite in matrix.								
		62.75 - 62.90 Fractured zone with quartz-calcite-hematite veinlets.								
		64.35 - 65.40 Quartz-hematite veinlets and later stage calcite veins.								
70		70.20, 72.80, 73.30, 74.30, 77.40 Quartz-hematite veinlets 0.01 - 0.03m.								
80		80.30 - 80.50 Fractures filled with quartz stringers.								
		82.10 - 82.50 Several quartz-hematite veinlets.								
		86.30 Quartz stringers.								
		87.90 - 100.30 Poor veinlets								
90										
100		100.30 m End of hole.								

Hole No. MJO - A8 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
0 - 27.50		Gravel and sand (terrace deposits). Gravel: boulder of harzburgite >> gabbro. 0 - 27.50 Poor core recovery.								
27.50 - 30.25		Gravel and sand, white to whitish brown, cemented with calcite. Gravel: subrounded pebble to granule.								
30.25 - 35.10		Gravel and sand, light greenish brown, cemented with calcite. Gravel: angular to subrounded cobble to granule.								
35.10 - 37.50		Doleritic massive lavas, green, with calcite stringers. Weakly fractured.								
37.50 - 37.80		Pillow lavas, green to dark green, weakly brecciated.								
37.80 - 37.90		Amigdal filled with zeolites and calcite. Fractures filled with thin hematite and calcite stringers.								
37.90 - 50.00		37.80 - 37.90 Hematite-white clay vein.								

Hole No. MJO-A8 (From 50.00 m to 100.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
53.80		Pillow lavas, dark green and dark brownish green in part. Brecciated to weakly brecciated. Chloritized and hematized in part. Fractures filled with quartz, hematite and calcite. Matrix of pillows: green clay minerals in places.								
60		54.70 - 54.90 Sheared and argillized zone with hematite.								
		59.50 - 59.55 Hematite.								
		62.65-62.80, 65.60-65.70 Quartz veins.								
		63.30 - 70.60 Amygdal in places filled with quartz and zeolite.								
		66.10 Quartz vein 0.02m.								
70		72.70 - 72.90 Brecciated zone filled with calcite.								
		76.80 - 77.70 Pillow breccia.								
80		78.95 Quartz-hematite veinlet.								
		84.60 - 84.70 Quartz-hematite vein 0.07m.								
90		88.00(±) - 126.70 More closely packed pillow lavas.								
100										

Hole No. MJO-A8 (From 100.00 m to 150.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
	∇ /	101.95 Quartz veinlet 0.02m.								
	∇									
	∇	105.20 - 105.30 Quartz-hematite vein.								
	∇	107.40, 107.55 Quartz-hematite veinlets.								
110	∇	107.60(±) - 126.70 More deep green in color.								
	∇	108.20 Quartz-hematite veinlets.								
	∇	111.30 - 111.35 Quartz-hematite vein.								
	∇									
	∇									
120	∇									
	∇	121.00 Quartz-hematite veinlet.								
	∇									
	∇	124.40, 126.05, 126.20 Quartz-hematite veinlets (0.02 - 0.03m).								
126.70	∇	Pillow lavas, dark green.								
128.10	∇	Strongly brecciated and chloritized								
130	∇	127.70, 128.10 Quartz-hematite veinlets.								
	∇	Pillow lavas, dark green and dark brownish green in part. Chloritized and hematized.								
	∇	Fractures filled with quartz, calcite and hematite.								
	∇	132.90 - 133.00 Quartz-hematite zone.								
	∇	136.60 - 138.40 Anigdal texture.								
	∇									
140	∇	138.40-138.50, 140.10-140.40 Quartz-calcite veins (vertical).								
	∇									
	∇									
	∇									
150	∇									

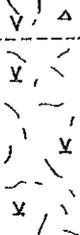
Hole No. MJO-A8 (From 150.00 m to 200.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
150.90, 152.70	V	Hematite veinlets.								
155.00(t) - 179.10	V	Pillow margin: hematized.								
160	V									
170	V									
179.10	V									
180	V, Δ	Brecciated pillow lavas, dark green to brown. Chloritized, hematized and brecciated. More intense alteration than upper pillow lavas.								
183.90	Δ									
184.85	Δ	Hematite zone (hematized pillow lavas). Reddish brown brecciated.	Pyrite disseminations.	184.85						
	Δ	Silicified, strongly chloritized and brecciated zone with stockwork mineralization. Green.	Chalcopyrite-pyrite-quartz stringers in places.	186.85	2.00	Tr	Tr	0.07	—	0.05
	Δ			188.85	2.00	Tr	Tr	0.24	—	0.02
190	Δ			190.85	2.00	Tr	Tr	0.12	—	0.02
	Δ		192.20 Chalcopyrite-pyrite-quartz stringers and veinlets.	192.85	2.00	Tr	Tr	0.20	—	0.02
	Cp-py			194.85	2.00	0.2	1.2	0.67	—	0.05
	Cp-py		196.00 Chalcopyrite-pyrite-quartz in matrix.	196.85	2.00	0.2	0.5	0.68	—	0.02
	Δ			198.85	2.00	1.0	0.7	0.61	—	0.16
200	Δ, Cp			200.00	2.00	0.2	1.0	1.15	—	0.10

Hole No. MJO-A8 (From 200.00 m to 240.05m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
209.70		<p>Strongly chloritized and sheared zone. Pillow lavas, dark green at the top and green, weakly brecciated. Chloritized and hematized. Hematite in matrix. A few quartz and quartz-hematite stringers.</p> <p>221.70 - 223.20 Quartz, quartz-hematite and quartz-calcite stringers and veinlets dominant zone.</p> <p>226.50 Quartz-calcite veinlet 0.01m.</p> <p>227.10 Quartz-hematite veinlet 0.03m.</p> <p>227.60 Quartz-calcite-hematite veinlet 0.04m.</p> <p>232.40 - 233.50 Quartz veinlets dominant zone More strongly chloritized and weakly sheared.</p> <p>232.40 - 232.60 Silicified-quartz vein.</p> <p>234.90 Quartz-veinlet 0.01m.</p>	<p>201.80 Chalcopyrite-pyrite in matrix.</p> <p>202.40 Chalcopyrite-pyrite.</p>	200.85						
210				202.85	2.00	0.1	1.0	1.03	—	0.03
210.30				204.85	2.00	Tr	Tr	0.65	—	0.02
				206.85	2.00	Tr	Tr	0.50	—	0.26
				208.85	2.00	Tr	Tr	0.67	—	0.10
				209.70	0.85	Tr	Tr	0.08	—	0.05
240		240.05 m End of hole.								
240.05										
250										

Hole No. MJO - A9 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		Casing. No recovery.								
3.00		Gravel and sand (terrace deposits), light green to brown. Gravel: harzburgite and gabbro (boulder to cobble). Matrix: sand and white clay								
10										
18.95		Gravel, sand and soil. Light brownish gray.								
20										
21.00		Gravel: angular pebble to granule.								
		Gravel and sand. Rounded cobble to pebble. Cemented with calcite.								
24.00		Doleritic massive lavas, light green. Fractures filled with dominant calcite and hematite. Weakly hematized and chloritized.								
30		Bottom: strongly brecciated (0.15m).								
31.20		Pillow breccia, dark brownish green. Epidotized and chloritized. Dominant calcite and hematite in matrix.								
		38.90 Calcite vein.								
40		40.10 Calcite and white clay vein.								
42.20		Pillow lavas, yellowish green. Brecciated and fractured. Weakly epidotized. Fractures filled with hematite and calcite.								
49.10		Bottom 0.70m: strongly brecciated.								
50										

Hole No. MJO-A9 (From 50.00 m to 100.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
53.10		Pillow breccia, dark brownish green. Strongly hematized and weakly chloritized. Fractures with hematite and calcite.								
60		Pillow lavas and pillow breccia in part. Brecciated and weakly chloritized. Fractures filled with quartz, calcite and hematite. Calcite and zeolites spots in places. 56.85 - 56.90 Hematite-calcite vein. 57.15 (0.04m) Calcite-hematite veinlet								
70										
80		75.50 - 76.10 Pillow breccia.								
88.70		86.20 - 88.70 More chloritized 88.30, 88.50 - 88.60 Zeolites-quartz-hematite vein								
89.40		Strongly chloritized sheared zone with quartz stringers.	Pyrite disseminations.	88.70 89.40	0.70	Tr	Tr	0.06	--	0.21
90		Argillized.								
100		Pillow lavas, brecciated, dark green to dark brownish green. Chloritized and silicified. Quartz-hematite stockwork with no sulfides								

Hole No. MJO - A9 (From 100.00 m to 150.20 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
		101.90 - 102.20 Quartz-hematite network vein.								
102.30		Pillow lavas, brownish green Chloritized, hematized and weakly silicified. Quartz stringers.								
110		109.50 - 109.60 Quartz-hematite vein. 110.10 Quartz veinlet 0.03m. 111.30 Quartz veinlet 0.02m.								
		113.70 - 113.85 Quartz-hematite vein.								
117.80		Weakly brecciated at the bottom.								
120		Pillow breccia, brownish green. Hematized, chloritized and silicified. Quartz stringers along fractures and in matrix.								
123.00		Pillow lavas, brownish green, weakly brecciated. Chloritized, hematized and weakly silicified. Quartz- hematite and quartz stringers.								
130		126.00 - 127.40 Pillow breccia.								
		133.20 - 133.25, 133.60 - 133.65 Quartz-hematite vein.								
		136.60 - 136.75 Quartz-hematite vein. 137.10 Quartz veinlet 0.02m.								
137.70		Same pillow lavas with more intense quartz-hematite stockwork veins and veinlets. Chloritized and strongly silicified. Light brown.								
140		141.90 Calcite vein 0.03m.								
144.60		Pillow lavas, dark green to dark brownish green. Fractures filled with quartz and hematite veinlets and stringers. Chloritized and weakly silicified.								
150		150.20 m End of hole.								

Hole No. MJO-A 10 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
	V	Pillow lavas, light green, weakly brecciated. Weathered. Fractures filled with hematite and calcite.								
	V	6.65 - 6.80 Hematite veins.								
7.20	V	6.80 - 7.20 Enrichment of copper oxide minerals along fractures. Strongly argillized and weathered zone, white to brown with limonite and hematite.		7.20						
9.60	△			9.60	2.40	Tr	Tr	0.65	—	0.01
10	△	Siliceous gossan, reddish brown and white, intensely brecciated.	Limonite and hematite.	11.60	2.00	0.6	1.9	0.01	—	<0.01
	△			13.60	2.00	0.1	0.9	0.01	—	<0.01
	△			15.60	2.00	0.3	1.3	0.03	—	<0.01
	△			17.60	2.00	0.2	2.5	0.02	—	<0.01
	△			19.60	2.00	0.5	3.2	0.03	—	<0.01
20	△			21.60	2.00	0.3	5.9	0.01	—	<0.01
	△			23.60	2.00	0.1	2.2	0.03	—	<0.01
	△			25.60	2.00	1.8	5.7	0.06	—	<0.01
26.50		Cave zone.		26.50	0.90	5.4	12.9	0.03	—	<0.01
28.50				28.50						
30	△			30.50	2.00	3.7	16.0	0.05	—	<0.01
	△			32.50	2.00	1.2	7.7	0.05	—	<0.01
	△			34.50	2.00	0.7	3.9	0.09	—	<0.01
36.00		Cave zone.		36.00	1.50	0.2	5.6	0.06	—	<0.01
37.50				37.50						
37.90	△	Pillow breccia, brownish green. Argillized and weathered.		37.90	0.40	Tr	Tr	0.15	—	<0.01
39.10	V	Pillow lavas, yellowish green, strongly chloritized and fractured. Fractures filled with dominant quartz-hematite-calcite veinlets and stringers. Hematite and dark green clay minerals in matrix. Variole like texture.								
	V	39.10 - 41.85 Weathered with limonite along fractures.								
	V	42.30 Quartz-hematite veinlet.								
50	V									

Hole No. MJO-A 10 (From 50.00 m to 100.00m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
50.10		50.10 Quartz-hematite-calcite veinlet 0.03 m.								
56.80		56.80 Quartz-hematite veinlet 0.04 m.								
58.00		58.00 Quartz-hematite veinlet 0.02 m.								
60										
64.40		64.40 Quartz-hematite calcite veinlet 0.03 m.								
65.80		Pillow breccia, yellowish green to dark green, chloritized and hematized (same lava flows as above). Variole like texture. Many quartz-hematite stringers. Hematite in matrix. Fractures filled with calcite.								
70										
71.75 - 72.00		Light green aphanitic rock (pillow margin?).	71.80 - 72.00 Calcite veinlets with native copper.							
		Pillow lavas, green to dark green, chloritized and hematized. Fractures filled with quartz, hematite and calcite. Hematite in matrix.								
77.30		77.30 Quartz-hematite veinlet 0.01 m.								
80										
		Thick hematite in matrix.								
90										
91.85		91.85 Calcite stringer 0.01 m.								
94.40 - 94.65		94.40 - 94.65 Hematite dominant in matrix.								
100										
106										

Hole No. MJO-A 10 (From 100.00 m to 120.55 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
104.55		101.20 - 102.20 Pillow breccia. Hematite in matrix. 104.35 - 104.55 Quartz-hematite vein (fault?)								
110		Pillow lavas, dark green, weakly brecciated. Chloritized and silicified. Fractures filled with quartz, hematite and calcite. Hematite in matrix. 110.30 - 110.50 Strongly brecciated and sheared zone. Matrix filled with quartz, hematite and green clay minerals. 115.10 Quartz-hematite stringer 0.01 m. 114.20 - 120.55 Vesicles filled with quartz. 118.60 Quartz-hematite stringer 0.01 m.								
120 120.55		120.55 m End of hole.								
130										
140										
150										

Hole No. MJO-A 11 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
0.75		Soil and gravel, overburden.								
4.00		Doleritic massive lavas, yellowish green. Weakly brecciated.								
5.10 - 6.00		Pillow lavas, light yellowish green. Calcite and hematite stringers. Brecciated and epidotized in places.								
6.00 - 6.95		Weakly argillized.								
7.95 - 8.15		Strongly fractured with calcite veinlets and stringers.								
8.90 - 9.90		Hematite and calcite in matrix.								
10.25 - 10.80		Pillow breccia. Calcite fills fractures in matrix.								
11.70 - 13.30		Sheared and argillized zone.	15.15 Quartz-hematite veinlet 0.02m.							
13.30 - 13.70		Strongly brecciated zone. Hematite/calcite in matrix.	17.20 Quartz-calcite veinlet 0.01m.							
18.95		Brecciated/argillized zone.								
20.00		Doleritic massive lavas, light green to yellowish green, brecciated in places. Fractures filled with calcite and limonite.								
24.00		Pillow lavas, light green, brecciated. Fractures filled with limonite. Copper oxide minerals along fractures.		24.00						
27.65		Argillized zone, bleached, whitish green.		26.00	2.00	0.1	1.5	3.60	—	0.10
28.20		Siliceous gossan zone, reddish brown, intensely brecciated.		27.55	1.65	Tr	Tr	3.98	—	0.05
30.00			Limonite-hematite-goethite.	28.20	2.00	0.1	0.8	0.14	—	0.01
32.00				30.20	2.00	0.1	6.4	0.12	—	0.01
34.00				32.20	2.00	Tr	1.0	0.04	—	0.01
36.00				34.20	2.00	5.6	8.7	0.21	—	0.03
38.00				36.20	2.00	1.1	5.4	0.07	—	0.01
40.00				38.20	2.00	0.2	3.7	0.10	—	0.01
42.30		Stockwork zone, intensely brecciated and strongly silicified. Hematite in matrix	Fine-grained pyrite disseminations and stringers.	40.20	2.10	0.4	19.0	0.43	—	0.01
44.00				42.30	2.00	Tr	Tr	3.10	—	0.01
46.00				44.30	2.00	0.3	2.7	0.66	—	0.01
48.00				46.30	2.00	0.3	12.7	1.06	—	0.01
50.00				48.30	2.00	0.4	5.8	1.19	—	0.03

Hole No. MJO - A 11 (From 50.00 m to 100.65m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
50.00 - 53.35		Hematite dominant.		50.30						
					2.00	0.1	3.3	0.89	---	0.01
53.35		Argillized clay zone, whitish green, with hematite.	Weak pyrite disseminations.	52.30						
53.70		Pillow lavas, medium to coarse-grained, dark green, brecciated and chloritized. Fractures filled with quartz, calcite and hematite. Matrix filled with hematite in places		53.35						
60		54.60 - 54.65 Quartz-hematite vein 0.05m.			1.05	0.1	3.2	1.39	---	0.01
67.50, 67.70		Quartz-hematite veinlets 0.01m.								
68.00		68.00 Quartz-hematite veinlet 0.01m.								
70		Pillow lavas, aphanitic to fine-grained, light green to light greenish gray. Quartz, calcite and zeolites stringers. Hematite in matrix. Weakly brecciated in part.								
74.60		74.60 Quartz-hematite veinlet 0.03m.								
77.65		77.65 Zeolites veinlets 0.01m.								
80										
84.40 - 87.50		Brecciated in part. Matrix: calcite.								
88.20		88.20 Hematite in matrix 0.05m.								
90										
91.60		91.60 Calcite stringer.								
97.20		Pillow breccia, dark green, chloritized. Matrix filled with hematite.								
100		97.20 - 97.60 Quartz-hematite veinlets zone.								
100.65		100.65 m End of hole.								

Hole No. MJO-A12 (From 0.00 m to 50.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
0.00		Gravel, sand and soil (terrace deposits). Gravel: harzburgite >> gabbro, rounded boulder to pebble.								
12.90		Gravel and sand, harzburgite >> gabbro, cobble to granule. Cemented with calcite. Upper part: subangular pebble to granule dominant.								
23.00		Pillow lavas and pillow breccia in places, light brown to light brownish green. Brecciated and dominant fractures filled with calcite and quartz stringers. 26.75, 26.95, 27.10 Calcite veinlets 0.01 - 0.02m 26.10-26.50, 28.10-28.60, 31.60-34.20 Variole texture.								
30										
40										
50										

Hole No. MJO-A12 (From 50.00 m to 100.00 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
52.70		Pillow lavas, green. Brecciated chloritized and hematized in part. Fractures and matrix are filled with hematite, quartz and calcite.								
		57.20 - 57.35 Metalliferous sedimentary layer.								
60		59.80, 60.40, 62.20 Metalliferous sediments in matrix.								
63.20		Pillow lavas, rather massive and aphanitic, light green. Hematized in part. Few quartz and calcite stringers.								
69.40		Pillow lavas, dark green and medium grained. Chloritized and weakly hematized. Hematite, quartz and calcite are in fractures and matrix of pillows.								
70		Bright green clay minerals in pillow matrix.								
		73.20, 74.40 Quartz veinlets 0.03m.								
		76.10 - 77.10 Vesicles filled with zeolites, quartz and calcite.								
80		78.20 - 80.70 Pillow breccia.								
		79.30 Quartz-hematite veinlet 0.03m.								
		82.80 Metalliferous sediments 0.03m.								
		83.60-86.40, 88.50-90.40 Vesicles filled with zeolites and calcite.								
90		91.40, 91.45 Quartz-hematite-calcite veinlets.								
		91.95 - 92.00 Green clay zone with hematite veinlet.								
92.00		Massive sulfide ore zone, brecciated.	Chalcopyrite ore breccia filled with pyrite and minor quartz.	92.00						
				93.00	1.00	3.9	26.1	2.95	—	0.26
				94.00	1.00	3.7	21.4	4.79	—	0.36
				95.30	1.30	3.3	42.6	6.29	—	2.28
95.30		Hematite zone, brecciated.		95.30	0.40	0.3	2.3	0.26	—	0.41
95.70		Pillow lavas, dark green. Vesicles filled with calcite. Matrix and fractures are filled with calcite and quartz, and partly with hematite.								
100										

Hole No. MJO - A 12 (From 100.00 m to 130.35 m)

Depth (m)	Chart	Lithology and Alteration	Mineralization	Depth (m)	D.L. (m)	Au (g/t)	Ag (g/t)	Cu (%)	Pb (%)	Zn (%)
101.60		101.60 Calcite-quartz-(hematite) veinlet 0.02m.								
103.90		Pillow lavas with dominant quartz-hematite veinlets and stringers, green to dark green. Vesicles filled with quartz.								
103.90 - 104.74		103.90 - 104.74 Brecciated zone with quartz- hematite veins.								
105.20, 109.40		105.20, 109.40 Quartz veinlets (0.01 - 0.02m).								
113.40 - 113.80		113.40 - 113.80 Hematite dominant zone.								
118.25 - 118.30		118.25 - 118.30 Quartz vein 0.05m.								
119.20 - 119.60		119.20 - 119.60 Quartz-hematite veinlet zone.								
129.20 - 129.60		129.20 - 129.60 Quartz veins and veinlets.								
130.25		130.25 Quartz veinlet 0.01m.								
130.35		130.35 m End of hole.								
140										
150										

Appendix 9

Assay results for gossan and gossan dump samples in area B

Sample number	Descriptions	Assay results			
		Au(g/t)	Ag(g/t)	Cu (%)	Zn (%)
N501	Gossan dump. Light brown gossan soil with siliceous fragments. Limonite rich.	3.6	4.3	0.38	0.02
N502	Gossan dump. Reddish brown gossan soil with minor siliceous fragments. Hematite rich.	12.8	13.2	0.86	0.01
N503	Gossan dump. Light yellowish brown gossan soil. Limonite rich.	0.5	1.4	0.25	0.01
N504	Gossan dump. Purplish red porous gossan soil with minor siliceous fragments. Hematite & goethite rich.	7.4	21.1	0.68	0.01
N505	Gossan dump. Light yellowish brown gossan soil with siliceous fragments. Limonite rich.	2.5	6.9	0.30	0.01
N506	Gossan dump. Light yellowish brown gossan soil with volcanic fragments.	5.8	11.2	0.35	0.01
N507	Gossan dump. Mixture of red and light yellowish brown gossan soil with siliceous fragments.	3.3	8.0	0.40	0.01
N508	Gossan dump. Reddish brown gossan soil with siliceous fragments. Hematite > limonite.	1.0	2.5	0.10	0.01
N509	Gossan dump. Brown and reddish brown in part gossan soil with minor siliceous fragments.	4.4	3.8	0.20	0.02
N510	Gossan dump. Red to reddish brown gossan soil with minor siliceous fragments.	2.2	2.3	0.12	0.01
N511	Gossan dump. Light reddish brown gossan soil with siliceous fragments.	0.6	1.7	0.26	0.10
N512	Siliceous gossan. Strongly brecciated. Hematite > limonite > goethite with green copper speck.	0.5	0.4	0.25	0.05
N513	Siliceous gossan. Intensely silicified and brecciated. Goethite rich.	Tr	Tr	0.21	0.05
N514	Siliceous gossan. Strongly silicified and brecciated. Hematite > limonite > goethite.	4.6	8.4	0.09	0.10
N515	Siliceous gossan. Strongly silicified and brecciated. Green copper along fractures. Limonite rich.	2.1	6.3	0.18	0.01
N516	Siliceous gossan. Chart origin ?. Brecciated. Goethite rich.	13.7	13.5	0.28	0.10
N517	Siliceous gossan. Strongly silicified and brecciated. Goethite rich.	Tr	Tr	0.10	0.03
N518	Siliceous gossan. Intensely silicified. Limonite > goethite > hematite.	0.6	4.1	0.08	0.02
N519	Gossan dump. Brown porous gossan soil with siliceous volcanic fragments.	Tr	Tr	0.03	0.01
N520	Gossan dump. Yellowish brown and reddish brown gossan soil with siliceous fragments.	0.8	4.6	0.08	0.01

Sample number	Descriptions	Assay results			
		Au(g/t)	Ag(g/t)	Cu (%)	Zn (%)
N521	Gossan dump. Reddish brown gossan soil with silicified volcanics.	2.2	4.3	0.26	0.01
N522	Gossan dump. Reddish brown gossan soil with silicified volcanics. Hematite rich.	2.3	2.3	0.32	0.01
N523	Gossan dump. Reddish brown gossan soil with silicified volcanics.	2.2	3.1	0.19	0.01
N524	Siliceous gossan. Dark brown, strongly silicified. Limonite with green copper speck.	Tr	Tr	0.16	0.01
N525	Siliceous gossan. Brown and black. Limonite and goethite.	Tr	Tr	0.32	0.03
N526	Siliceous gossan. Brown, brecciated. Limonite rich.	Tr	Tr	0.23	0.01
N527	Siliceous gossan. Brown, limonite>hematite. Brecciated.	Tr	Tr	0.28	0.01
N528	Gossan dump. Reddish brown gossan soil with siliceous fragments.	1.0	1.4	0.32	0.01
N529	Gossan dump. Reddish brown gossan soil with siliceous fragments.	1.1	1.8	0.37	0.01
N530	Gossan dump. Reddish brown gossan soil with siliceous & volcanic fragments. Limonite & hematite.	2.1	2.9	0.71	0.10
N531	Gossan dump. Reddish brown gossan soil. Limonite & hematite.	0.9	3.4	0.60	0.05
N532	Gossan dump. Reddish brown gossan soil. Hematite rich.	Tr	Tr	0.42	0.02
N533	Gossan dump. Brownish gray soil with volcanic fragments.	0.9	1.8	1.13	0.16
N534	Gossan dump. Reddish brown gossan soil. Hematite rich.	1.8	3.5	0.53	0.10
N535	Gossan dump. Reddish brown gossan soil. Hematite rich.	4.5	3.1	0.11	0.01
N536	Gossan dump. Light reddish brown gossan soil with fragments.	Tr	Tr	0.55	0.05
N537	Gossan dump. Reddish brown gossan soil. Hematite rich.	0.6	1.7	0.62	0.10
N538	Siliceous gossan. Dark purplish brown, strongly silicified and brecciated.	Tr	Tr	0.32	0.01
N539	Siliceous gossan. Red and yellowish brown. Hematite rich.	0.7	1.3	0.11	0.01
N540	Gossan. Dark brown silicified and argillized in part.	Tr	Tr	0.40	0.01

Sample number	Descriptions	Assay results			
		Au(g/t)	Ag(g/t)	Cu (%)	Zn (%)
N541	Siliceous gossan. Gray and brownish gray. Limonite rich.	0.8	1.9	0.08	0.01
N542	Siliceous gossan. Dark purplish brown. Hematite > goethite > limonite.	Tr	Tr	0.24	0.03
N543	Siliceous gossan. Dark reddish brown gossan with green copper speck. Hematite rich.	Tr	Tr	0.10	0.02
N544	Gossan dump. Light yellowish brown weathered volcanics with limonite.	0.4	1.5	0.35	0.10
N545	Gossan dump. Reddish brown gossan soil. Porous soil in part.	1.5	1.7	0.32	0.01
N546	Gossan dump. Reddish brown gossan soil with siliceous fragments.	1.9	2.3	0.47	0.01
N547	Gossan dump. Dark brown gossan soil with fragments. Limonite rich.	1.6	3.3	0.28	0.03
N548	Siliceous gossan. Dark purplish gray, strongly silicified and brecciated.	1.0	1.3	0.12	<0.01
N549	Gossan dump. Red gossan soil with volcanic fragments.	5.8	6.5	0.23	<0.01
N550	Siliceous gossan. Dark purplish brown, silicified and brecciated.	0.7	1.9	0.31	0.01
N551	Siliceous gossan. Dark brown. Goethite and limonite.	0.8	2.6	0.45	0.10
N552	Siliceous gossan. Brownish gray silicified and rusty volcanics with green copper speck.	Tr	Tr	0.28	0.02
N553	Slag with green copper speck.	0.5	2.0	1.98	0.01
N554	Slag.	0.7	2.0	1.52	0.03
N555	Slag.	0.3	1.5	0.99	0.05

Appendix 10

Charged potential in area B

X (m)	Y (m)	Potential (mV/A)		X (m)	Y (m)	Potential (mV/A)		X (m)	Y (m)	Potential (mV/A)	
		MJO-B1	MJO-B5			MJO-B1	MJO-B5			MJO-B1	MJO-B5
0	1000	22.7	23.2	250	300	67.9	74.1	700	-200	50.9	54.4
-100	1000	21.8	22.4	300	300	64.6	70.3	800	-200	42.3	44.5
100	1000	23.7	24.8	350	300	60.0	65.7	700	-100	49.7	53.5
0	1100	19.2	19.7	400	300	53.2	58.7	800	-100	44.8	48.1
100	1100	20.0	20.6	500	300	50.8	55.3	600	100	53.2	58.3
200	1000	23.9	24.8	300	250	65.9	73.1	700	100	46.8	51.0
300	1000	22.4	23.4	350	250	63.1	69.8	700	0	48.8	52.6
200	900	26.8	28.0	400	250	58.4	64.4	800	0	44.1	47.7
100	900	27.4	28.3	450	250	55.5	60.9	800	100	44.1	47.6
300	900	26.7	28.1	500	250	51.9	56.9	700	200	45.8	49.7
300	800	30.5	32.5	350	200	65.7	72.8	600	300	46.7	50.7
200	800	31.2	32.9	400	200	59.6	65.4	800	300	41.0	44.4
100	800	31.8	33.1	450	200	56.7	62.1	800	200	42.6	46.0
200	700	35.9	37.9	500	200	58.1	59.3	900	100	40.5	43.7
100	700	35.5	37.4	550	200	51.6	56.2	1000	200	34.7	37.2
300	700	36.7	39.4	600	200	50.5	55.0	700	300	43.9	48.0
400	700	34.0	36.3	400	150	63.7	70.2	900	300	35.6	38.4
400	800	30.2	32.4	450	150	60.8	66.8	900	400	33.6	36.2
400	900	27.0	28.7	500	150	56.2	61.7	900	200	36.1	38.7
500	700	32.5	34.8	550	150	54.4	59.6	1000	100	35.1	38.0
500	800	28.7	30.5	600	150	51.8	56.3	1000	0	35.9	38.5
500	900	25.5	27.7	400	100	74.0	82.2	900	0	40.2	43.5
600	700	30.1	32.5	450	100	64.2	70.6	900	-100	41.2	43.9
600	800	26.9	28.8	400	50	76.7	85.3	900	-200	38.6	40.9
700	700	29.1	31.3	450	50	67.7	74.5	300	200	70.6	77.7
700	800	26.2	28.1	500	50	62.2	68.7	250	200	78.8	87.3
800	700	27.5	29.3	550	50	58.7	64.2	250	250	74.7	82.1
800	800	24.7	26.5	500	100	60.1	66.3	200	200	88.2	98.0
900	600	26.8	28.8	550	100	56.2	61.9	200	250	79.1	87.0
800	600	29.6	32.2	600	50	55.1	60.1	200	300	74.3	80.6
900	700	24.5	26.4	600	0	54.7	59.9	150	200	95.6	105.3
1000	700	23.1	24.9	550	0	58.2	63.9	150	250	86.7	94.1
1100	600	22.2	23.8	500	0	61.1	67.3	150	300	77.4	83.4
1000	600	24.1	25.9	450	0	69.6	76.9	100	200	104.5	113.1
1200	600	21.0	22.3	400	0	77.5	86.3	100	250	92.7	99.1
1000	500	25.8	27.9	600	-50	57.1	62.8	100	300	80.0	85.8
1100	500	23.8	25.4	550	-50	60.7	66.4	100	350	75.1	80.0
1200	500	22.1	23.8	500	-50	65.4	71.7	150	350	70.7	75.5
1100	400	25.3	27.2	450	-50	73.0	79.8	50	300	85.3	89.6
1100	300	26.9	28.9	400	-50	80.8	89.3	50	450	70.7	73.3
1000	400	28.4	30.8	600	-100	57.4	62.2	50	-100	154.7	165.6
1000	300	30.5	32.7	550	-100	62.1	67.7	50	-150	152.8	159.5
200	600	46.1	49.3	500	-100	65.9	71.9	0	-150	167.7	162.7
100	600	47.9	50.4	450	-100	72.7	79.6	-50	-150	182.1	161.7
300	600	42.2	44.7	400	-100	81.6	89.6	-100	-150	196.9	160.4
400	600	39.4	42.5	600	-150	57.1	61.3	-150	-150	202.7	159.0
200	500	52.8	56.5	550	-150	60.9	66.6	-200	-150	192.7	152.3
100	500	58.9	62.3	500	-150	65.7	71.5	-250	-150	157.1	130.3
300	500	50.5	55.1	450	-150	72.1	78.0	-300	-150	147.8	123.6
300	400	54.4	59.1	400	-150	81.7	89.3	-350	-150	119.3	103.2
400	500	47.9	52.5	600	-200	57.6	61.9	-500	-100	82.5	74.7
400	400	51.5	56.4	550	-200	59.7	64.5	-400	-100	101.5	90.9
500	600	37.4	40.5	500	-200	66.3	71.1	-400	-50	102.5	92.3
500	500	44.4	47.9	450	-200	71.5	77.8	-350	-100	117.1	102.4
500	400	48.5	52.8	400	-200	83.1	90.5	-350	-50	117.3	104.1
600	500	42.4	46.0	550	-250	60.1	64.3	-400	-200	97.3	86.3
600	400	45.0	49.2	500	-250	66.2	70.8	-300	-100	145.8	123.2
600	600	33.9	36.5	450	-250	71.5	76.6	-300	-50	138.7	118.7
700	600	32.0	34.5	400	-250	80.3	86.3	-300	-200	142.1	120.0
700	500	38.2	41.7	600	-300	55.6	59.4	-250	-100	151.5	124.3
700	400	40.9	44.8	500	-300	62.8	67.0	-250	-50	151.8	128.8
800	500	34.1	37.1	400	-300	74.8	79.8	-250	-200	148.8	124.2
800	400	37.5	41.0	500	-400	55.4	58.6	-200	-100	184.7	147.9
900	500	29.1	31.2	400	-400	65.7	68.6	-200	-50	169.7	143.9
200	450	58.3	62.4	600	-500	46.9	49.1	-150	-50	183.8	155.8
150	450	61.7	65.7	500	-500	51.4	53.3	-150	-100	196.9	162.5
100	450	64.9	68.5	400	-500	58.1	60.0	-200	-200	169.7	138.2
200	400	63.4	68.2	600	-600	43.1	44.9	-200	-250	155.9	129.3
150	400	66.1	70.4	700	-600	39.5	40.8	-200	-300	129.7	112.3
100	400	71.3	75.1	700	-500	43.2	44.9	-150	-200	192.1	152.1
250	400	58.9	63.1	600	-400	47.7	50.0	-150	-250	169.0	139.7
200	350	66.7	71.8	700	-400	45.5	47.5	-100	-200	194.5	157.3
250	350	62.3	67.7	800	-400	40.5	42.3	-100	-250	166.5	141.5
300	350	59.3	64.5	700	-300	48.6	51.5	-100	-300	141.5	125.1
350	350	55.0	60.1	800	-300	41.7	43.9	-100	-100	195.1	165.9

X (m)	Y (m)	Potential (mV/A)	
		MJO-B1	MJO-B5
-100	-50	183.5	166.5
-50	-200	164.3	146.5
-50	-250	153.0	138.9
-50	-300	138.2	126.5
-50	-100	183.8	166.1
-50	-50	181.7	166.7
0	-200	157.5	151.6
0	-250	147.3	140.3
0	-300	136.3	130.4
0	-100	176.6	170.3
0	-50	171.2	171.6
50	-50	156.9	166.8
50	-200	145.6	148.4
50	-250	139.1	139.9
50	-300	129.1	128.2
100	-200	132.1	140.4
100	-250	128.3	134.3
100	-300	119.4	123.8
100	-400	98.1	98.8
100	-150	140.8	154.8
100	-100	145.4	161.2
100	-50	144.2	160.2
150	-200	120.5	130.4
150	-250	115.9	124.5
150	-300	113.1	119.7
150	-150	131.5	145.9
150	-100	132.0	147.5
150	-50	129.3	145.3
200	-200	112.2	121.5
200	-250	111.4	119.1
200	-300	107.9	114.9
200	-400	87.1	89.8
200	-150	113.5	124.5
200	-100	118.5	132.0
200	-50	115.9	130.4
250	-200	105.5	115.1
250	-150	102.5	112.3
250	-100	106.8	119.1
250	-50	104.9	118.1
250	-250	103.1	111.1
250	-300	96.9	102.9
300	-300	87.3	92.4
300	-400	73.5	76.4
300	-500	65.6	66.8
350	-250	86.9	93.5
300	-250	95.4	102.5
300	-200	98.0	106.2
300	-150	96.6	106.3
300	-50	96.3	107.4
350	-200	92.0	99.7
350	-150	92.3	100.9
350	-100	93.1	102.4
350	-50	89.7	99.4
50	0	157.3	167.3
0	0	166.6	170.8
-50	0	171.7	165.7
-100	0	173.0	162.2
-150	0	159.3	145.3
-200	0	148.1	132.1
-250	0	135.5	119.3
-300	0	128.0	112.8
-350	0	112.7	101.1
-400	0	104.5	94.1
-500	0	82.0	75.3
-400	50	96.7	88.8
-400	100	86.3	80.6
-400	150	80.4	75.7
-350	50	104.7	95.5
-350	100	97.9	91.2
-350	150	90.3	84.7
-300	50	114.1	104.1
-300	100	106.9	99.5
-300	150	98.8	92.5
-250	50	120.2	109.5
-250	100	105.3	98.5

X (m)	Y (m)	Potential (mV/A)	
		MJO-B1	MJO-B5
-250	150	102.6	98.4
-200	50	123.2	114.9
-200	100	113.1	108.9
-200	150	106.8	103.3
-150	50	140.3	133.4
-150	100	122.8	120.0
-150	150	110.4	110.3
-100	50	153.7	151.3
-100	100	133.5	133.1
-100	150	117.3	117.5
-50	50	149.2	152.4
-50	100	133.4	137.1
-50	150	118.1	121.3
0	50	153.4	158.3
0	100	129.0	139.4
0	150	114.7	121.7
50	50	138.5	149.5
50	100	127.9	138.7
50	150	116.5	125.1
100	0	137.0	150.5
150	0	120.8	135.9
200	0	110.4	124.2
250	0	102.9	115.5
300	0	93.6	104.0
350	0	85.4	95.5
350	50	83.8	93.5
350	100	79.2	88.1
350	150	69.8	77.3
300	50	91.9	103.1
300	100	89.7	100.5
300	150	81.8	91.1
300	-100	97.2	106.8
250	50	99.0	111.6
250	100	100.4	112.9
250	150	86.7	96.7
200	50	107.6	121.3
200	100	105.0	118.0
200	150	99.4	111.2
150	150	104.6	116.2
150	50	110.7	124.5
150	100	107.4	120.3
100	50	125.2	138.1
100	100	115.8	128.1
100	150	108.6	119.6
0	200	106.7	111.6
-50	200	105.3	107.7
-100	200	105.2	105.9
-150	200	104.2	102.9
-200	200	103.5	100.9
-250	200	94.4	90.9
-300	200	85.9	81.3
-350	200	80.6	75.9
-400	200	78.1	73.3
-350	250	75.4	72.1
-300	250	81.7	78.1
-300	300	73.3	71.0
-250	250	87.2	84.9
-250	300	77.8	76.3
-250	350	71.1	69.1
-200	250	93.5	92.4
-200	300	83.7	82.7
-200	350	77.6	76.8
-150	250	97.2	96.7
-150	300	86.2	86.1
-150	350	81.1	81.2
-100	250	95.2	96.3
-100	300	88.4	90.5
-100	350	83.6	84.8
-50	250	93.5	96.6
-50	300	86.2	89.1
-50	350	83.6	85.6
0	250	93.3	97.5
0	300	85.9	88.7
0	350	82.7	85.9
50	200	107.7	115.0

X (m)	Y (m)	Potential (mV/A)	
		MJO-B1	MJO-B5
50	250	94.4	100.5
0	900	26.3	27.1
-100	900	25.9	26.2
0	800	31.3	32.3
-100	800	31.3	31.6
0	700	38.7	39.5
-100	700	40.6	40.8
-200	700	40.3	40.2
0	600	50.7	51.9
-100	600	51.8	52.4
-200	600	50.0	49.8
0	500	64.8	67.2
-100	500	64.0	64.7
-200	500	58.7	58.1
-300	500	55.2	54.4
0	450	75.1	77.3
-50	450	71.8	73.7
-100	450	71.9	73.0
-150	450	65.1	65.1
0	400	78.7	81.2
-50	400	77.9	80.3
-100	400	75.3	76.5
-150	400	74.4	74.8
-200	400	73.0	72.4
-300	400	67.8	66.6
50	350	79.7	83.5
50	400	77.4	80.5

Appendix 11

Electric field in area B

X (m)	Y (m)	MJO-B1		MJO-B5		X (m)	Y (m)	MJO-B1		MJO-B5		X (m)	Y (m)	MJO-B1		MJO-B5	
		E	φ	E	φ			E	φ	E	φ			E	φ	E	φ
1050	50	9	196	10	205	175	475	37	132	34	133	275	275	67	128	60	131
1050	150	9	183	11	180	175	525	16	43	16	138	225	225	79	134	77	136
950	250	7	177	8	182	175	575	23	137	24	136	275	225	39	137	40	142
950	150	9	171	9	176	175	650	21	113	18	112	325	225	60	140	55	144
950	350	11	184	12	186	125	425	85	136	83	136	225	175	69	140	67	147
850	350	10	175	11	179	125	475	32	130	29	131	275	175	72	141	64	146
850	250	11	171	12	175	75	425	56	107	56	106	325	175	44	156	42	161
850	150	11	172	12	177	75	475	39	123	35	124	225	125	89	143	80	151
750	250	12	190	13	197	75	525	25	122	25	118	275	125	84	155	71	159
750	150	9	186	11	186	75	575	27	125	24	119	325	125	34	152	31	158
750	350	17	156	19	156	125	525	33	135	32	136	375	125	35	131	33	137
750	450	10	159	11	159	125	575	20	120	21	122	375	175	37	139	31	144
850	450	9	154	11	153	75	650	22	120	20	116	325	75	47	137	36	148
750	550	11	148	12	152	25	650	18	81	18	87	525	75	61	145	38	142
850	550	9	152	8	149	25	575	22	82	20	85	-75	75	48	76	23	75
750	650	8	162	10	162	25	525	19	69	19	69	-125	75	61	81	39	37
750	750	8	152	9	148	25	475	52	103	49	104	-125	25	87	59	41	23
750	850	10	133	10	134	25	425	48	96	47	96	-125	-25	73	83	23	347
650	950	9	130	9	129	-25	650	33	116	34	116	-125	-75	75	97	28	347
650	850	9	126	11	130	-25	575	26	125	22	125	-125	-125	41	135	19	338
650	1050	5	118	6	114	-25	525	38	132	35	130	-125	-175	64	231	40	237
550	1050	7	131	8	129	-25	475	50	114	43	110	-125	-225	180	261	114	255
550	1150	6	134	6	135	-25	425	51	113	50	108	-125	-275	47	258	33	267
450	1050	10	130	12	129	-75	650	23	94	22	82	-125	-325	143	266	102	268
350	1050	10	120	11	117	-75	575	30	107	28	104	-50	-450	62	310	41	272
650	250	27	159	31	158	-75	525	23	98	21	93	-75	-375	78	274	58	277
650	150	31	172	33	175	-75	475	41	88	38	89	-25	-375	136	327	60	279
650	350	15	153	14	158	-75	425	53	95	50	92	-75	-325	143	270	104	275
650	450	14	160	16	162	-125	650	17	83	16	74	-25	-325	140	310	74	258
550	250	18	161	18	169	-125	575	24	72	27	78	-150	-350	112	275	85	278
550	150	32	151	33	154	-125	525	29	87	25	85	-75	-275	46	219	23	194
550	350	22	162	27	166	-125	475	39	85	33	76	-25	-275	99	319	59	240
450	350	12	143	12	146	-125	425	57	91	57	89	-175	-275	44	310	28	311
550	450	23	158	27	155	-175	650	20	99	19	98	-75	-225	166	270	120	281
450	450	12	140	13	138	-175	575	14	61	17	51	-25	-225	105	301	89	238
650	550	15	144	18	145	-175	525	40	96	33	87	-175	-225	113	292	76	293
550	550	18	164	19	166	-175	475	31	83	33	88	-75	-175	96	219	75	255
450	550	13	140	15	144	-175	425	70	97	64	95	-25	-175	81	300	84	225
550	650	24	154	26	156	-225	625	24	95	21	87	-25	-125	37	2	75	225
450	650	12	123	14	126	-225	525	37	88	33	87	-75	-125	66	172	37	207
650	650	10	153	11	153	-225	475	32	90	30	78	-175	-175	161	316	99	315
650	750	9	141	10	144	-225	425	55	72	53	67	-225	-175	95	317	68	310
550	750	19	146	21	147	-250	650	22	74	21	73	-275	-150	134	347	91	339
450	750	11	128	12	130	-275	550	30	47	27	45	-175	-125	54	348	43	323
550	850	17	132	19	130	-275	450	49	47	45	45	-225	-125	116	6	63	352
450	850	11	220	16	129	-350	550	32	47	30	46	-175	-75	152	85	56	74
550	950	10	125	10	126	-350	450	41	48	38	42	-225	-75	155	26	80	9
475	250	86	176	30	174	-450	650	12	79	11	77	-275	-75	126	7	82	355
525	175	45	152	27	143	-450	550	18	48	17	39	-75	-75	81	136	3	336
475	125	97	169	34	155	-450	450	30	41	27	38	-25	-75	121	4	21	184
425	225	41	139	39	139	-550	650	16	43	15	45	-175	-25	95	21	80	341
425	175	30	149	26	155	-350	650	25	15	24	15	-225	-25	63	27	39	350
425	125	50	141	41	144	-350	750	18	59	16	52	-275	-25	75	7	65	343
450	275	118	136	33	143	-250	750	22	71	20	69	-75	-25	37	106	21	278
375	225	33	126	27	131	-150	750	26	98	25	95	-25	-25	133	23	25	258
375	275	27	138	28	145	-150	850	13	56	9	352	-175	25	78	50	58	16
375	325	88	163	35	140	-50	750	15	100	14	100	-225	25	65	39	57	2
425	425	37	150	14	143	-50	850	11	100	1	203	-275	25	66	33	51	13
325	275	39	150	38	150	125	650	21	113	21	118	-75	25	113	104	25	75
325	325	42	139	37	142	150	750	9	109	9	110	-25	25	160	26	24	99
325	375	51	126	45	129	50	750	15	114	13	108	-25	75	172	22	33	85
350	450	32	167	10	124	50	850	12	91	0	243	-175	75	77	62	68	36
350	550	34	158	13	119	150	850	12	113	11	112	-225	75	63	59	51	34
275	325	18	115	21	130	250	750	11	120	10	115	-275	75	70	44	63	21
275	375	34	124	34	127	350	650	29	163	8	119	-175	125	72	53	88	35
275	425	36	151	34	148	350	850	34	151	17	120	-225	125	65	73	58	58
325	475	39	147	24	125	250	850	20	103	19	102	-275	125	55	35	56	22
275	550	11	132	12	133	150	950	21	130	13	159	-350	150	60	27	66	20
225	375	40	113	40	112	350	750	31	163	12	132	-125	125	52	64	55	54
225	425	19	111	17	107	350	950	31	101	15	111	-75	125	67	95	69	94
225	475	11	231	15	114	450	950	41	133	18	133	-25	125	126	36	89	123
225	525	54	133	20	128	250	950	4	110	4	102	-175	175	69	37	89	30
250	575	9	131	8	132	50	950	13	85	17	127	-225	175	32	44	40	43
250	650	18	129	17	129	225	325	40	134	33	133	-275	175	30	63	34	44
175	425	31	145	29	145	225	275	56	117	55	118	-125	175	90	89	107	86

|E| : Intensity(unit; mV/A·100m) of Electric Field
φ : Azimuth(unit; Degree) of Electric Field

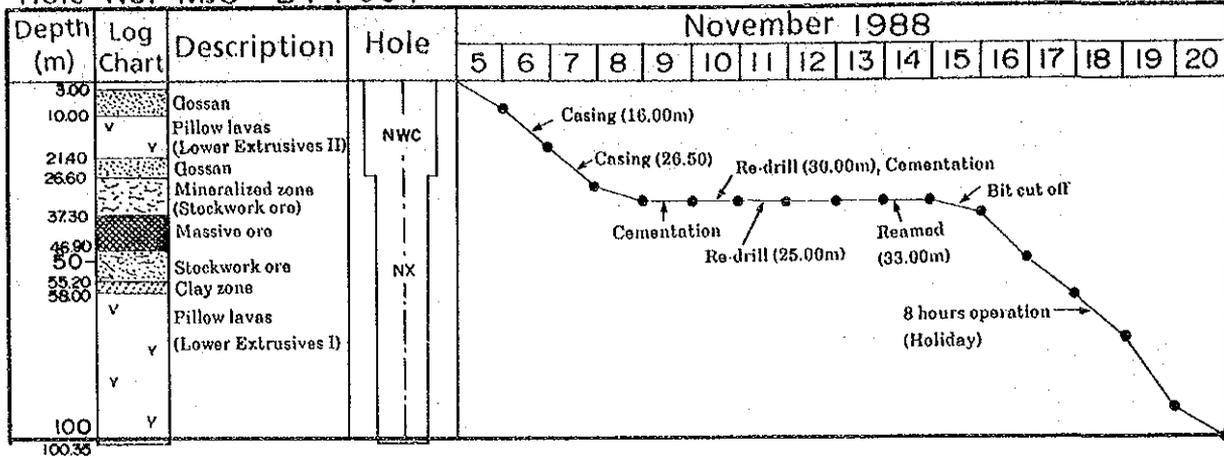
X	Y	MJO-B1		MJO-B5		X	Y	MJO-B1		MJO-B5		X	Y	MJO-B1		MJO-B5	
(m)	(m)	E	φ	E	φ	(m)	(m)	E	φ	E	φ	(m)	(m)	E	φ	E	φ
-75	175	69	101	78	98	125	375	65	151	61	161	425	75	55	138	45	143
-25	175	103	40	88	122	175	375	44	124	42	122						
-175	225	34	79	35	65	75	325	50	105	50	105						
-225	225	62	274	42	73	125	325	78	127	78	127						
-275	225	46	293	64	71	175	325	99	133	96	134						
-350	250	52	357	71	28	-75	325	26	102	22	82						
-125	225	61	65	71	58	75	275	44	79	43	81						
-75	225	60	102	65	97	125	275	105	142	102	142						
-25	225	100	34	69	117	175	275	56	148	55	149						
-175	275	62	256	47	107	75	225	54	107	51	109						
-125	275	70	288	45	42	125	225	43	141	43	143						
-75	275	50	259	62	95	175	225	101	131	98	132						
-25	275	107	330	55	104	175	175	62	150	60	155						
-225	275	102	153	47	65	75	175	27	136	26	143						
-275	275	69	57	66	52	125	175	23	140	24	151						
-275	350	62	38	50	32	75	125	104	123	84	126						
-350	350	48	30	45	26	125	125	66	131	57	138						
-450	350	33	44	29	35	175	125	35	136	37	152						
-225	375	50	52	48	49	225	25	80	185	72	194						
-225	325	54	73	49	68	225	-25	71	187	59	199						
-175	325	37	104	33	89	225	-75	60	181	49	191						
-125	325	26	81	27	84	225	-125	42	188	34	206						
-25	325	43	113	43	113	225	-175	60	184	44	193						
-175	375	53	88	46	83	225	-225	70	232	59	239						
-125	375	64	86	58	82	225	-275	57	244	50	251						
-75	375	72	106	66	103	225	-325	44	226	33	236						
-25	375	59	116	54	111	300	-375	27	213	20	221						
25	75	166	133	123	137	325	-325	47	234	35	237						
25	25	96	145	65	165	275	-275	60	213	49	224						
25	-25	139	167	71	201	350	-275	31	238	29	248						
25	-75	116	176	57	198	275	-225	68	214	57	221						
25	-125	141	216	103	235	325	-225	53	221	48	221						
25	-175	164	204	108	217	425	-225	54	226	44	241						
25	-225	119	220	81	232	275	-175	63	200	53	204						
25	-275	95	208	54	217	325	-175	39	203	34	209						
25	-325	104	242	65	244	375	-175	35	217	31	225						
25	-375	68	226	44	232	275	-125	67	170	53	178						
75	-450	83	234	56	237	325	-125	34	203	33	222						
75	-375	79	217	53	219	375	-125	42	201	37	209						
125	-375	78	243	58	245	275	-75	42	166	29	183						
175	-375	61	257	47	255	325	-75	32	155	29	167						
75	-325	70	234	48	244	375	-75	49	180	42	185						
125	-325	71	230	53	232	275	-25	44	179	38	187						
175	-325	77	221	59	222	325	-25	15	175	18	174						
75	-275	57	220	35	229	375	-25	35	171	27	183						
125	-275	50	169	35	172	275	25	45	188	46	199						
175	-275	81	196	63	208	325	25	20	169	15	197						
75	-225	91	191	61	206	375	25	30	143	26	153						
125	-225	49	250	52	269	225	75	82	166	73	173						
175	-225	55	207	45	213	275	75	55	170	55	172						
75	-175	119	239	97	252	950	50	25	155	17	167						
125	-175	69	237	62	243	950	-50	23	183	16	189						
175	-175	29	228	37	252	850	50	21	136	16	157						
75	-125	132	218	112	233	850	-50	16	180	15	187						
125	-125	98	221	82	233	750	50	35	129	25	143						
175	-125	56	228	52	224	750	-50	28	168	25	172						
75	-75	124	167	91	184	800	-150	22	182	20	185						
125	-75	97	180	81	194	650	50	48	138	38	154						
175	-75	73	183	61	198	650	-50	34	174	32	178						
75	-25	98	195	82	201	650	-150	30	191	27	195						
125	-25	96	164	80	188	550	50	63	132	51	145						
175	-25	79	165	68	182	550	-50	37	184	35	191						
75	25	171	149	104	155	550	-150	31	212	29	219						
125	25	86	176	89	178	600	-250	29	201	27	202						
175	25	49	193	53	199	475	25	67	157	26	130						
75	75	102	128	79	133	525	-25	53	202	38	208						
125	75	100	133	86	142	475	-75	48	179	10	200						
175	75	71	138	58	151	525	-125	57	226	47	237						
25	125	120	126	96	130	425	25	23	160	20	169						
25	175	87	134	82	134	425	-25	37	187	33	188						
25	225	49	111	46	108	425	-75	25	217	26	228						
25	275	61	113	61	109	425	-125	56	185	49	190						
25	325	50	102	43	96	450	-175	44	191	24	209						
25	375	48	101	47	102	450	-250	41	202	22	220						
75	375	51	123	49	124	375	75	31	116	23	131						

|E| : Intensity (unit; mV/A·100m) of Electric Field
φ : Azimuth (unit; Degree) of Electric Field

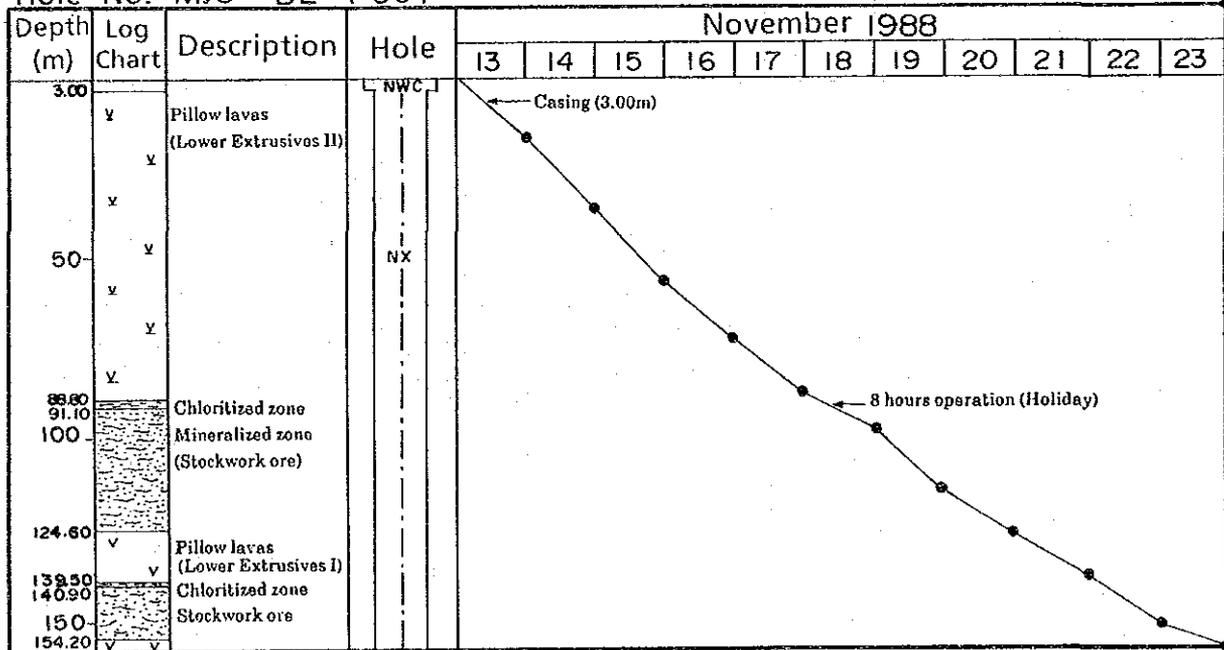
Appendix 12

Progress of the each drill hole in area B

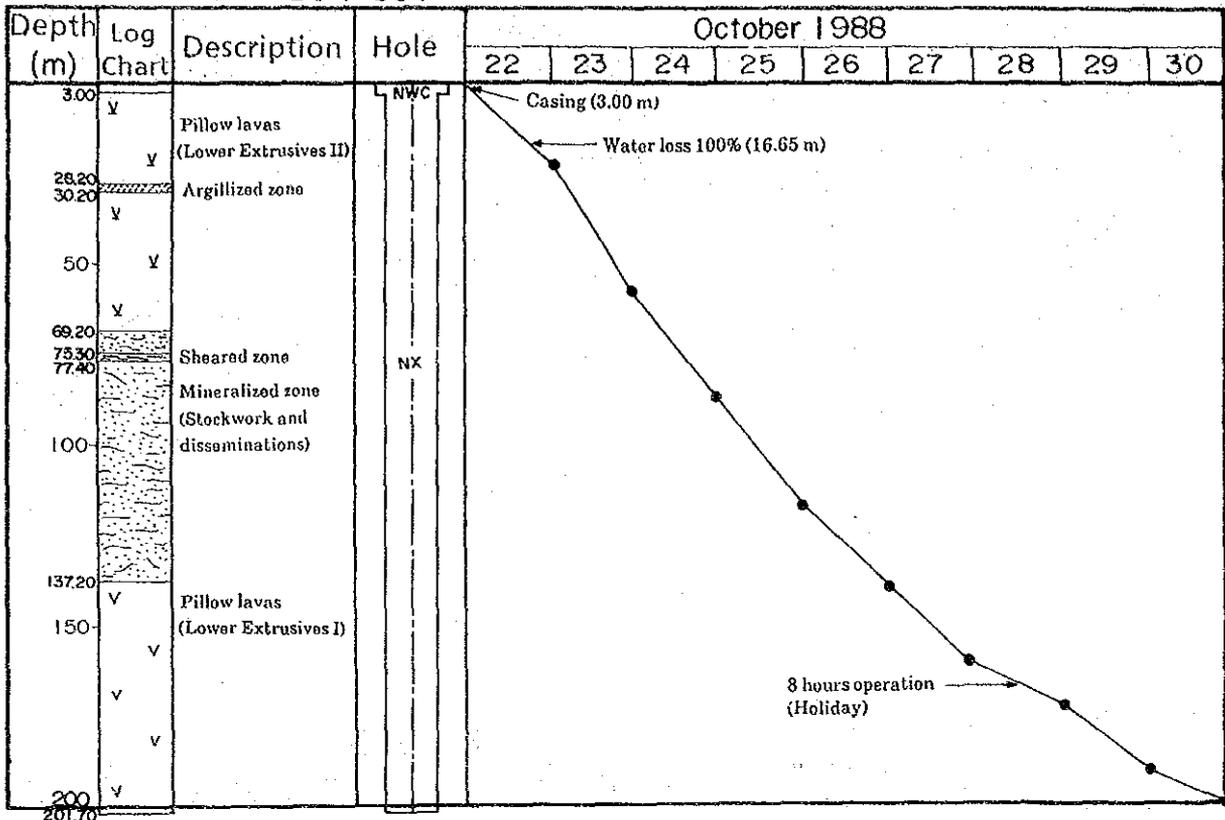
Hole No. MJO - B1 (-90°)



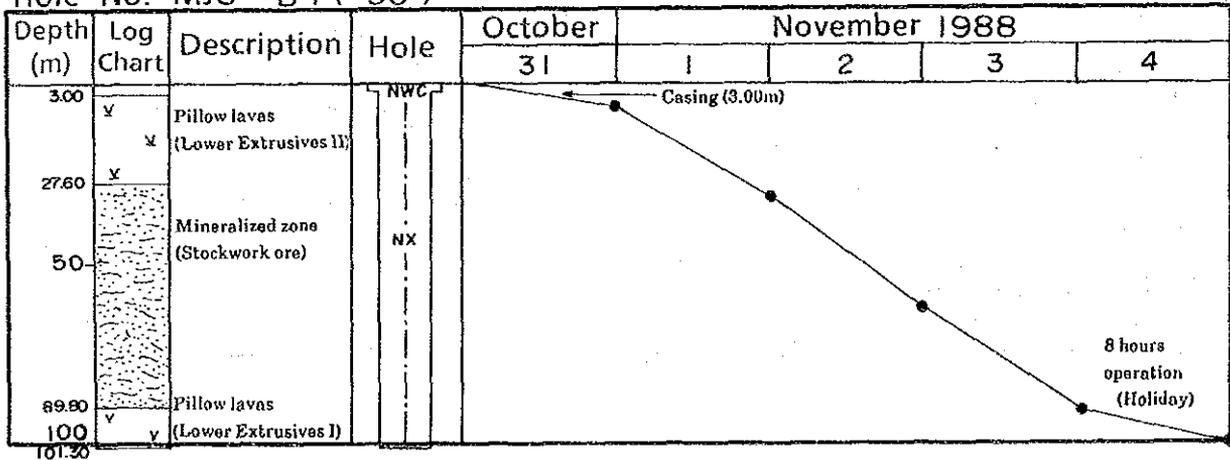
Hole No. MJO - B2 (-90°)



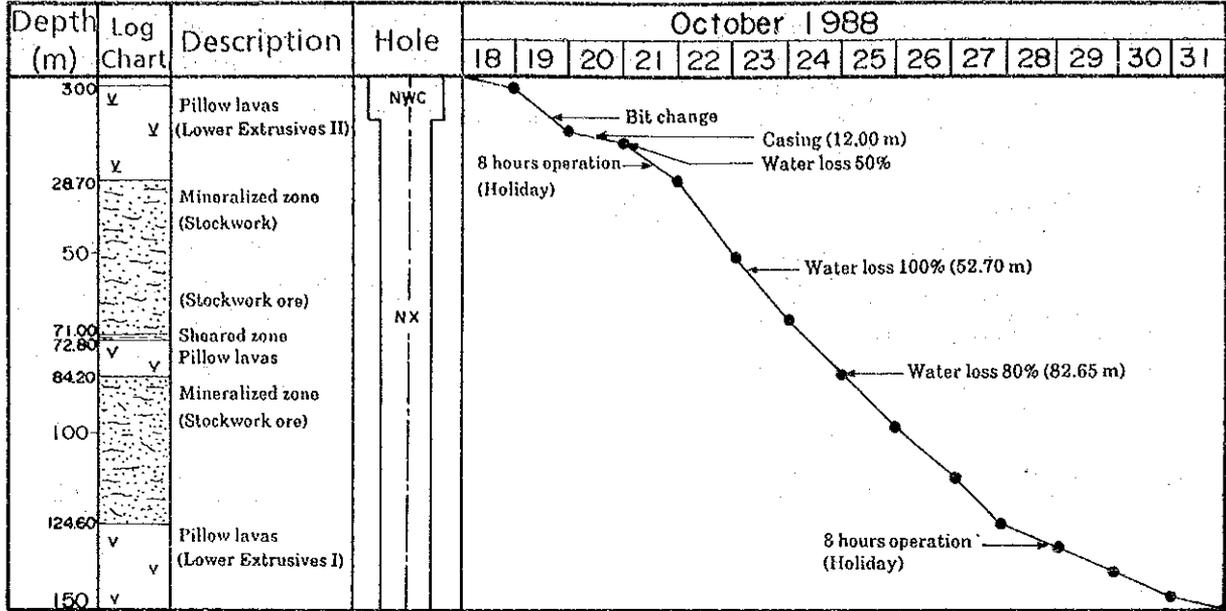
Hole No. MJO -B3 (-90°)



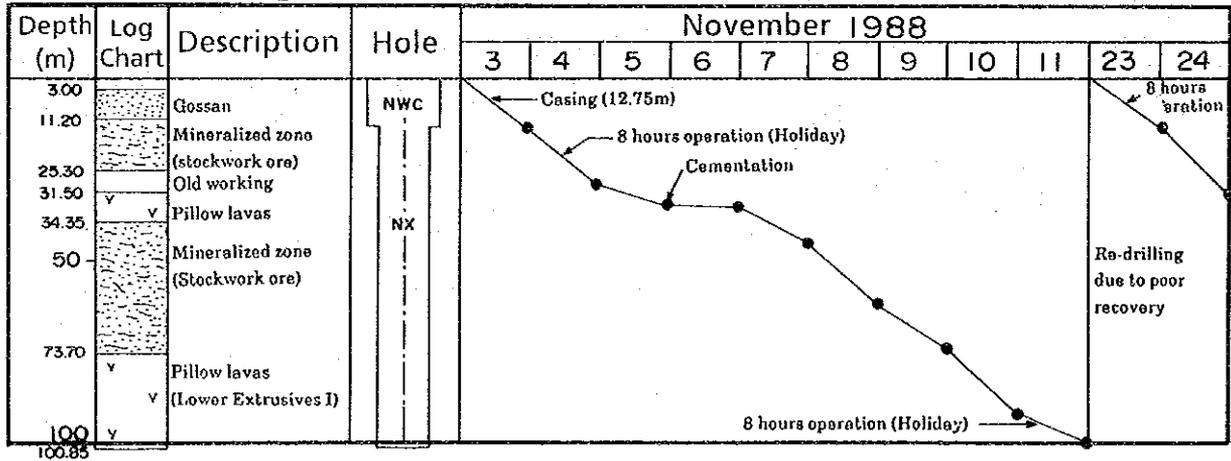
Hole No. MJO - B4 (-90°)



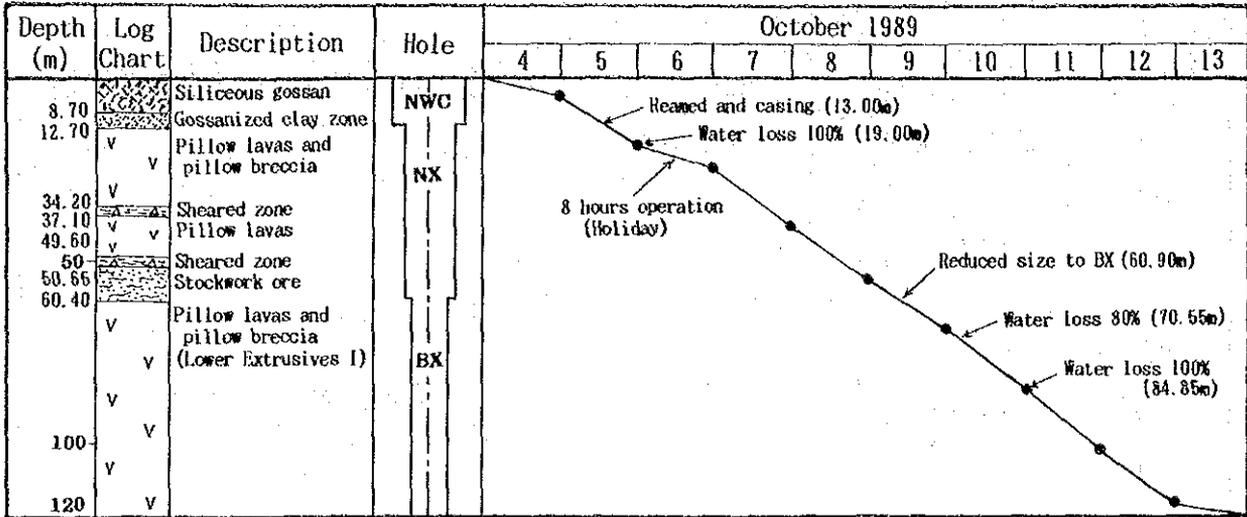
Hole No. MJO - B5 (-90°)



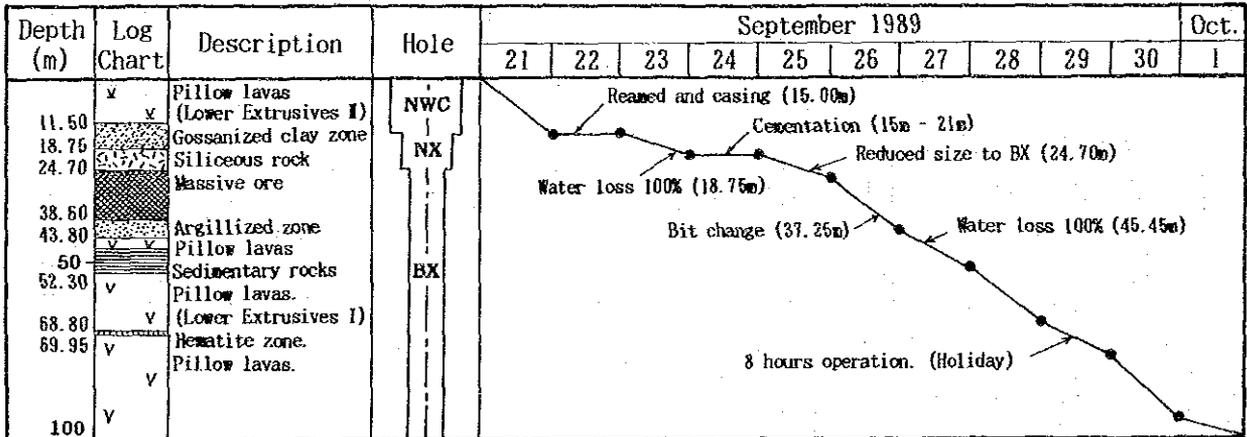
Hole No. MJO - B6 (-90°)



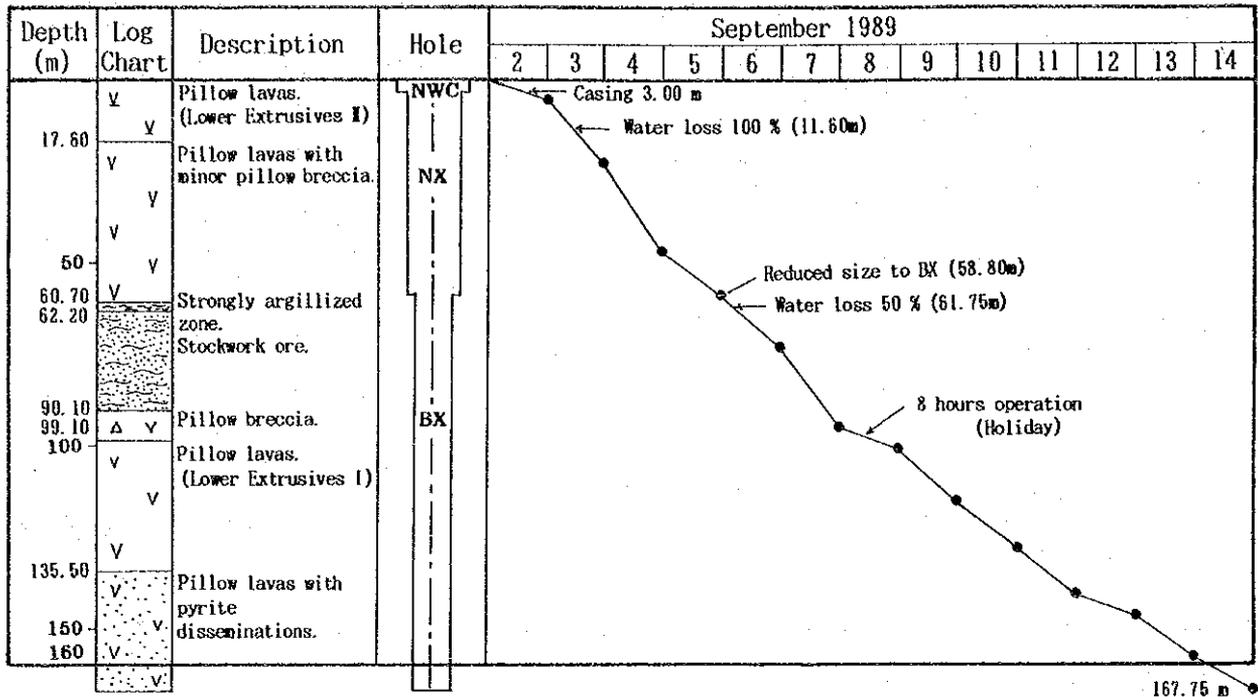
Hole No. MJO-B7 (-90°)



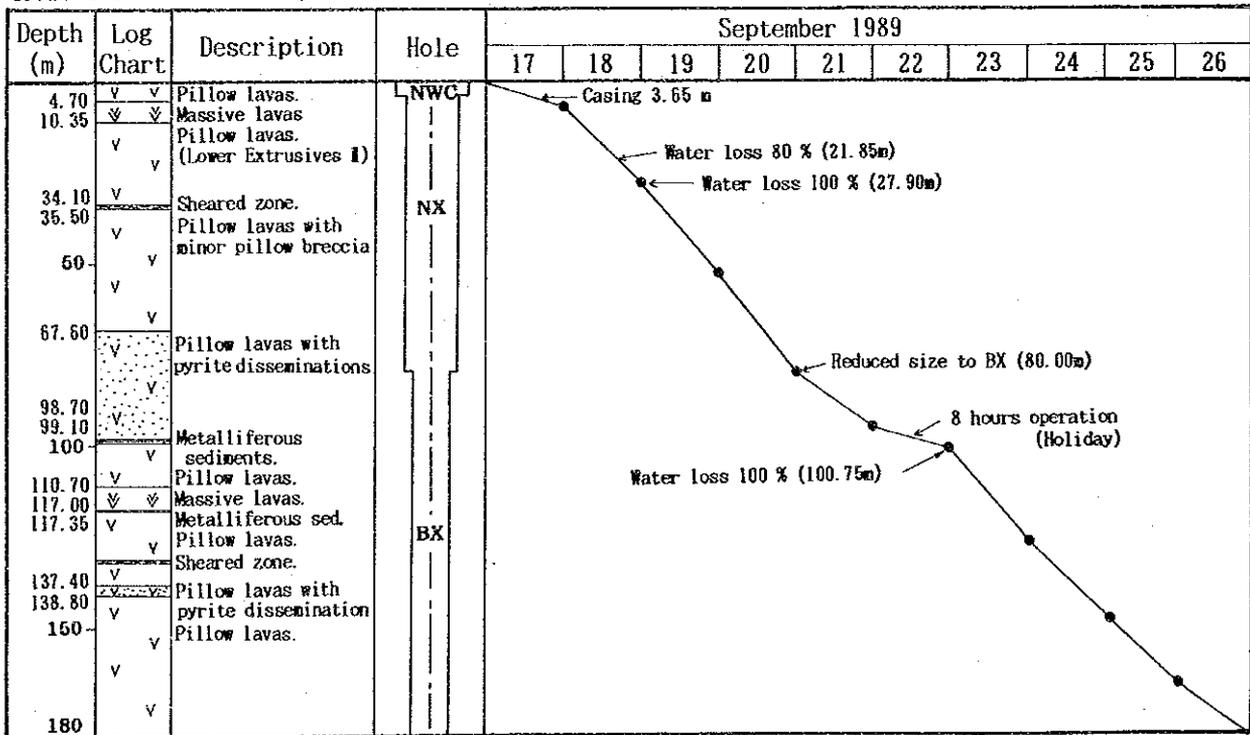
Hole No. MJO-B8 (-90°)



Hole No. MJO-B9 (-90°)



Hole No. MJO-B10 (-90°)



Hole No. MJO-B11 (-90°)

