PART II SURVEY RESULTS

CHAPTER 1 GEOLOGICAL SURVEY

1-1 Stratigraphy

The general stratigraphy of the area is shown in Fig.II-1-1. The geology of the South Batinah Coast area is mainly composed of Samail Ophiolite, Supra-ophiolite Sediments of Batinah Olistostrone, Tertiary and Quaternary sediments.

The Samail Ophiolite in the surveyed area consists of Sheeted-dyke Complex (SD), Samail Volcanic Rocks (SV), Intrusive Rocks (I') as well as Batinah Olistostrone and Tertiary and Quaternary sediments.

1-1-1 Sheeted-dyke Complex (SD)

In outcrops, the Sheeted-dyke Complex appears as a set of sub-parallel dykes of 0.5 to 3m wide whose composition ranges from microgabbroic to doleritic. The Sheeted-dyke Complex grades upward into the Lower Volcanic Rocks.

1-1-2 Samail Volcanic Rocks (SV)

The Samail Volcanic Rocks can be divided into three members consisting of Lower Volcanic Rocks (SV1), Middle Volcanic Rocks (SV2), and Upper Volcanic Rocks (SV3).

(1) Lower Volcanic Rocks (SV1)

The Lower Volcanic Rocks consist of Lower extrusives rocks (V1-1), Upper extrusives rocks (V1-2) and metalliferous sediments (U1).

V1-1 consists of differential basaltic to andesitic lavas, and composed mainly of reddish brown colored pillow lava with large pillow size of 1m to 2m in diameter. V1-1 also consists of reddish brown to gray colored massive lava, hialoclastite and pillow breccia. Characteristically, the pillow lava is aphanitic and accompanied with thick interpillows of 5cm to 40cm in thickness. The massive lava shows gray to brownish gray color with a thickness of several tenth centimeters to several meters. Columnar joints are developed in the thick massive lava.

V1-2 consists of primitive basaltic lava composed mainly of pillow lava accompanied with massive lava. The pillow lava shows light gray to purplish gray in color with pillow sizes mainly of 10cm to 1m in diameter and a maximum of 1.5m. It is characteristically accompanied with small sized pillow lavas of 10cm to 30cm in many places. Additionally, this pillow lava is porphyritic and shows a variole-like texture. In contrary to V1-1, V1-2 is accompanied with thin interpillows of 1cm to 5cm in thickness. The upper part of V1-2 includes pillow lavas with radial joints.

U1 is the so-called umber that includes many radiolarians and predominant in iron oxides. This unit shows dark brown color.

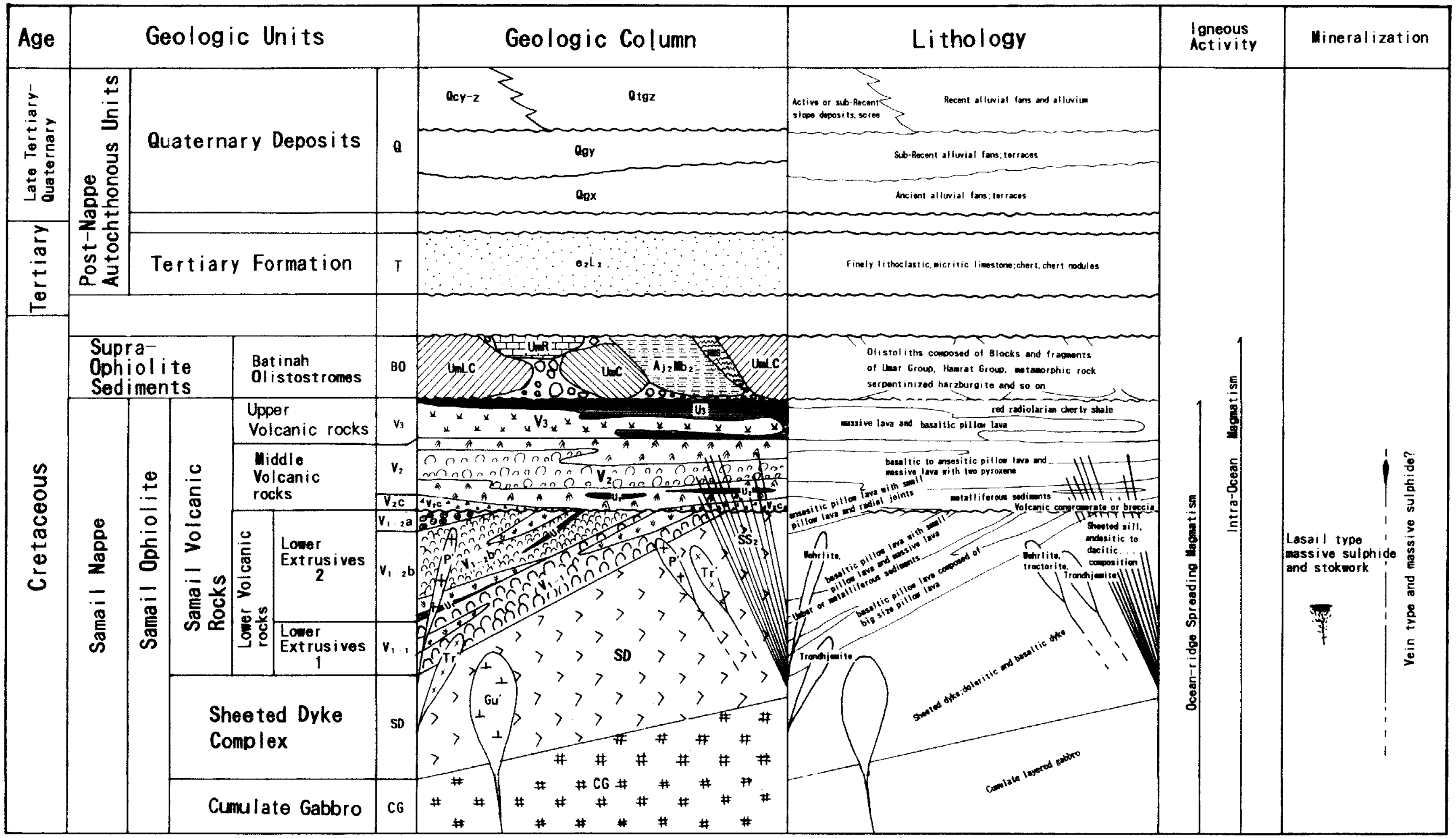


Fig. II-1-1 Stratigraphic columnar section of survey area

(2) Middle Volcanic Rocks (SV2)

The Middle Volcanic Rocks (SV2) consist of volcanic conglomerates and breccia (V2c), extrusives rocks (V2) and metalliferous sediments (U2).

V2c consists of angular to rounded matrices of sand to gravels and of fragments and blocks of Sheeted dykes and Lower Volcanic Rocks.

V2 consists mainly of pillow lavas and massive lavas of andesite containing clinopyroxene and orthopyroxene. Most of the lavas are massive. The weathered surface shows various colors of gray, brownish gray, green, bluish gray and orange color. In general the massive lava shows a doleritic texture. The pillow lavas show purple, green and greenish gray colors. Most of the pillow lavas present irregular pillow shapes with diameters of about 0.5 to 1.0m.

U2 are the so-called umber and contains more radiolarians but fewer amounts of iron oxides than U1. This unit shows brownish black color.

(3) Upper Volcanic Rocks (SV3)

The Upper Volcanic Rocks consist mainly of extrusives rocks (V3) and metalliferous sediments (U3).

V3 is composed of doleritic massive lava (sheet flow) and pillow lava. Massive lava of V3 shows a light greenish gray color and forms a columnar joint in many places. The sheet flow of this massive lava reaches 170m in maximum thickness as one unit. Pillow lava of V3 can be seen in the lowermost, middle, and uppermost of SV3, showing in general a dark greenish color. The size of pillows ranges mostly between 0.6m and 1.2m in diameter.

U3 is interbedded in the uppermost and middle parts of SV3. It is mainly composed of reddish brown sediments predominant in iron materials and accompanied with pinkish shale and jasper.

(4) Intrusive Rocks (I')

The Intrusive Rocks include peridotite (P'), gabbro (Gu'), trondhjemite (Tr') and late dolerite dykes. Peridotite (P') consists of wehrlite, troctolite, plagioclase-bearing dunite and olivine-bearing pyroxenite. Gabbro (Gu') is associated with diorite and quartz diorite. Trondhjemite (Tr') also includes quartz diorite in parts. Late dolerite dykes are accompanied with fine-grained gabbro.

1-1-3 Supra-ophiolite Sediments (Batinah Olistostrome)

The sediments (BO) consist of olistoliths of sedimentary formations formed in Tethys Sea. Olistoliths, which came as result of the obduction process at the same time when Tethys Sea closed, are composed of sedimentary and igneous rocks of Triassic to Cretaceous age.

1-1-4 Post-nappe autochthonous units

These units consist of Tertiary and Quaternary sediments. The Tertiary sediments consist of yellow marl with large foraminifera (e2M1), upper nodular limestone (e2L2), and sedimentary breccia (Br) of late Paleocene to early Eocene. The Quaternary deposits consist of ancient alluvial fans (Qgx), sub-Recent alluvial fans (Qgy), active or sub-Recent slope deposits (Qcy-z), Khagra depressions with Recent or sub-Recent clay and silt (Qky-z), eolian sand of Recent or sub-Recent dunes (Qdy-z), coating of sub-Recent dunes (Qsy-z) and Recent alluvial fans and alluvium (Qtgz).

1-2 Geological Structure in South Batinah Coast Area

Main structure in the South Batinah Coast area is the pile-up structure formed when allochthonous Samail Ophiolite and Supra-ophiolite sediments had been thrust over the Arabian shield at the late Cretaceous age. The Tertiary and Quaternary sediments of the post-nappe autochthonous units unconformably overlie the allochthonous units in the South Batinah Coast area. Many thrust faults are developed in the area that formed contacts of piled-up blocks originated before Tertiary and sliced the autochthonous and allochthonous blocks. High-angle faults developed in the area cut each of the above blocks and displaced the geological boundaries. These faults were formed before Tertiary.

1-3 Massive Sulphide Deposits in South Batinah Coast Area

Massive sulphide deposits distributed in the project area are considered to be formed by hydrothermal convection processes in the spreading ridge of the Paleo-Tethys Sea during Middle to Late Cretaceous age.

On the basis of the results of the exploration projects in the northern Oman Mountains, Bishimetal (1987) proposed the idea of the formation processes of massive sulphide deposits as follows (Fig.II-1-2):

1) During spreading after the eruption of Lower extrusives1 (V1-1), intensive intrusion of dykes occurred around the marginal part of the magma chamber along major normal faults and/or fractures. This intrusion initiated the eruption of Lower extrusives2 (V1-2).
2) The intrusion of dykes may have caused local hydrothermal convection around the cluster of dykes, overlapping the pre-existing major convection.
3) This local convection may have provided voluminous hydrothermal fluids containing ore-forming metals, which were exhaled to the superficial parts of Lower extrusives 1 and discharged on the seafloor along numerous fractures parallel to the major faults.
4) Ore-forming fluids exhaled on the seafloor precipitated ore minerals and formed a massive sulphide deposits in a relatively large depression formed on an undulating surface of Lower extrusives 1.
5) Then volcanic activities became intense again and above massive sulphide deposits was covered by Lower extrusives 2.

1-4 Geological Survey

According to the exploration indicators described in Chapter 1 of Part 1, detailed geological survey

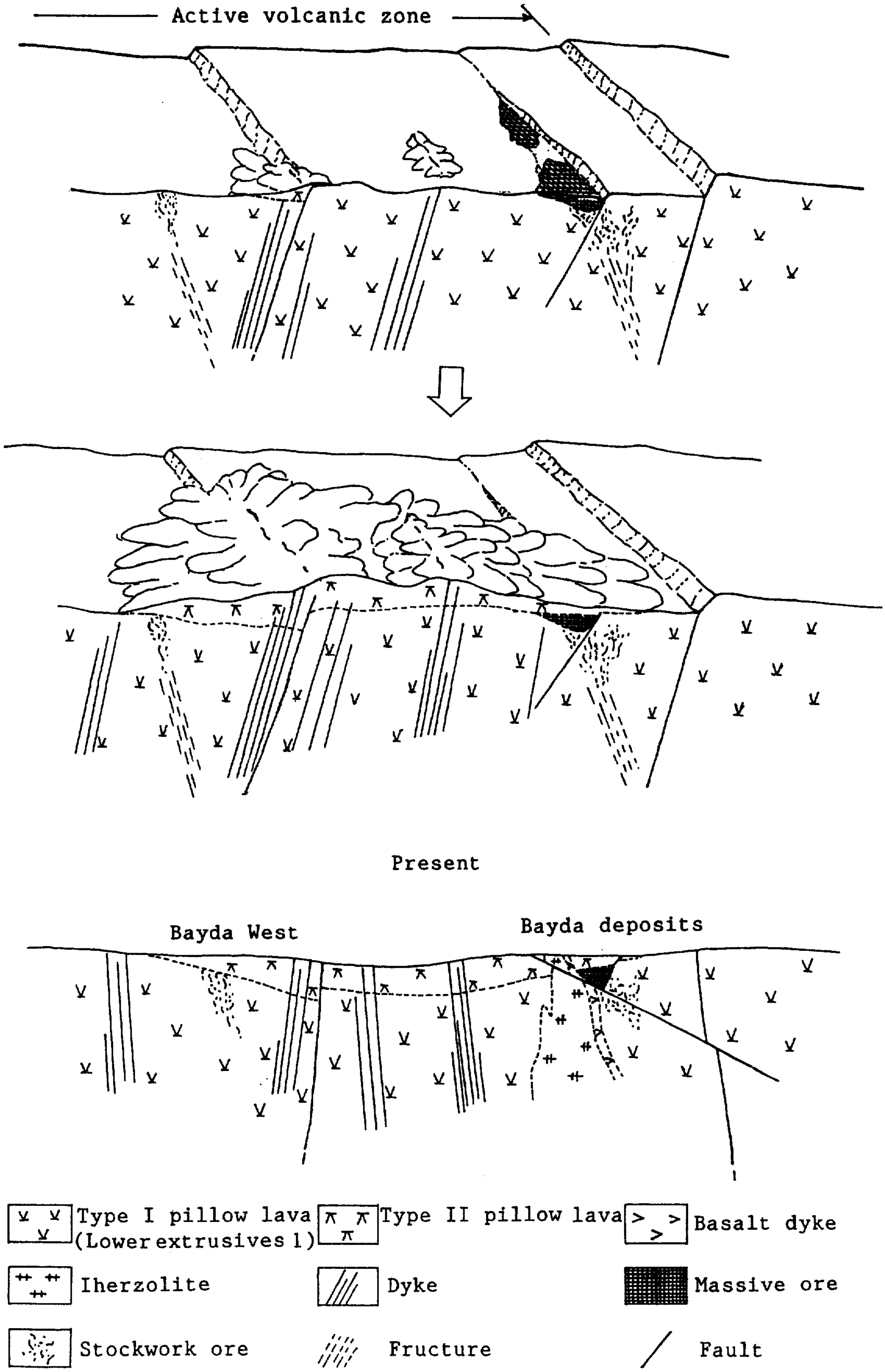


Fig.II-1-2 Schematic formation processed of massive sulphide deposits in Sohar was carried out in and around mineral showings in the northwestern part of the project area. On this basis, the following 6 mineral showings were selected as promising areas for further study: Zuha, Salahi, Maqail, Hara Kilab, Mahab and Sarami. Big gossan exists in Zuha and small massive sulphide deposit had been recognized in Hara Kilab, for which these two areas were considered to have high potential for the existence of massive sulphide deposits. The results of geological survey in these areas were as follows:

Zuha area: Three features can be noted, i.e., a large scaled gossan of almost the same size as the gossan in Ghuzayn, an ancient smelting site nearby the gossan and abundant copper oxides around the gossan. The intense epidotization observed in V1-1 and U1 can be continuously traced for a long distance. These facts confirmed a high potential for the existence of ore deposits in this area.

Hara Kilab area: Good indications for the existence of massive sulphide deposits are given by two ancient mines located in the area and by a widely distributed silicified zone that is partly gossanized. Intense epidotization can be seen around ancient mining sites as well as near Mahab village in the southern part of the area. Since small-scaled massive sulphide deposits were already confirmed and several features of mineralization were observed in the area, the area was considered to have a high potential for the existence of massive sulphide deposits.

Salahi area: U1 with copper oxides and magnetite was recognized in many locations. Intense epidotization was also recognized in some location. Especially, U1 with abundant magnetite outcropping in the north part has 2m thickness, shows developed stratification and is also accompanied by copper oxides. These features present the aspect of being the end part of massive sulphide ore body.

Maqail area: A thick U1 with abundant magnetite is extensively exposed and accompanied with copper mineralization. These features support the idea that U1 grades laterally into massive sulphide ore. Moreover, a gossanized zone with copper mineralization over V1-2 crops out along the faults of NNW-SSE trending in the central part.

Mahab area: U1 contains abundant magnetite and relatively intense epidotization is observed in V1-1. The existence of faults in this area, however, limits the extension of the area for exploration purposes.

Sarami area: Two features can be emphasized, i.e. a copper mineralization seen in V1-1 in several locations and a wide silicified zone with a small-scaled gossan found in V1-2 cropping out in northern part. Intense epidotization was confirmed in V1-1 outcropping around this silicified zone. In addition, metalliferous sediments containing magnetite and copper oxides were found in one location.

CHAPTER 2 DETAILED SURVEY IN DARIS AREA

2-1 Geology and Mineralization

This area is located in the eastern edge of the project area.

Geology of the area consists of sheeted dykes and Samail volcanic rocks of Samail Ophiolite, Supra-Ophiolite sediments (Batinah Olistostromes), Tertiary sedimentary rocks of autochthonous and Quaternary sediments. In this area widely covered by Quaternary sediments, the Samail volcanic rocks, which is host rock of massive sulphide deposits, crops out in a limited way.

Daris deposit accompanied by small gossan outcrops is located in the area. A drilling survey was conducted around this gossan by Prospection Ltd. during 1976 to 1978, and confirmed two distinctive mineralized blocks, differentiated as the eastern and western blocks.

In the eastern block, the top of mineralized part of Lower volcanic rocks occurs as a gossan lying directly below a recent thin overburden. Only small amounts of massive sulphides are locally preserved below weathered Middle volcanic rocks. The primary ore is almost completely oxidized in this block. Prospection Ltd. estimated reserves is 0.6 Mt at 1.9% Cu.

It is thought that the western block is divided from the eastern block by a fault zone. Two boreholes drilled by Prospection Ltd. intersected a massive sulphide ore body. Drillings conducted later by BRGM in 1986 intersected this ore body by three boreholes and encountered a maximum core length of 7m with average grades of 2.36% Cu, 0.15% Zn, 16g/t Ag and 0.86g/t Au. According to the results of these drillings, it is confirmed that this ore body is of a small scale and was formed in a narrow (20 to 50 m wide) semi-graben which stretches westwards over at least 200 m. Geological reserves of the western block estimated by BRGM is 145,000 tons of sulphide ore averaging 1.95% Cu, 0.21% Zn, 12g/t Ag and 0.6g/t Au.

2-2 Survey Results

2-2-1 Geophysical Survey

(1) Outline of Survey

In this area, ground geophysical survey consisting of TDIP and TEM surveys were carried out in 1995 and 1996 during the project of Cooperative Mineral Exploration in the Central Batinah Coast Area. Fig.II-2-1 shows the location of the geophysical survey.

TDIP survey was carried out in 1995 with a total of 45.2km line-length consisting of 15 survey lines along the N10°E direction. TEM survey was carried out in 1995, 1996 and 1997 with a total of 6 loops consisting of 486 observed stations.

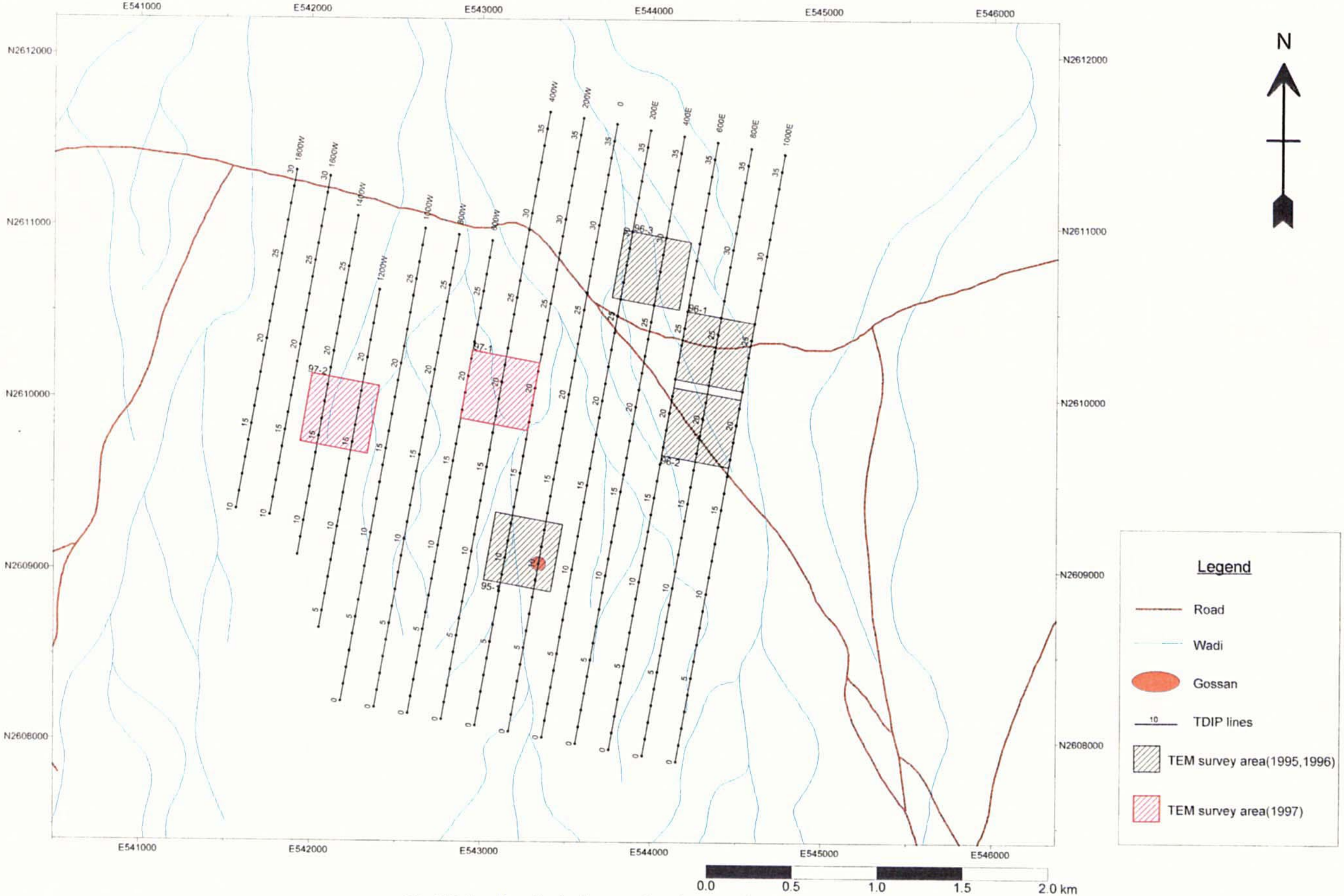


Fig.II-2-1 Geophysical survey location map in Daris area

(2) Survey results

The TDIP results are shown in Fig.II-2-2, while the compiled geophysical map is indicated in Fig.II-2- 3.

Regarding the resistivity distribution of this area, several resistivity parallel trends are seen from south to north: a distribution of relatively low values of less than 50 ohm-m, a high resistivity zone around 100 ohm-m, a low resistivity and finally, a medium resistivity distribution (50 to 100 ohm-m).

The chargeability distribution follows in general the same pattern as the resistivity distribution. For instance, in the central zone where high resistivity values are distributed, relatively high chargeabilities above 10mV/V are seen, while in the southern zone of the low resistivity values, low chargeabilities of less than 6mV/V are seen.

Since the metal factor is the ratio between chargeability and resistivity, it shows almost the same pattern as the above mentioned parameters. High metal factor anomaly zones with values above 30 are found distributed in the south of the area as well as in the gossan and its surrounding zones.

To further investigate the high metal factor zones, TEM survey was carried out within these zones, and detected three TEM anomaly zones in the northeast part and in the central part of this area. Drilling survey was carried out at six boreholes within these TEM anomaly zones.

2-2-2 Drilling survey

This survey was carried out by drilling one borehole in the TEM anomaly zone, however, no massive sulphide ore body was intersected. By observation of core samples from this borehole, it was inferred that the TEM anomaly resulted from the effect of a fractured zone.

The wide and high chargeability zone detected in Daris area may reflect indications of a blind massive sulphide mineralization. However, if any massive sulphide is found, it should not be a big scale deposit because significant low resistivity zones were not detected on the above mentioned high chargeability zone. Furthermore, the several fractures and faults recognized by the previous drillings suggest that Daris area is located in an area of a complicated geological structure.

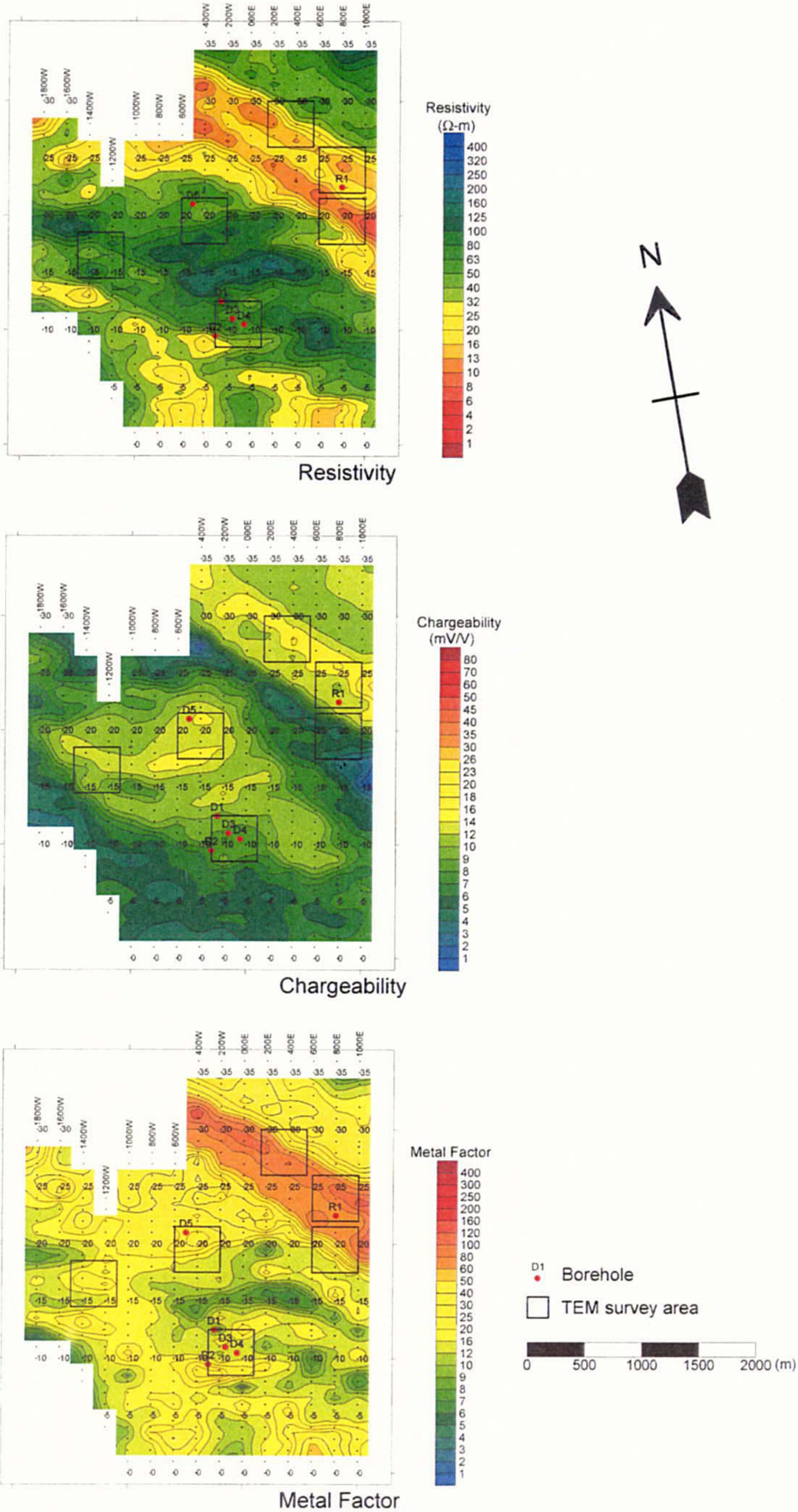


Fig.II-2-2 IP plane map for n=3 in Daris area

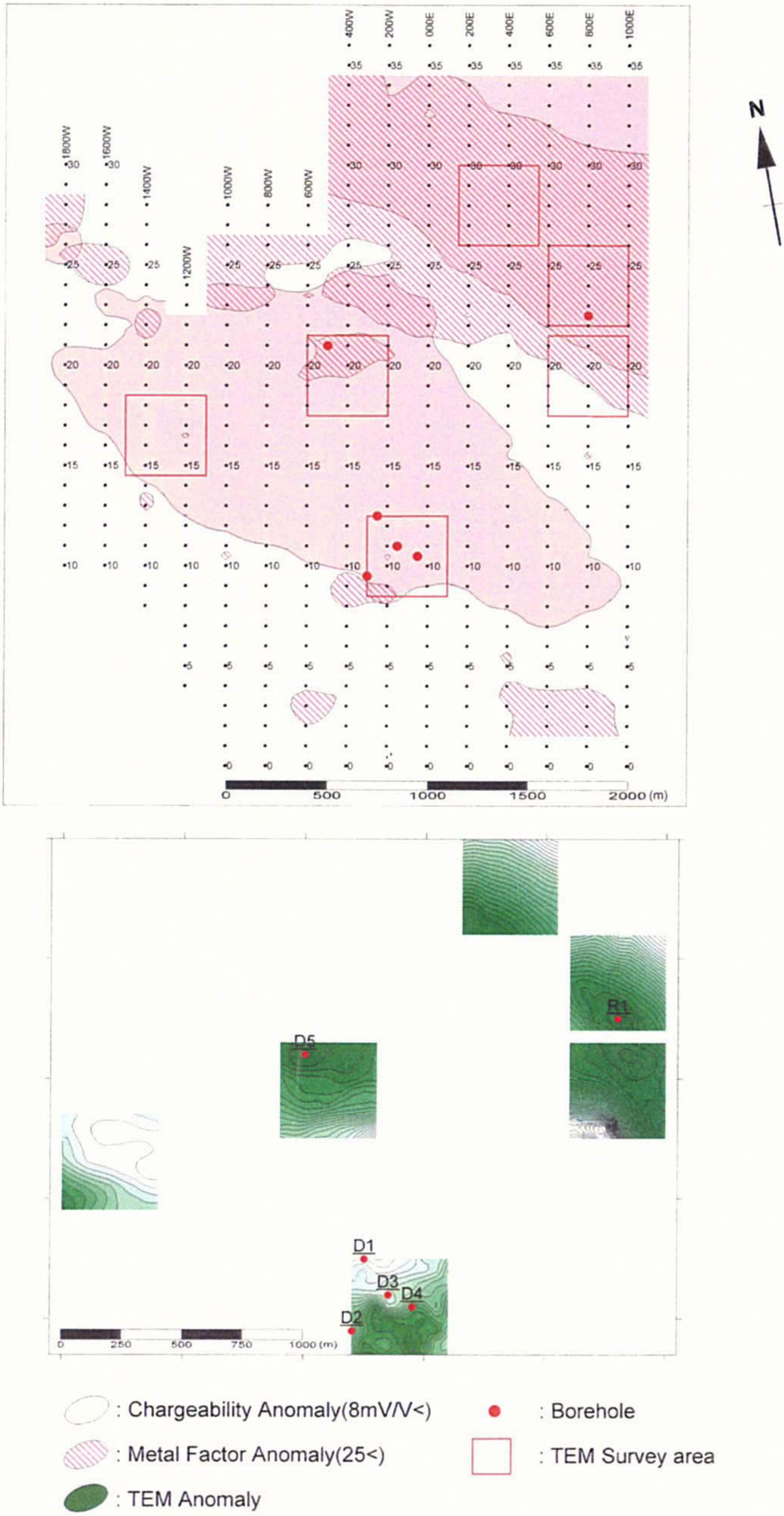


Fig.II-2-3 Compiled geophysical map in Daris area

CHAPTER 3 DETAILED SURVEY IN GHUZAYN and DOQAL AREAS

3-1 Geology and Mineralization

3-1-1 Ghuzayn area

This area is located in the central part of the project area.

The geology of Ghuzayn area consists mainly of SD, V1-1, V1-2, U1, and V2 of Samail Ophiolite and Quaternary sediments (Fig.II-3-1).

Within this area a large scaled siliceous gossan is found with an approximate extension of 100m by 200m. An oxidized mineralized zone of disseminations and stockwork consisting of pyrite and chalcopyrite forms this gossan. Nearby the gossan are also found copper oxides and U1 with abundant magnetite.

In the south of Ghuzayn area it is observed U1 with abundant magnetite and copper oxides, while in the west it is found a silicified zone with scattered copper oxides. In the east it can be found chalcopyrite bearing quartz veins and U1 with copper oxides.

In this area, ore bodies No.1 and No.2 were discovered by the previous Cooperative Mineral Exploration in the Central Batinah Coast area and ore body No.3 was discovered by this project. Details of these ore bodies are described later.

3-1-2 Doqal area

Doqal area is located 10km west of Ghuzayn deposit and to the south of Doqal village.

The geology of Doqal area consists mainly of SD, V1-1, V1-2, U1, and V2 of Samail Ophiolite and Quaternary sediments.

The gossan is found in the Middle volcanic rocks and extends over 600m with a width of about 10m. The 2.0g/t Au and 44.2g/t Ag in maximum were obtained from the analysis of gossan samples.

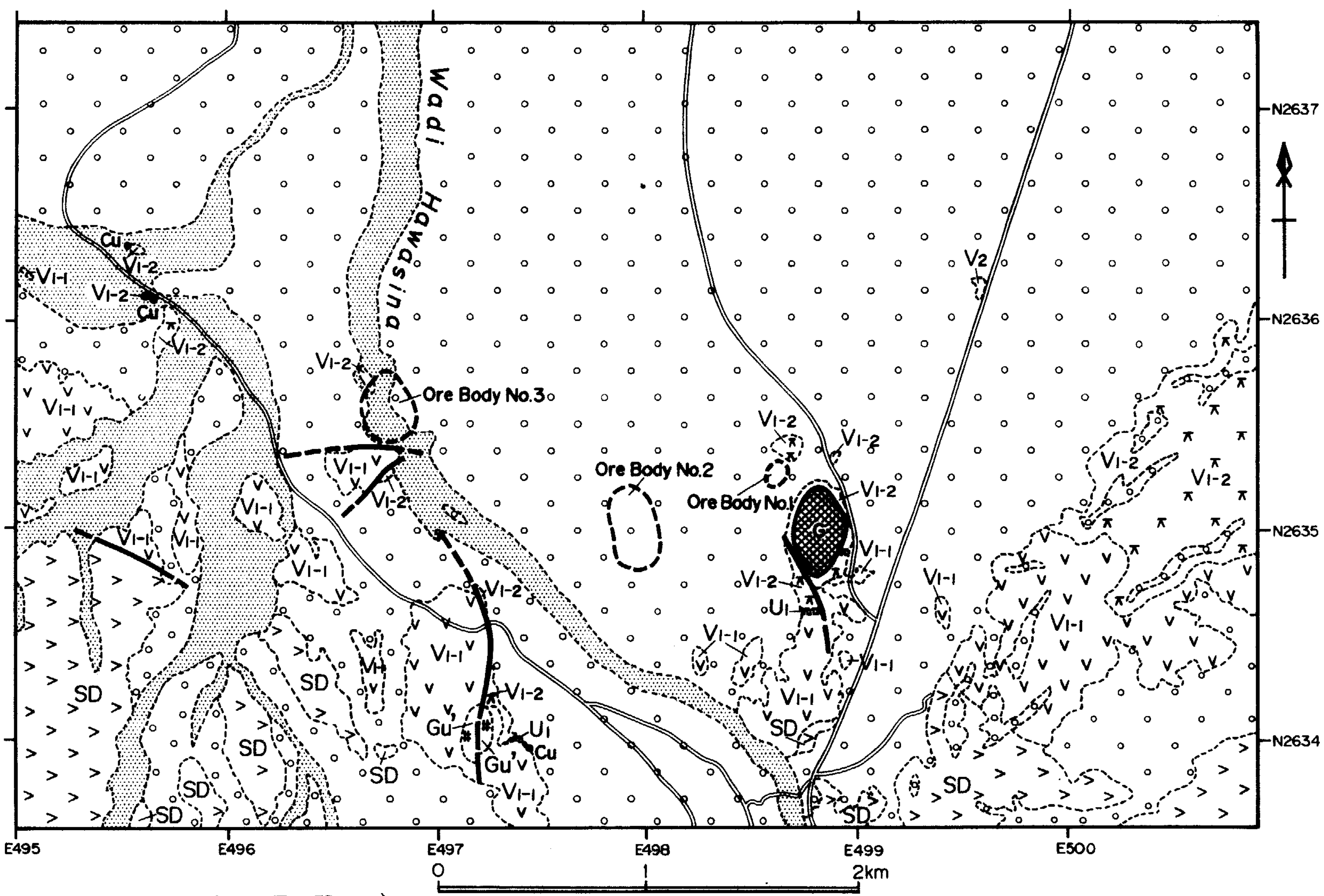
3-2 Survey Results in Ghuzayn Area

3-2-1 Geophysical survey

(1) Outline of survey

In this area, TDIP and TEM survey were first carried out in 1995 and 1996 during the Cooperative Mineral Exploration project in the Central Batinah Coast Area. TDIP and TEM survey was carried out by this project in and around the previous survey area. Fig.II-3-2 shows the location map where the geophysical survey was carried.

In relation to the TDIP survey, 53 survey lines with a total line-length of 122.6km were distributed



(For legend description refer to Fig.II-4-2.)

Fig.II-3-1 Geologic map of Ghuzayn area

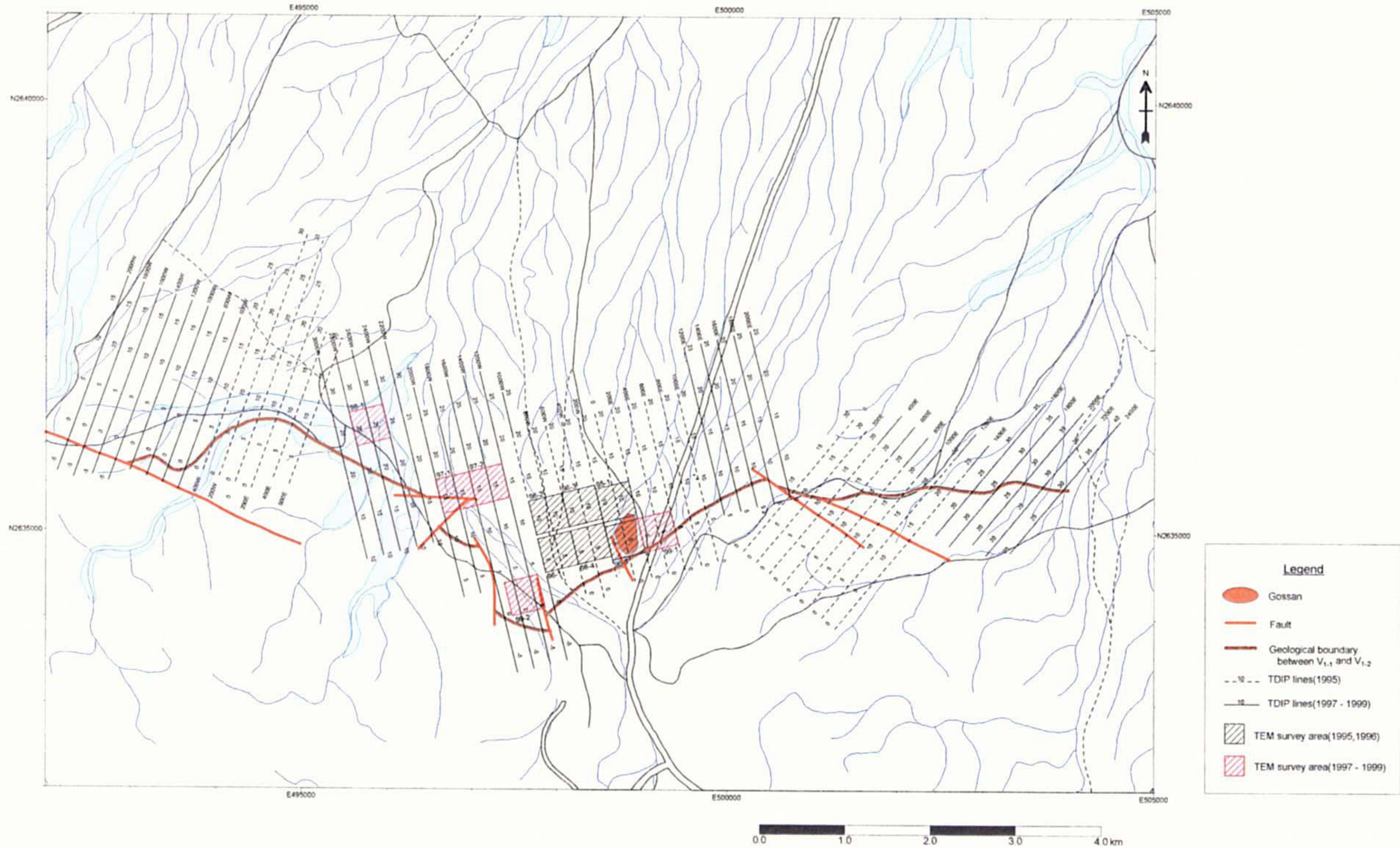


Fig.II-3-2 , Geophysical survey location map in Ghuzayn area within the survey area in the following manner:

(a) In the central part of this area, TDIP survey was carried out in 1995, 1997 and 1998. A total of 61.0km line-length consisting of 26 survey lines were set along the N14°W direction.

(b) In the eastern part of this area, TDIP survey was carried out in 1995 and 1999 for a total of 29.2km line-length with 13 survey lines set in the direction of N40°E.

(c) In the western part of this area, TDIP survey was carried out in 1995. A total of 32.4km line-length with 14 survey lines were located along the N20°E direction.

TEM survey was carried out in 1995, 1996, 1997, 1998 and 1999. 11 loops were surveyed in this area with total observed stations of 891 points.

(2) Survey results

The results of TDIP survey are shown in Fig.II-3-3(1) to II-3-3(3) and in the compiled geophysical map indicated in Fig.II-3- 4.

Resistivity shows in general, low values in the north and high in the south side of the geological boundary. High resistivity zone is considered to correspond with the V1-1 formation.

Chargeability distribution shows the same pattern as resistivity in general, however, highly interesting chargeability zones accompanied with high metal zones were recognized in three places: within a wide area around the gossan, near the station No.15 of the line 1800W and near the station No.24 of the line 2600W.

TEM survey, which was carried out within the high metal factor zones detected by TDIP survey, high TEM responses on the north of gossan, near the station No.7 of the line 800W and near the station No.15 of the line 1800W. Drilling survey was carried out in sites located within these TEM anomaly zones and as a result, the ore bodies No.1, No.2 and No.3 were found.

3-2-2 Drilling survey

Fig.II-3-5 shows the location of boreholes carried out by the Cooperative Mineral Exploration in the South Batinah Coast area and the Central Batinah Coast area. Drilling survey was carried out at 44 boreholes and intersected 3 ore bodies. Detailed description is as follows:

(1) Ghuzayn ore body No.1

Ghuzayn ore body No.1 is a high grade ore deposit intersected in 1996 by MJOB-G3 and MJOB-G13 boreholes located to the north of gossan. In 1997, it was also intersected by MJOB-G25 borehole between 115m and 154m. A core length of 7.95m of massive sulphide ore was intersected by MJOB-G3 with an average grade of 4.66%Cu (see Table I-4-1). Stockwork ore consisting of pyrite and chalcopyrite dissemination and network veinlets is observed between 142.80m and 232.00m beneath the massive sulphide ore at MJOB-G3 borehole. Average grade between 142.80m and 179.90m resulted in 0.47%Cu. Core length of the massive sulphide ore intersected by MJOB-G25 is 7.45m with an average grade of 3.51%Cu.

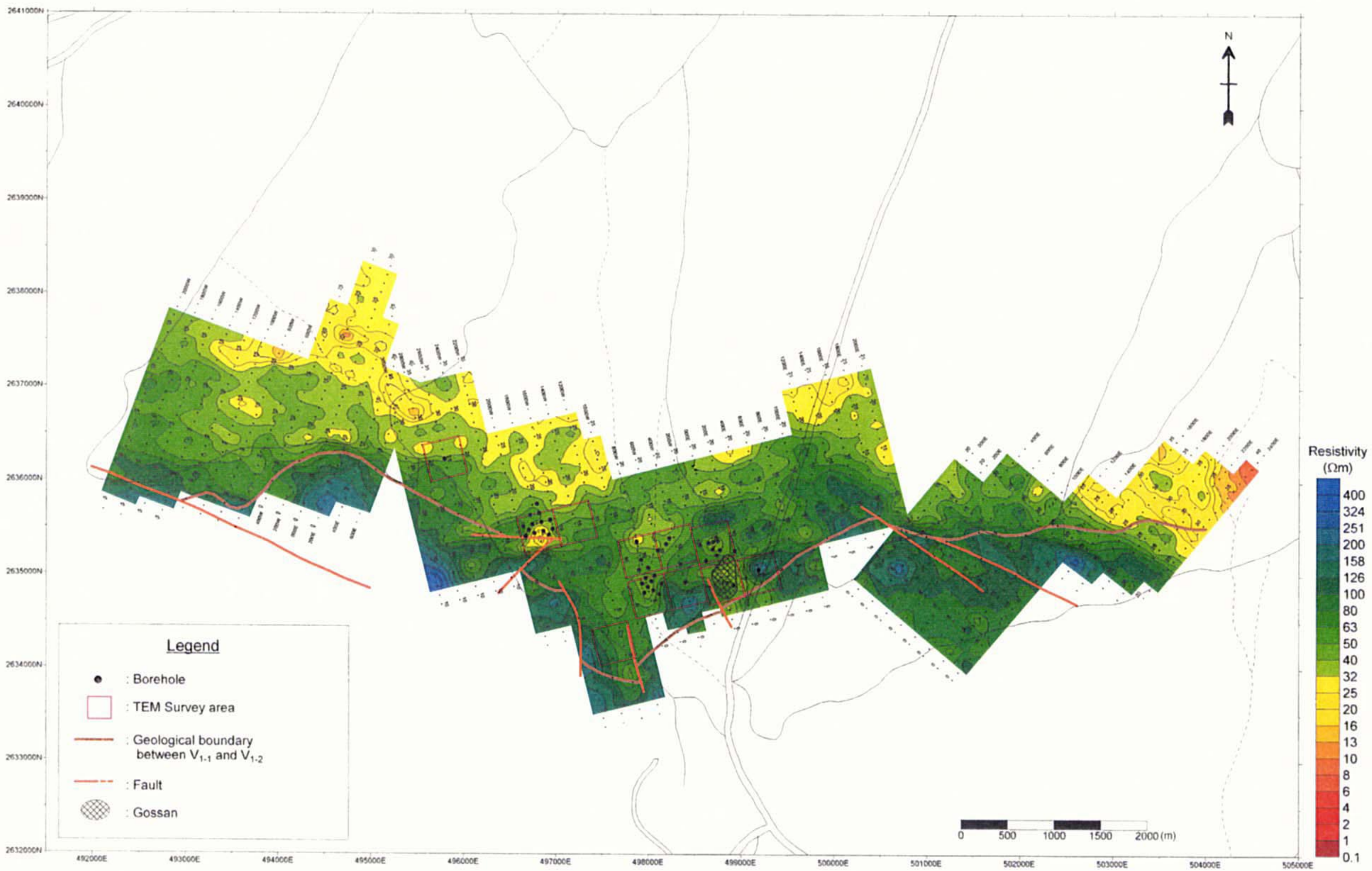


Fig.II-3-3 (1) IP plane map for n=3 in Ghuzayn area (Apparent resistivity)

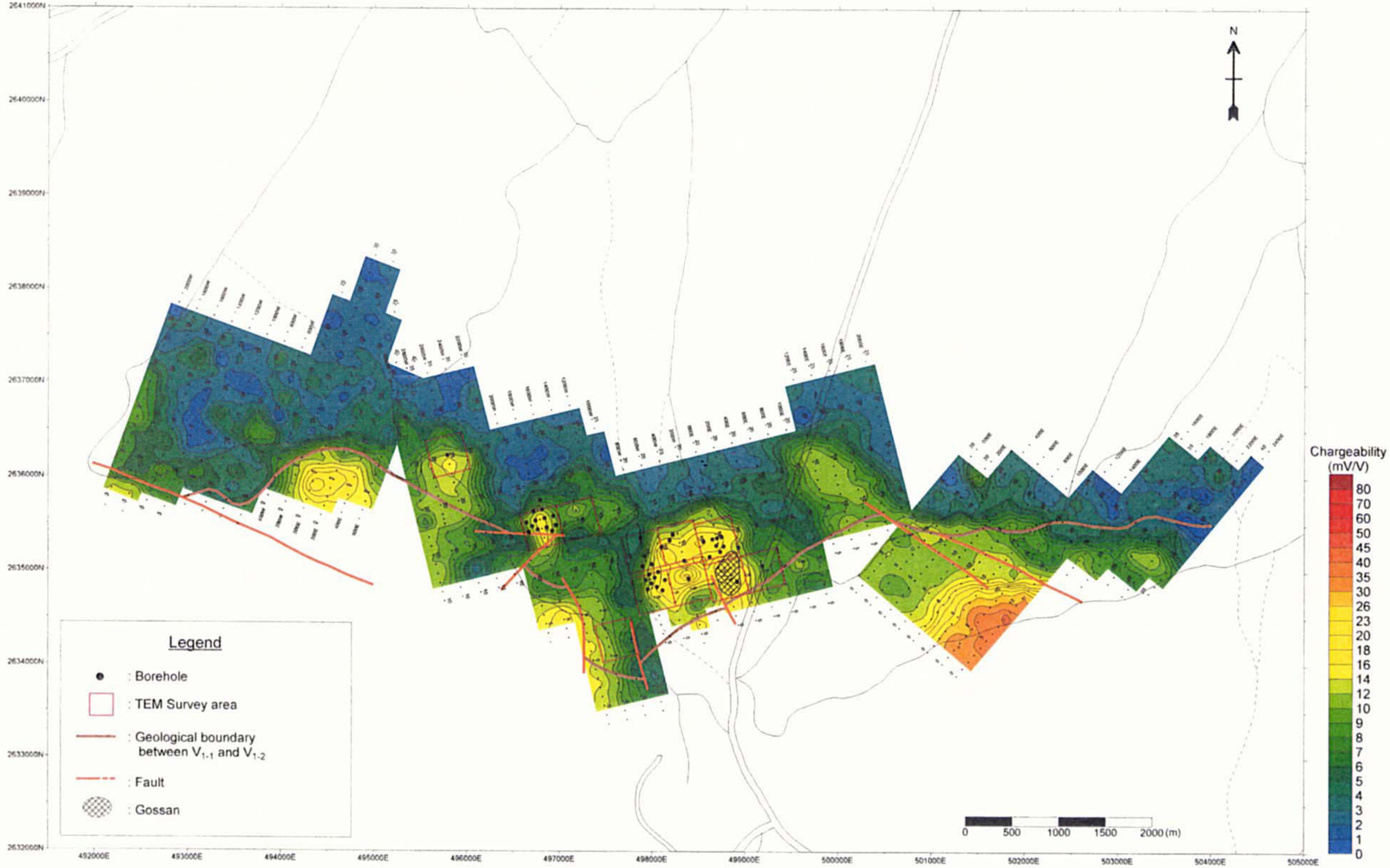


Fig.II-3-3 (2) IP plane map for n=3 in Ghuzayn area (Chargeability)

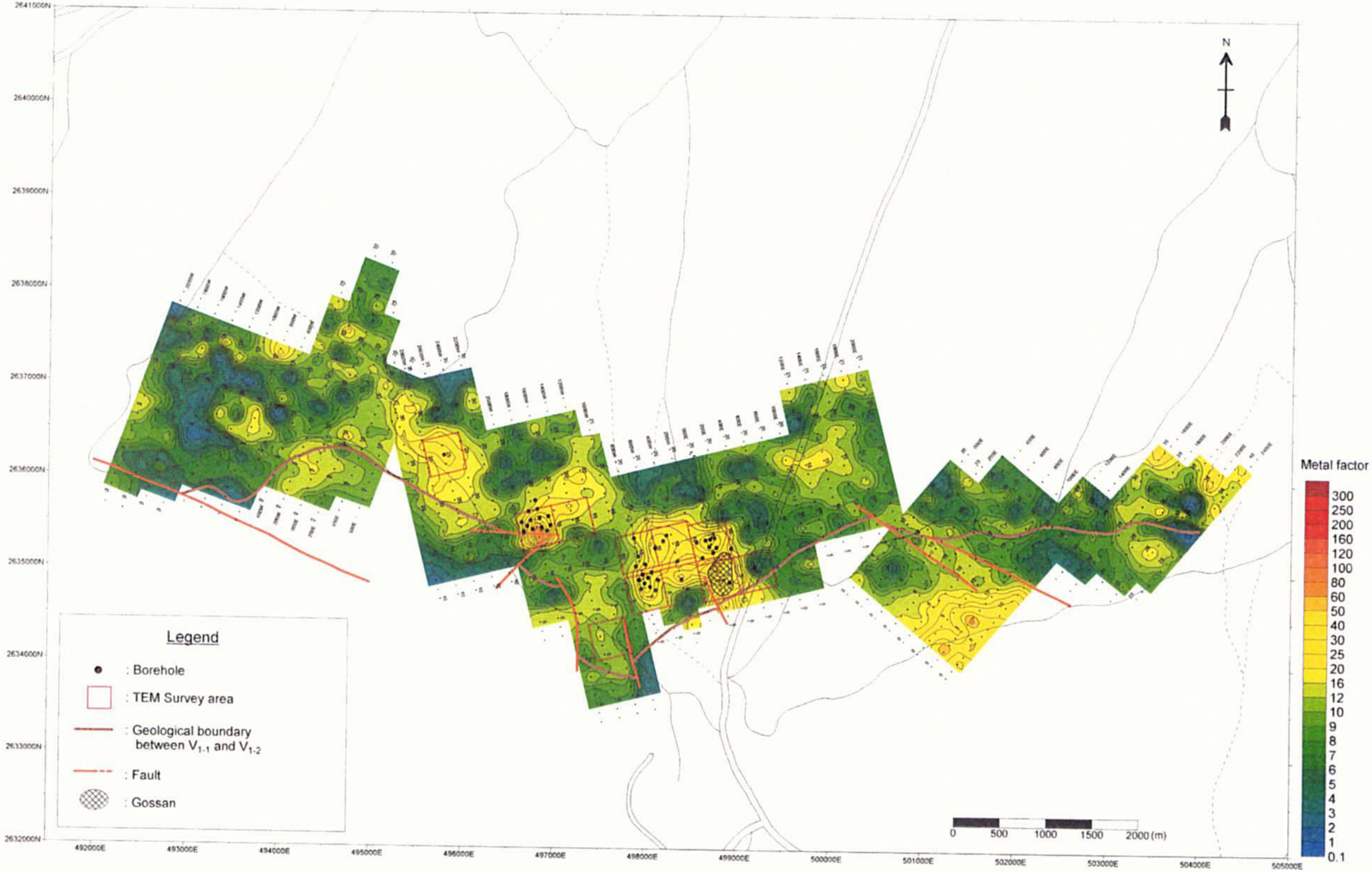


Fig.II-3-3 (3)   IP plane map for n=3 in Ghuzayn area (Metal factor)

Fig.II-3-4 Compiled geophysical map in Ghuzayn area

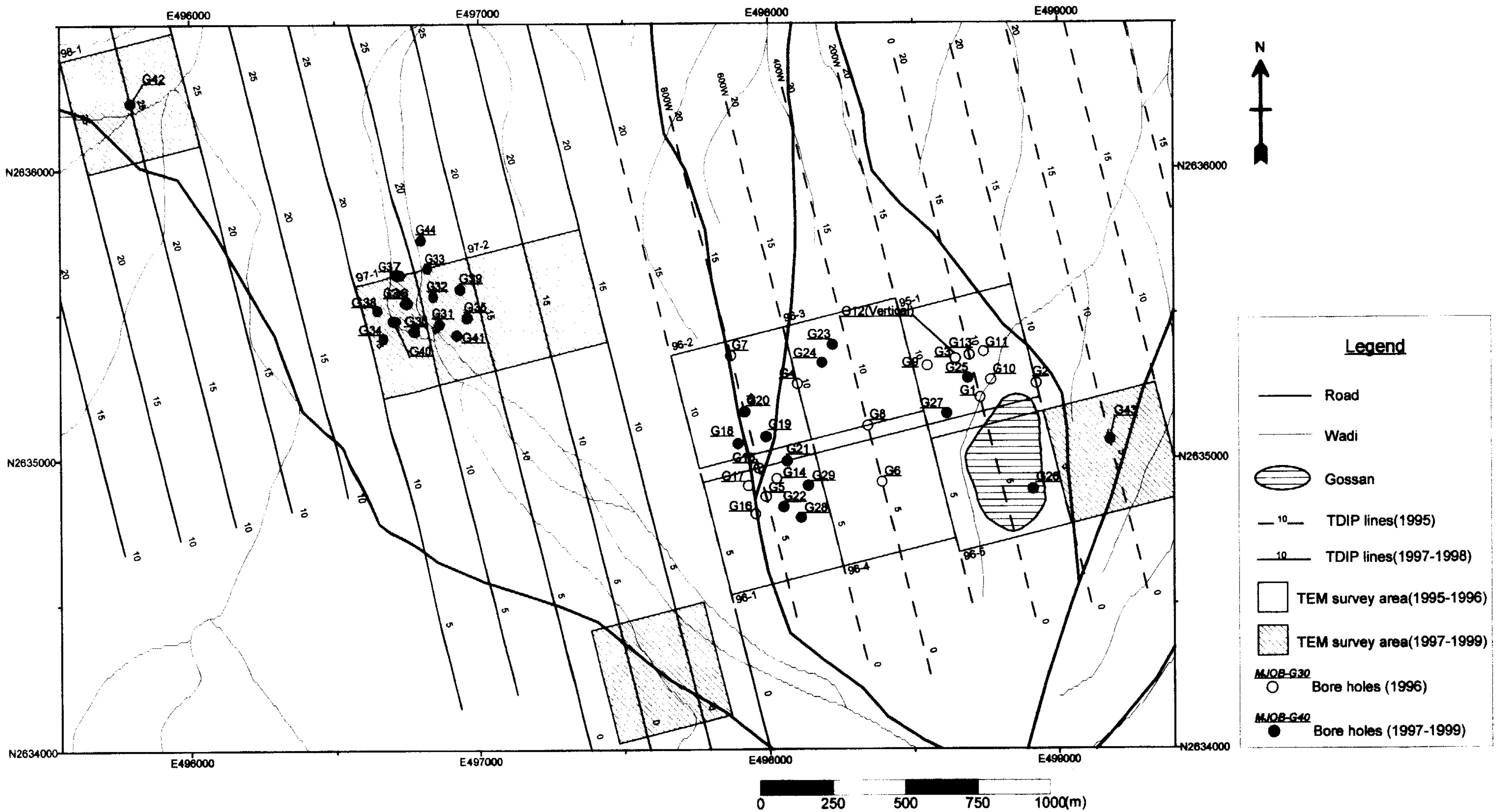


Fig.II-3-5 Location map of boreholes in Ghuzayn area

(2) Ghuzayn ore body No.2

Ghuzayn ore body No.2 was intersected by 5 boreholes (MJOB-G5, G14, G15, G16 and G17) in 1996, and by 5 boreholes (MJOB-G18, G19, G20, G21 and G22) in 1997. The depth of the ore body intersected by boreholes is between 96m and 267m. Table I-4-1 shows the scale and grade of this ore body. It is clear by drilling survey that the ore body No.2 strikes northeast to southwest and dips northwest by 20° to 40°. Geologic cross sections across boreholes are shown in Fig.II-3-6. As shown in Fig.II-6-1, the biggest thickness of this ore body is detected around the borehole G14, tending to decrease gradually in thickness towards north and northwest, and decreasing quickly at the southern side. The borehole G20 was drilled at the margin of this ore body, where the ore body shows a sedimentary structure (lamination and bedding) and consists of magnetite, hematite and pyrite layers.

(3) Ghuzayn ore body No.3

A remarkable geophysical anomaly was detected along the Wadi Hawasinah and investigated by the drilling survey of 4 boreholes (MJOB-G30, G31, G32 and G33) in 1997. All of these boreholes intersected a large scaled massive sulphide ore body (Ghuzayn Body No.3). 4 boreholes (MJOB-G35, G36, G37 and G39) in 1998 and 2 boreholes (MJOB-G40 and G44) in 1999 also intersected ore body No.3. The depth of this ore body, as inferred from boreholes, is between 109m and 280m. The massive sulphide ore intersected by MJOB-G30 indicated a core length of 91.40m and an average grade of 2.68%Cu.

Geologic cross sections across boreholes are shown in Fig.II-3-7. From this cross section, this ore body is seen to strike northeast to southwest and dips northwest by about 20°. Fig.II-3-8 shows the schematic view of this ore body. The bottom surface of the ore body shows monocline, while the top surface shows dome-type shape. The ore body extends northward decreasing its thickness. Therefore ore body No.3 has semi-ellipsoidal shape extending slightly northward.

3-3 Survey Results in Doqal Area

3-3-1 Geophysical survey

(1) Outline of survey

In this area, TDIP and TEM surveys were carried out in 1996 during the Cooperative Mineral Exploration project in the Central Batinah Coast Area. Fig.II-3-9 shows the location of geophysical survey.

TDIP survey was carried out in 1996 and 1997. During these 2 years, 10 survey lines with a total of 32.3km line-length were located along the EW direction. In relation to the TEM survey, 4 loops were carried out in 1996 and 1997 with total observed stations of 324 points.

(2) Survey results

The results of TDIP survey are shown in Fig.II-3-10 and in a compiled geophysical map shown in

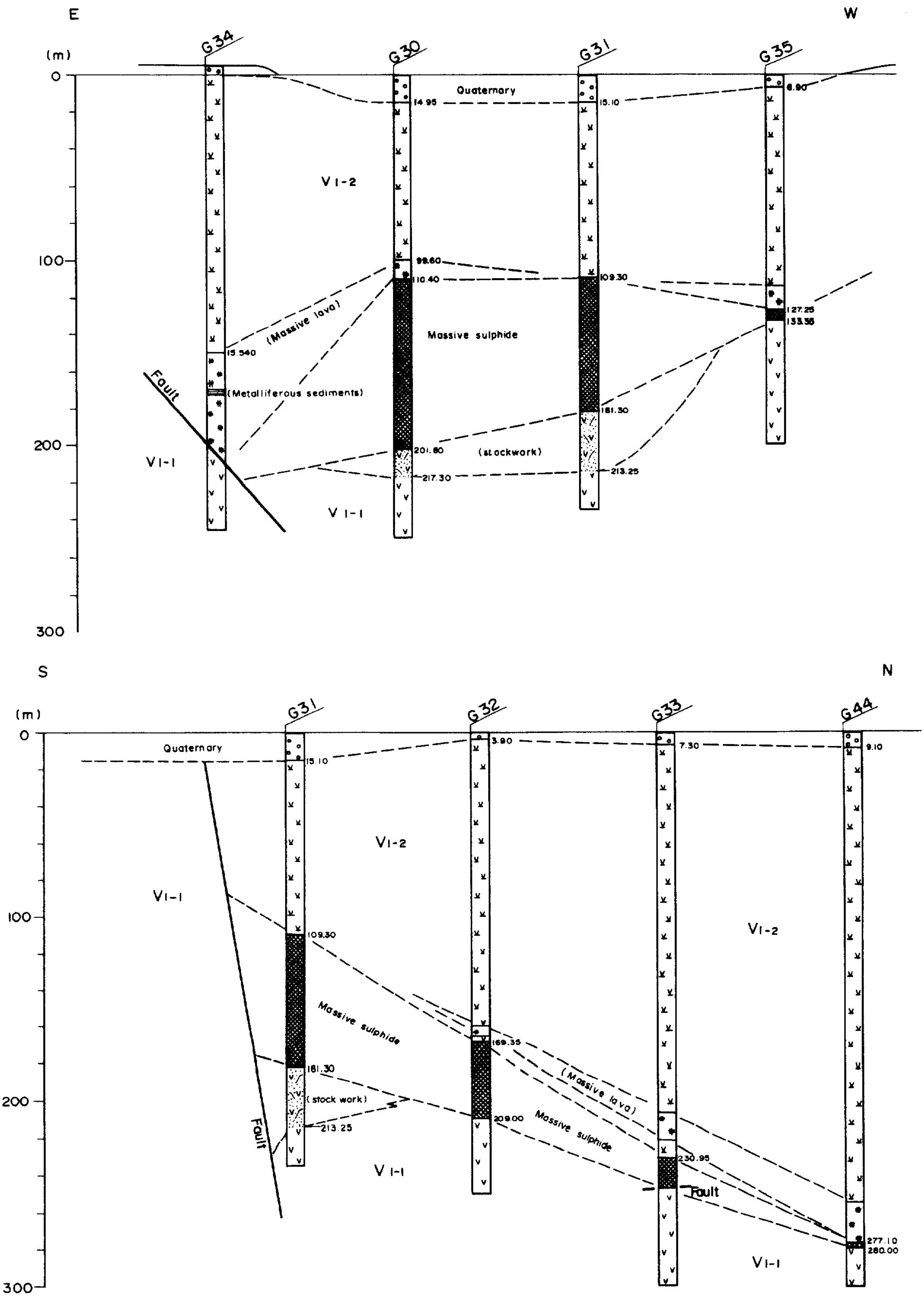


Fig.II-3-7 Cross section of borehole site in Ghuzayn Body No.3

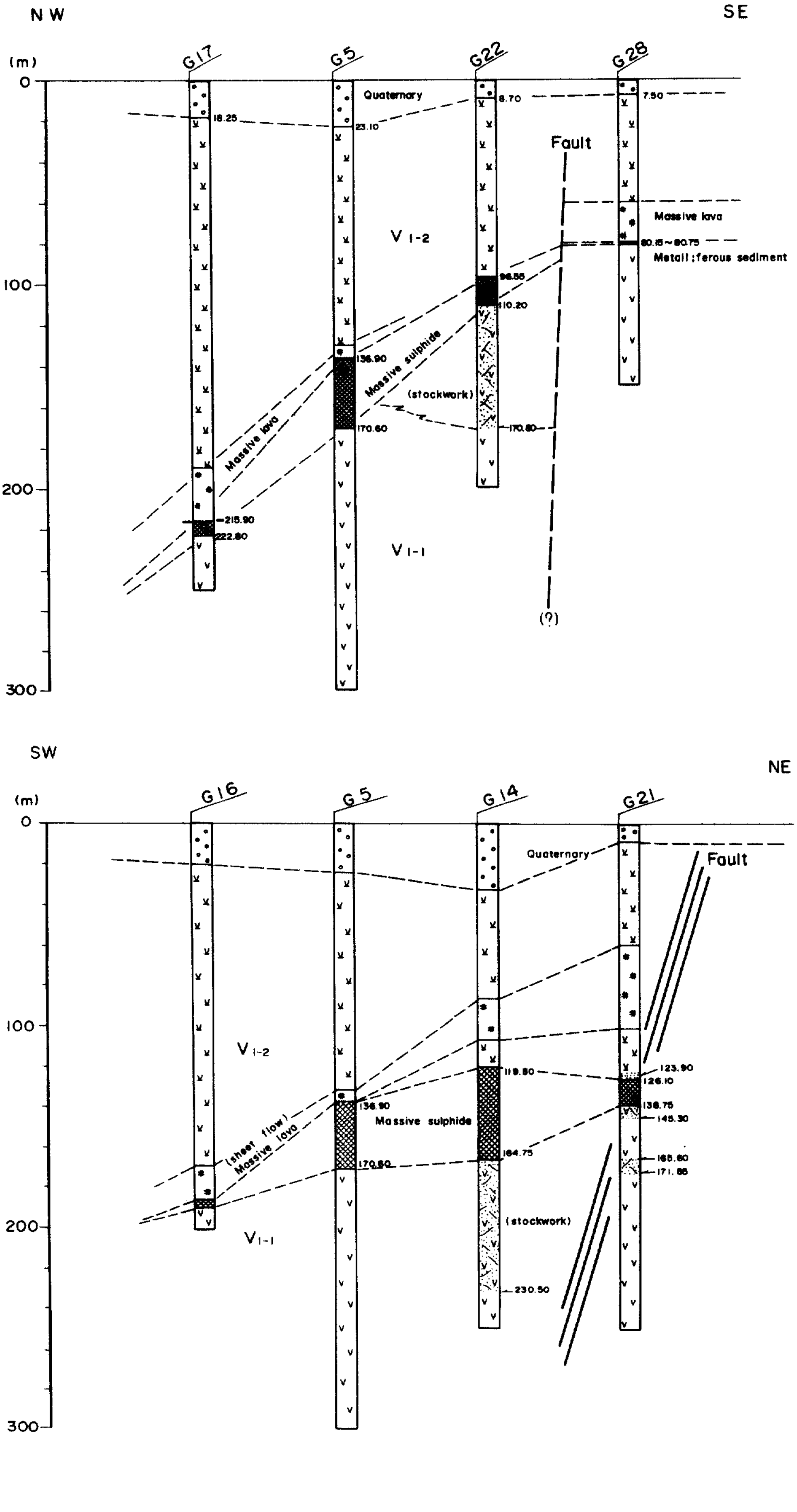
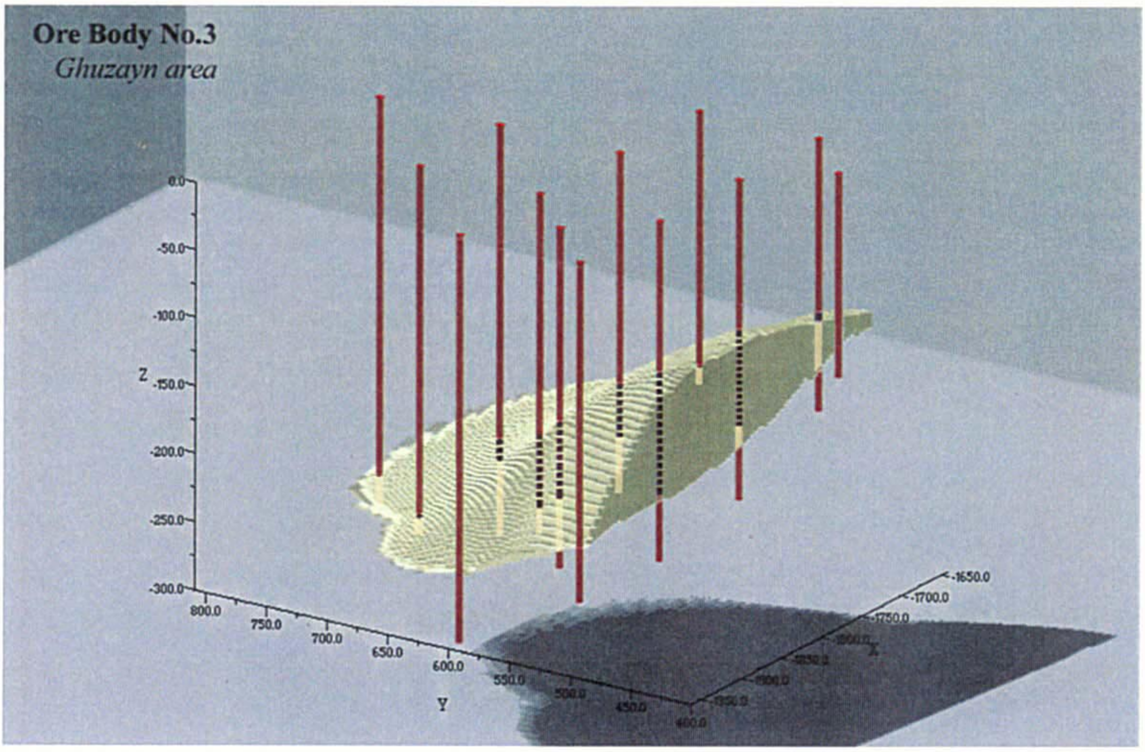


Fig.II-3-6 Cross section of borehole site in Ghuzayn Body No.2



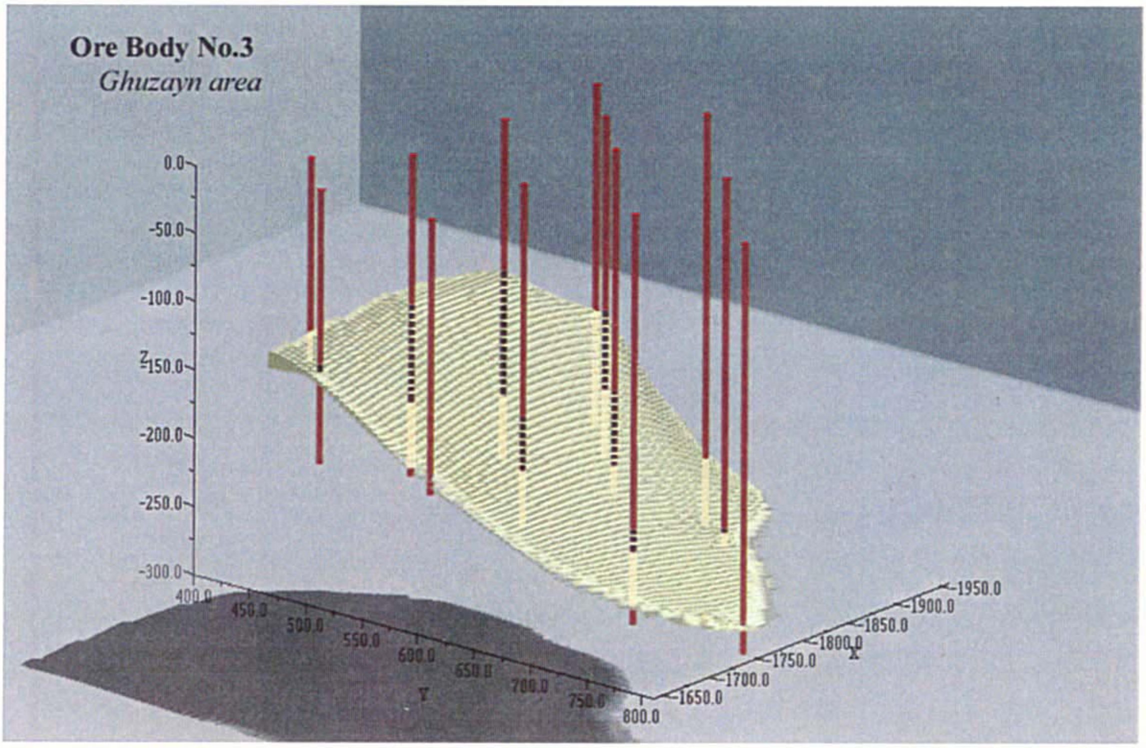


Fig.II-3-8 Schematic view of Ghuzayn Body No.3

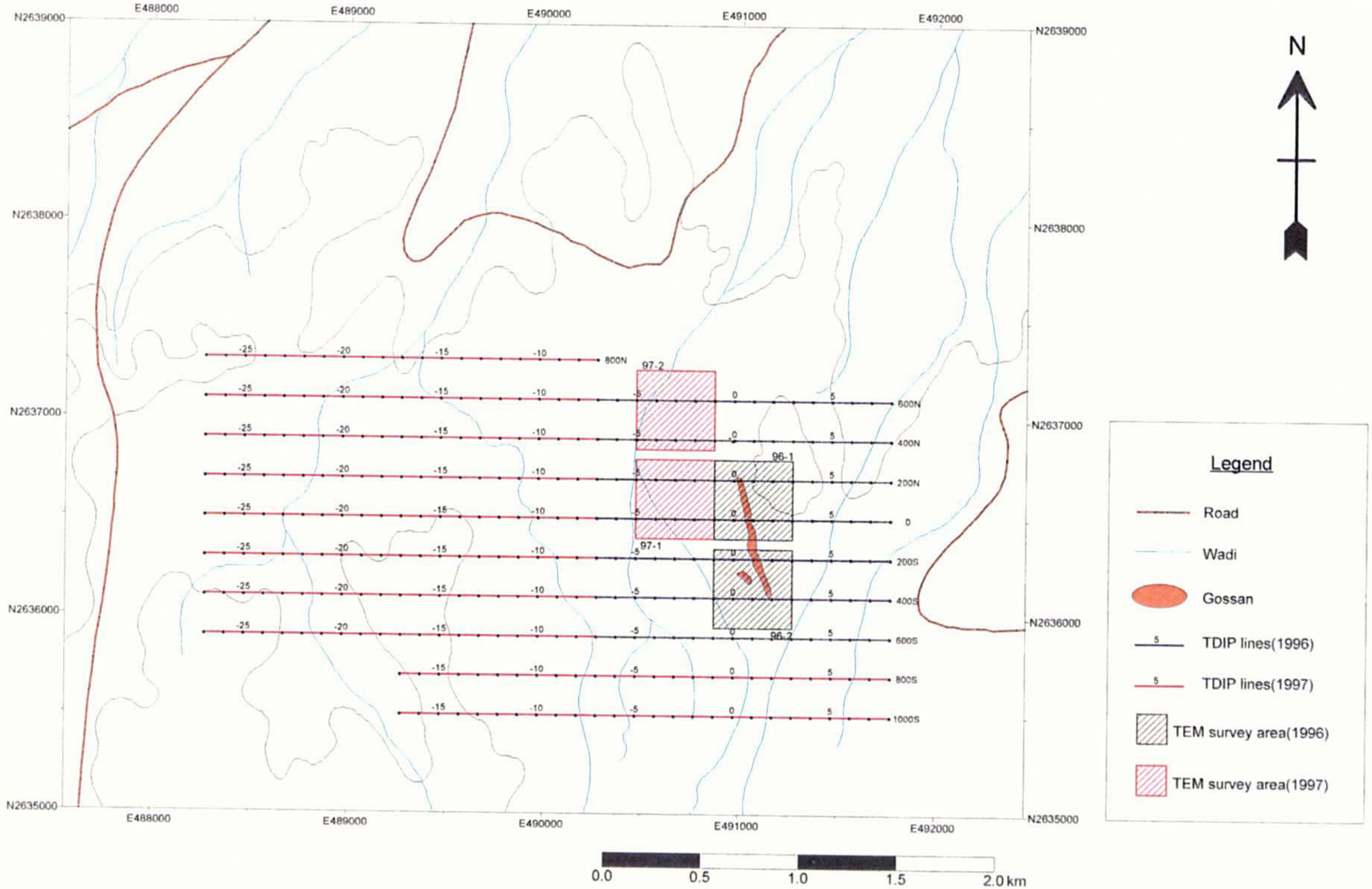


Fig.II-3-9 Geophysical survey location map in Doqal area

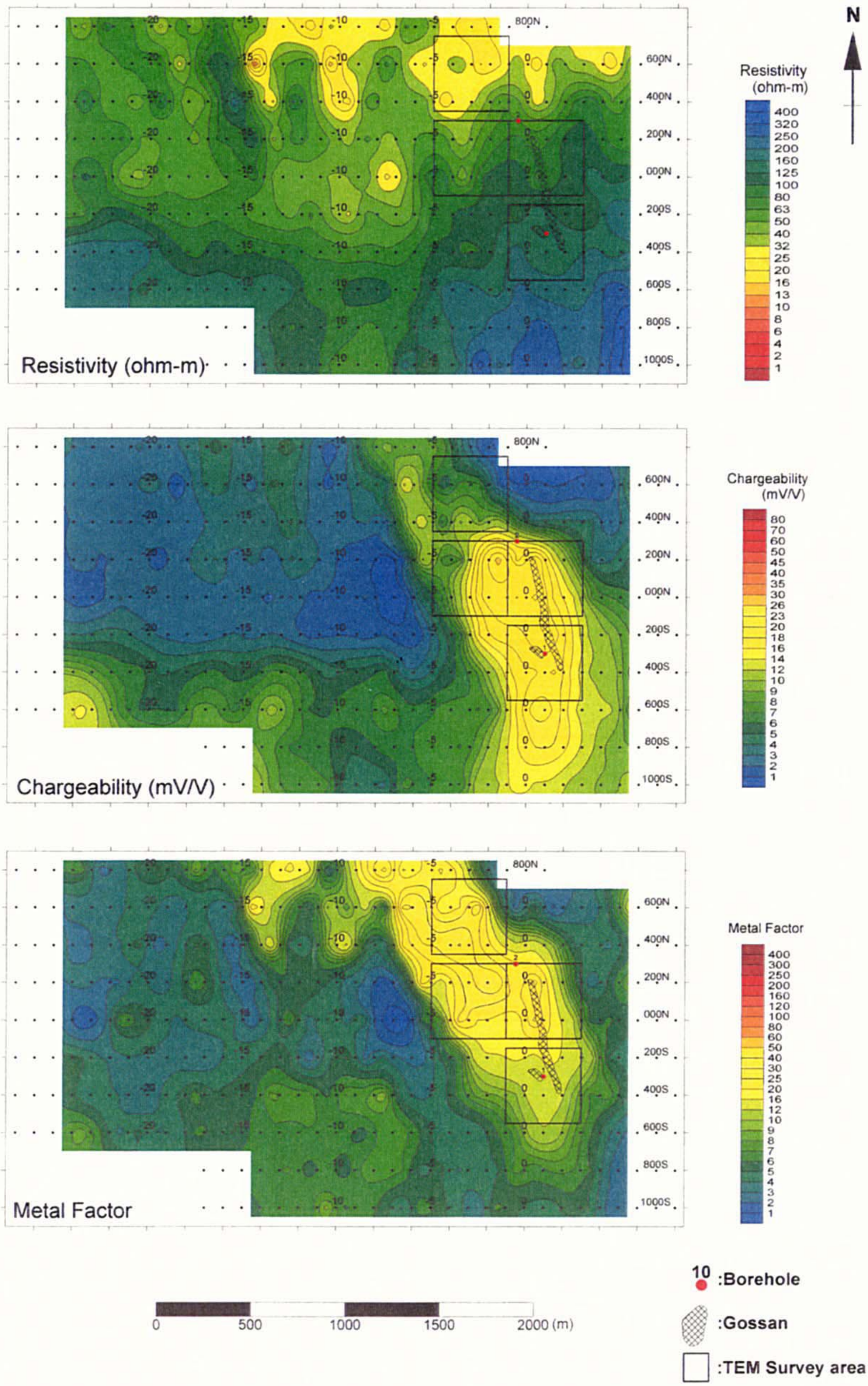


Fig.II-3-10 IP plane map for n=3 in Doqal area

Fig.II-3- 11.

Resistivity values are in general low in the north part and high in the south, indicating a transitional discontinuity around the central part of the area, between the lines 200S and 400S. Furthermore, in the north east part a low resistivity distribution of about 20 ohm-m is seen extended northward.

High chargeability values of above 8mV/V are seen distributed in the east part of this area extended along north-south and northwest directions from the gossan and its surroundings. The distribution from the central part of the gossan towards the northwest direction coincides with the high metal factor distribution. A high chargeability zone is also seen distributed in the southwestern part of the area.

TEM survey consisting of 4 loops was carried out within the high metal factor zone. A TEM anomaly detected near the gossan was further explored by a drilling survey, however, only pyrite dissemination was intersected.

3-3-2 Drilling survey

In this area the TEM survey was conducted to examine the remarkable chargeability zones associated with the low resistivity detected by the TDIP method. To investigate the nature of these geophysical anomalies, two boreholes were drilled on the site selected from the TEM anomalies. The boreholes confirmed extensive sulphide mineralization and veinlets, but failed to find any economically interesting sulphide mineralization. The high chargeability anomaly is considered to reflect the sulphide dissemination.

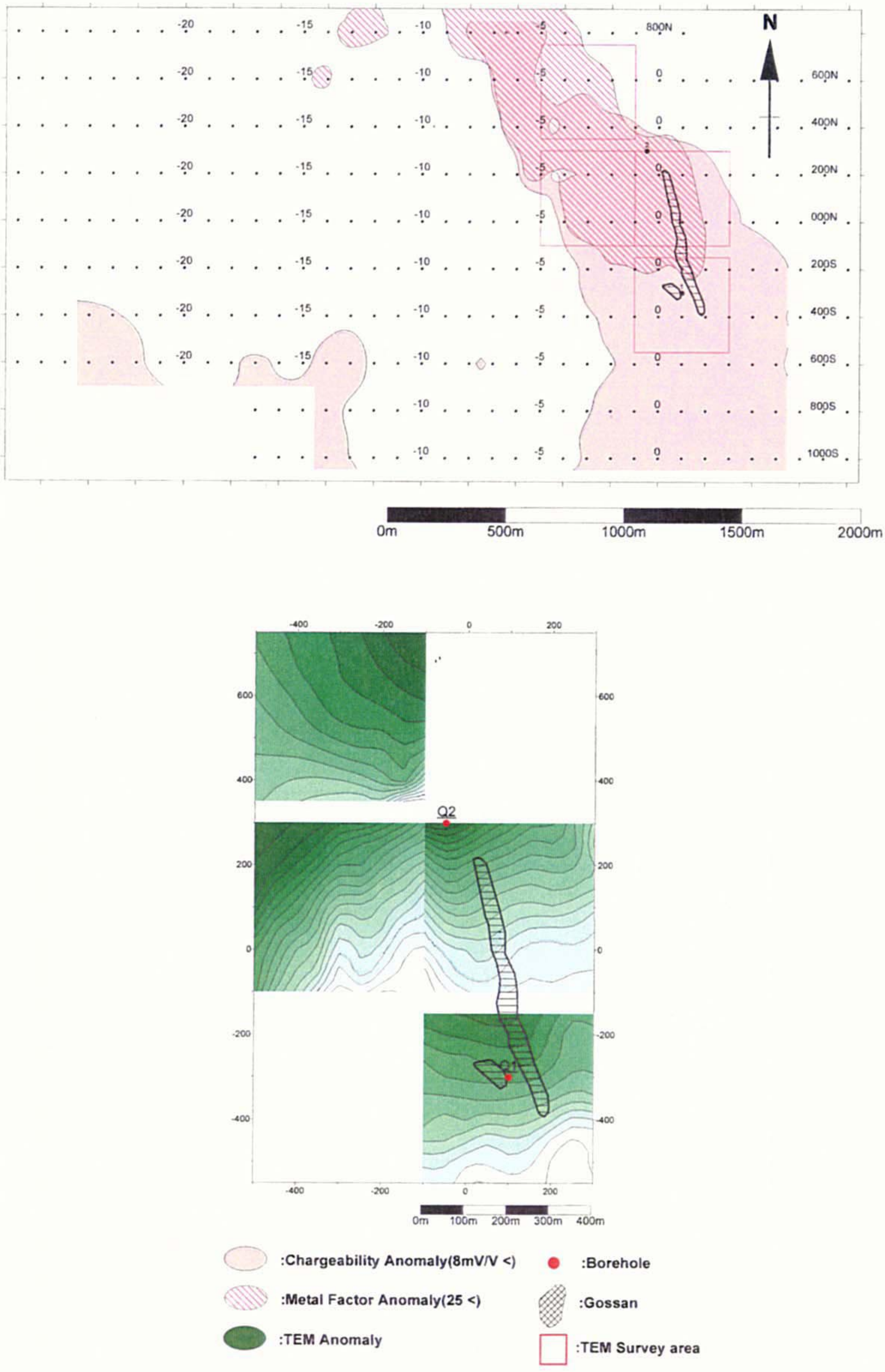


Fig.II-3-11 Compiled geophysical map in Doqal area

CHAPTER 4 DETAILED SURVEY IN SARAMI, MAHAB and HARA KILAB AREAS

4-1 Geology and Mineralization

4-1-1 Sarami area

Sarami area is located about 20km SSE of Saham City. As shown in Fig.II-4-1, the geology of this area consists mainly of V1-1, V1-2, U1, V2, Batinah Olistostrome and Quaternary sediments. Gabbro is also found along the boundary between V1-1 and V1-2.

V1-2 crops out in the northern part covering V1-1. In the southern part, however, V1-1 presents a direct contact with V2 through a fault trending NW-SE, while V1-2 is distributed within the limits of the west part of this fault. U1 shows a thickness of about 5 to 30cm, which is siliceous with abundant iron oxides in the northern part and pelitic in the southern part. Massive lava of a thickness of about 10m outcrops over U1 in the southern part. From the structural point of view, V1-2 and U1 in Sarami area strikes N45°E and dips 20°SW.

Silicified zone of V1-2 spreads out in the northwestern part, where many basalt dikes intruded into V1-2 and small-scaled vein-like gossans are distributed parallel to these dikes in many places. Copper mineralization is locally observed in the above-mentioned gossans which can also be seen in small-scaled gossans in some places of V1-1 and in U1 with abundant magnetite in the northwestern part. In the southern part, a silicified zone of 2 to 3m in width accompanied by many quartz veinlets and copper oxides is found along a NW-SE trending fault in which V1-1 and V2 indicate a direct contact.

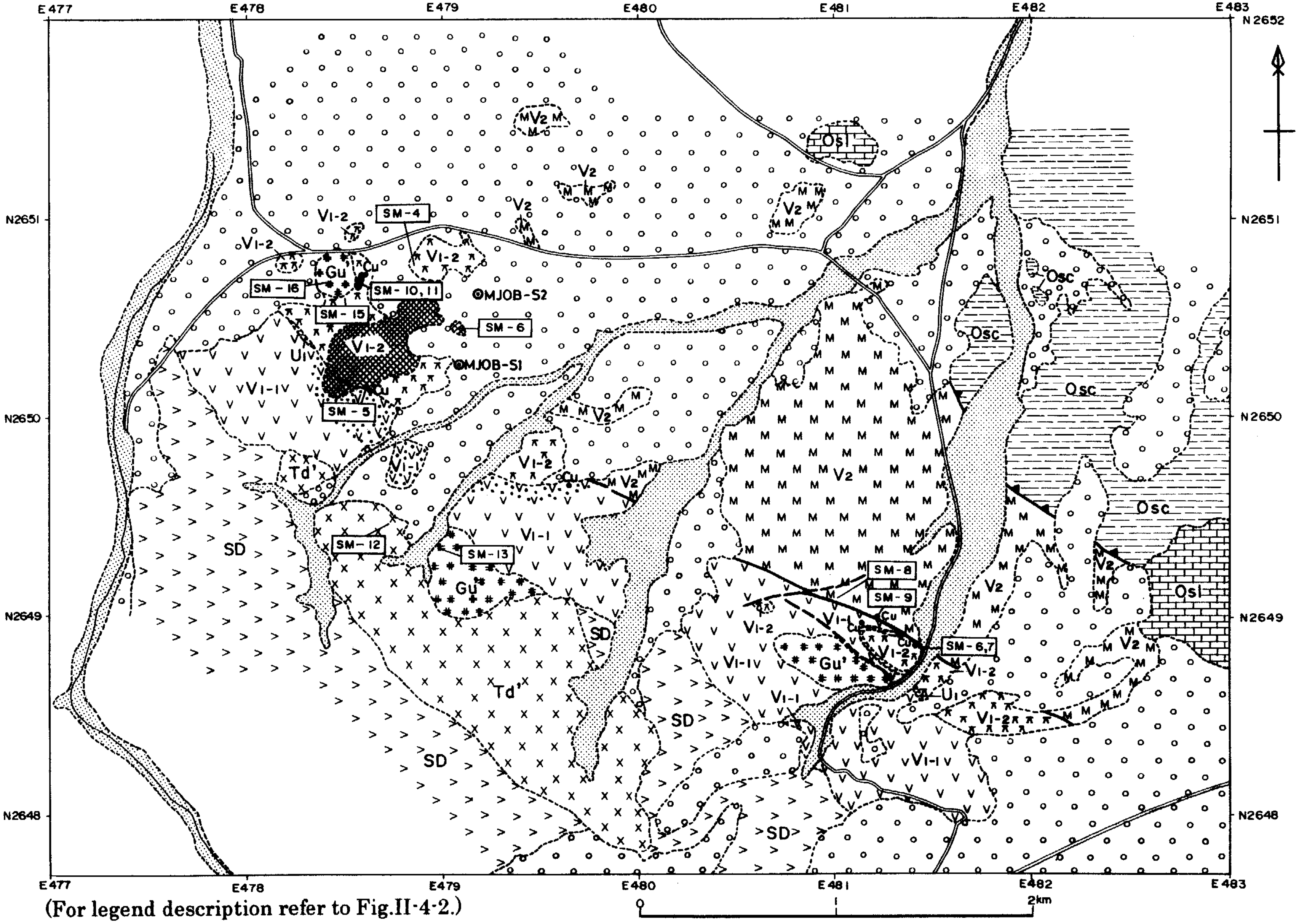
Epidotization can be seen in V1-1 along the boundary between V1-1 and V1-2. The intensity of epidotization is weak in most of the areas, however, it becomes strong in the vicinity of the silicified zone in the northwestern part.

4-1-2 Mahab area

Mahab area is located about 25km southwest of Saham City and about 4km east of Mahab village.

As indicated in Fig.II-4-2, the geology of the area consists mainly of SD, V1-1, V1-2, U1 and Quaternary sediments. Gabbro is also found exposed in SD along NW-SE trending fault that is almost parallel to the strikes measured on dikes and U1; while in the northern part, an E-W trending fault with a large displacement runs along Wadi Mahmum. Because of these two fault systems, V1-2 is distributed within the limits of this area. On the other hand, U1, which is distributed in the area, contains magnetite layers and a prominent epidotization observed in V1-1 along U1.

Mahab 2 mineral showing is located in the south part of the area, where a relatively large gossan (with abundant copper oxides) can be seen along the NW-SE trending fault mentioned above. Prospection Ltd. conducted a drilling survey in1976 and confirmed a silicified and chloritized zone of several meters in width with sulphide dissemination under the gossan.



(For legend description refer to Fig.II-4-2.)

Fig.II-4-1 Geologic map of Sarami area

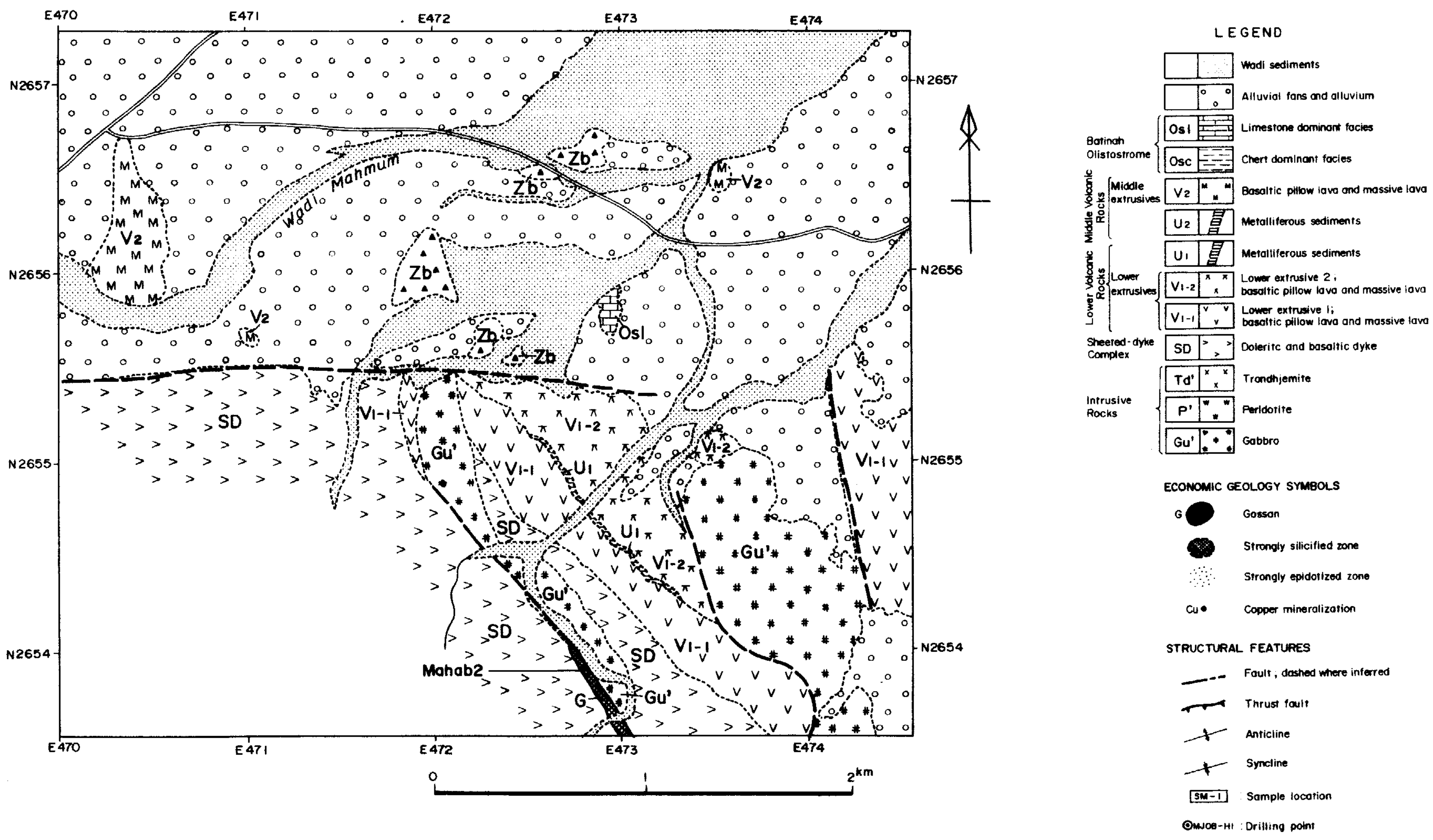


Fig.II-4-2 Geologic map of Mahab area

4-1-3 Hara Kilab area

Hara Kilab area is located about 25km southwest of Saham City and extended from Hara Kilab mineral showing in the north, to Mahab 4 mineral showing in the south.

As indicated in Fig.II-4-3, the geology of this area consists mainly of SD, V1-1, V1-2, U1, Batinah Oliststrome and Quaternary sediments. The intrusion of trondhjemite, which is seen cropping out along the boundary between V1-1 and V1-2, caused U1 to be intermittently exposed and in small scales. V1-2 and U1 strike N30°W and dip about 20° to the NE. A brief description of the three major mineral showings in Hara Kilab, Mahab 3, and Mahab 4 is as follows:

Hara Kilab mineral showing

Argillaceous gossan, which outcrops in this showing, is distributed over an area of 100m x 150m. Drilling survey in 1976 by Prospection Ltd. found a small massive sulphide body under the gossan as shown in Fig.II-4-4. Ancient mining activity can be observed here and this is the reason of abundant slag found scattered around the gossan.

Mahab 3 mineral showing

Gossan with abundant copper oxide can be seen around the boundary between V1-1 and V1-2. Slags of ancient mining activity can be found more abundantly than those remained in Hara Kilab showing. A large body of trondhjemite is exposed on the north of gossan. The drillings carried out by Prospection Ltd. in 1976 intersected this trondhjemite body at 30m to 40m below the gossan and also confirmed massive sulphide composed mainly of pyrite.

Mahab 4 mineral showing

Thin and continuous metalliferous sediments (U1) are exposed in this showing. Slight copper mineralization is seen on the surface and metalliferous sediments found rather siliceous. The boundary between V1-1 and V1-2 is well exposed in this showing, where limonitized gossan was found with copper oxide along the place of fault contact.

As for other characteristics of mineralization, an intense epidotization is found around Mahab 3 mineral showing and to the north of Mahab village. An extensive silicified zone with iron rusty features is exposed in the area between Mahab 3 mineral showing and Dhahwa village.

4-2 Survey Results in Sarami Area

4-2-1 Geophysical survey

(1) Outline of survey

TDIP survey was carried out in 1998. 25 lines with a total of 44.0km line-length were set in the direction of N45°E. TEM survey was carried out in 1998 by setting 8 loops with a total observed stations

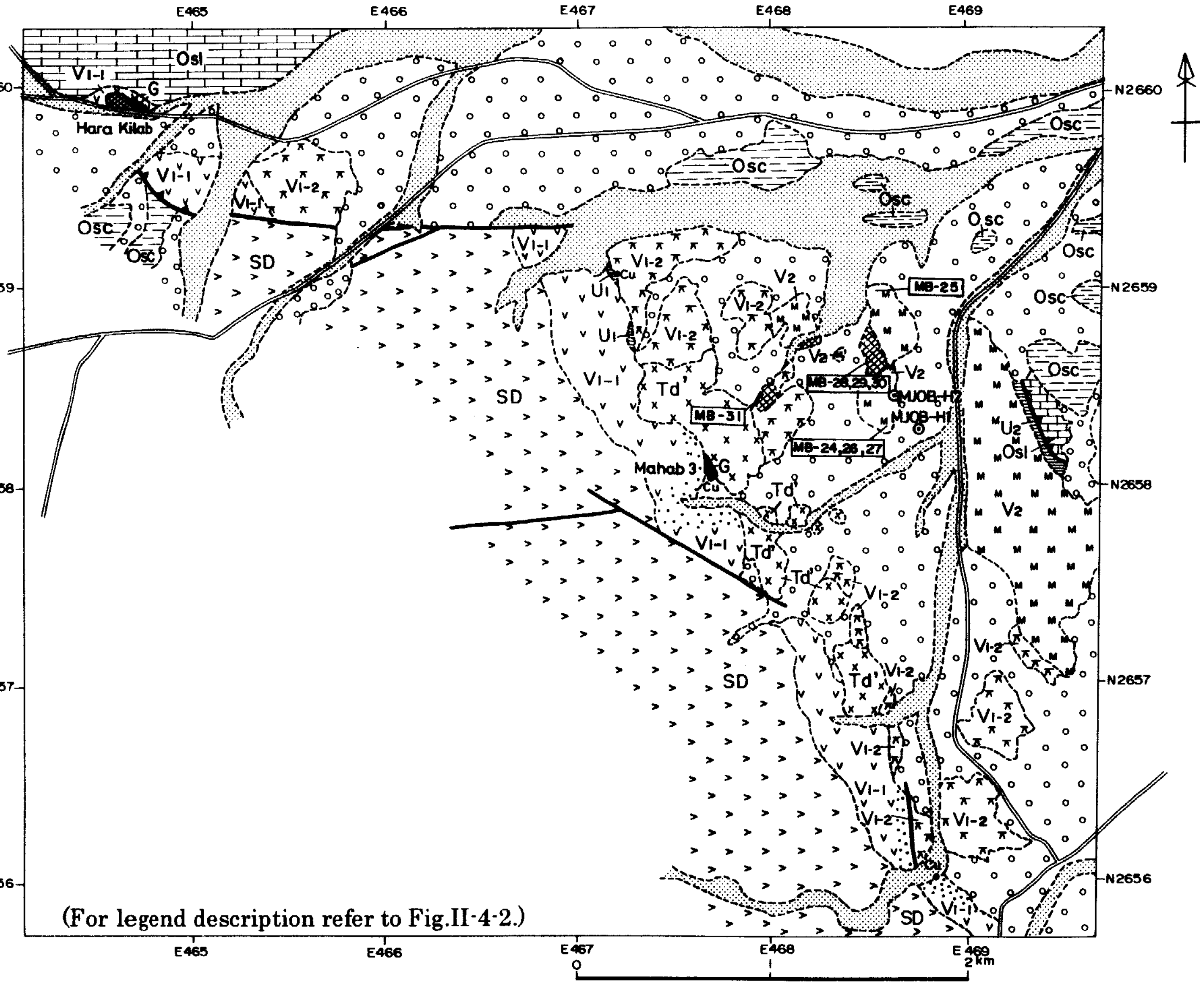


Fig.II-4-3 Geologic map of Hara Kilab area

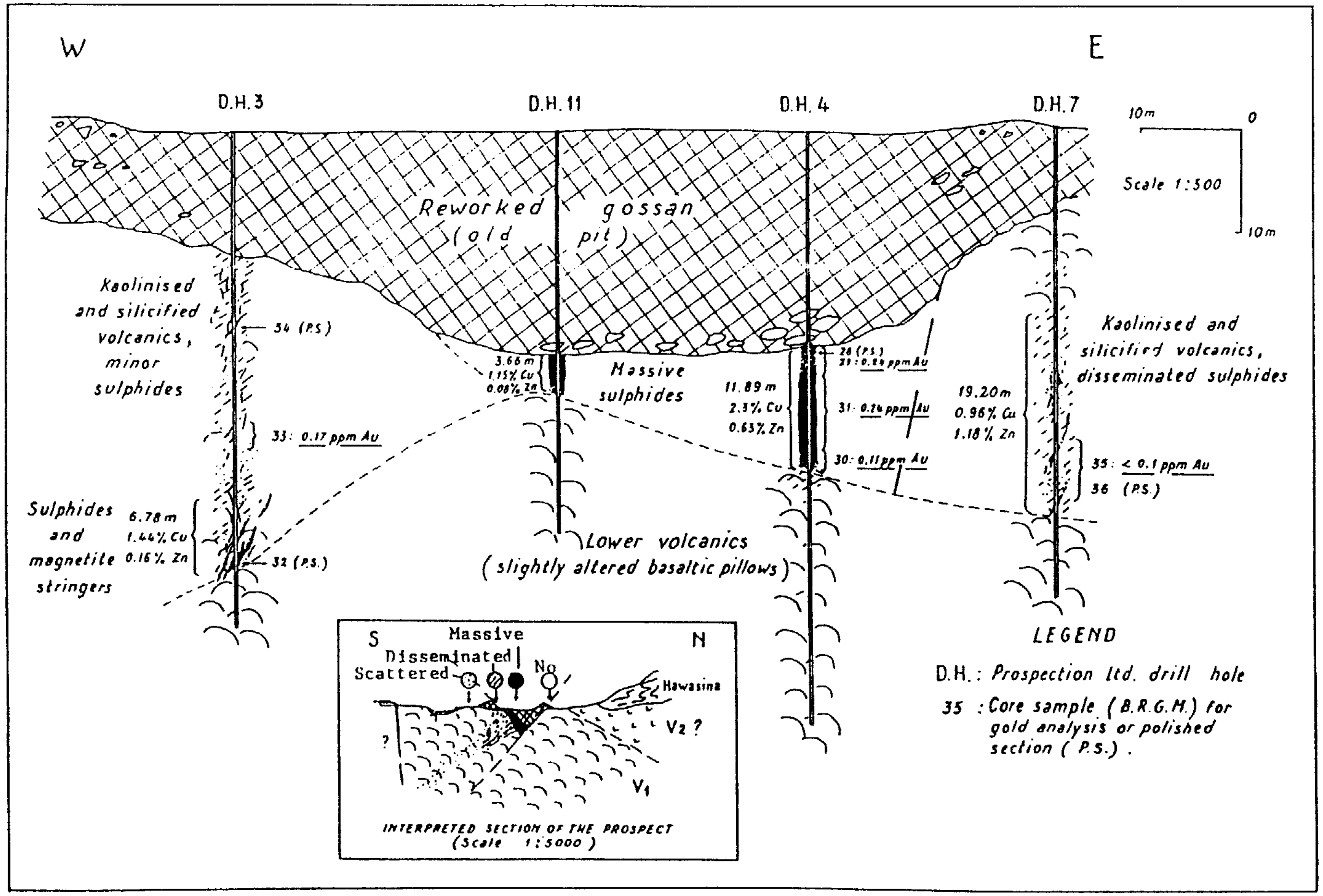


Fig.II-4-4 Cross section of borehole site in Hara Kilab area(Prospection Ltd., 1976) of 648.

Fig. II-4-5 shows the location of the TDIP survey lines as well as the TEM loops.

(2) Survey results

The results of TDIP survey are shown in Fig.II-4-6 and also in a compiled geophysical map in Fig.II-4-7.

The resistivity distribution presents a NW-SE tendency, for which the resistivity values increase gradually from low values in the southeast side to about 100 ohm-m in the northwest side of this area.

The chargeability distribution shows almost same pattern as the resistivity distribution. High chargeability distributions are detected mainly in the northwest side of the central part of the area, where the geological boundary between V1-1 and V1-2 is located and V1-2 crops out.

TEM survey was carried out with in the high metal factor zone distributed widely in the north west part of the area. To confirm the extracted TEM anomalies, the boreholes MJOB-S1 and MJOB-S2 were drilled within the TEM anomalies seen on Fig.II-4-7. The TEM anomaly zone detected at the east of MJOB-S2 borehole is probably due to the geological occurrence not related to mineralization, because this anomaly is found distributed in the low chargeability zone.

4-2-2 Drilling survey

In Sarami area, drilling survey was carried out at the anomaly zone detected by TDIP and TEM survey in 1998. Mineralization and alteration is recognized almost all over the core. Intense pyrite dissemination and a lot of veinlets are recognized. Geophysical anomaly reflects such intense mineralization. Drilling did not reach the stratigraphic position of massive sulphide deposits because the dip of beds is steep. Considering mineralization and alteration of basaltic dikes, it is thought that this mineralization occurred when dikes were intruded.

4-3 Survey Results in Mahab Area

4-3-1 Geophysical survey

(1) Outline of survey

Fig.II-4-8 shows the location of TDIP survey carried out in this area in 1998. Total of 14.0km line-length with 8 survey lines were set along the N45°E direction.

(2) Survey results

The results of TDIP survey are shown in Fig.II-4-9, and compiled geophysical map is shown in Fig.II-4-10.

The resistivity distribution shows a strong boundary running E-W that separates high resistivities in the south side from low resistivities in the north side. In the north side, extremely low resistivities of few ohm-m are widely distributed.

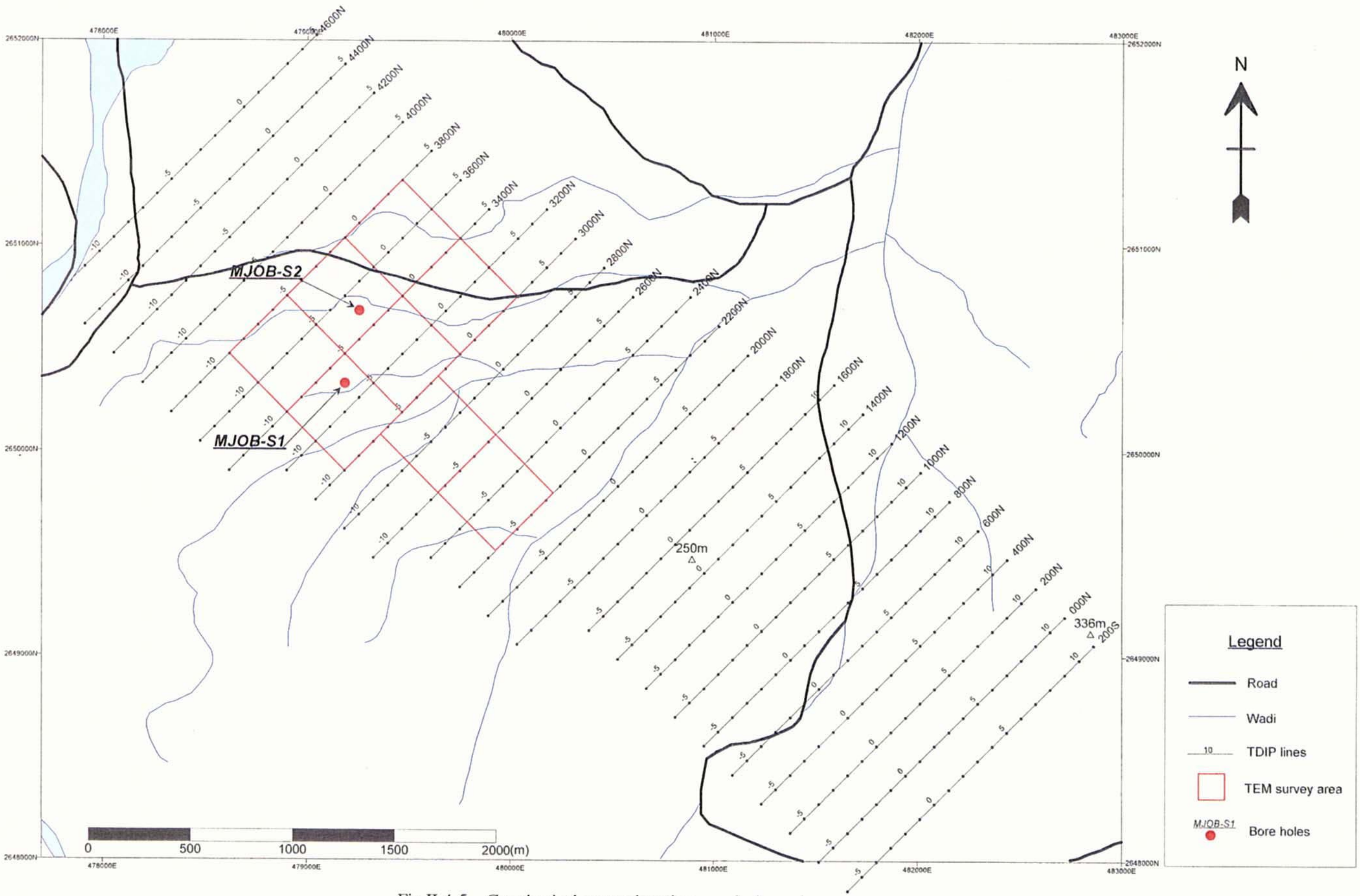


Fig.II-4-5 Geophysical survey location map in Sarami area

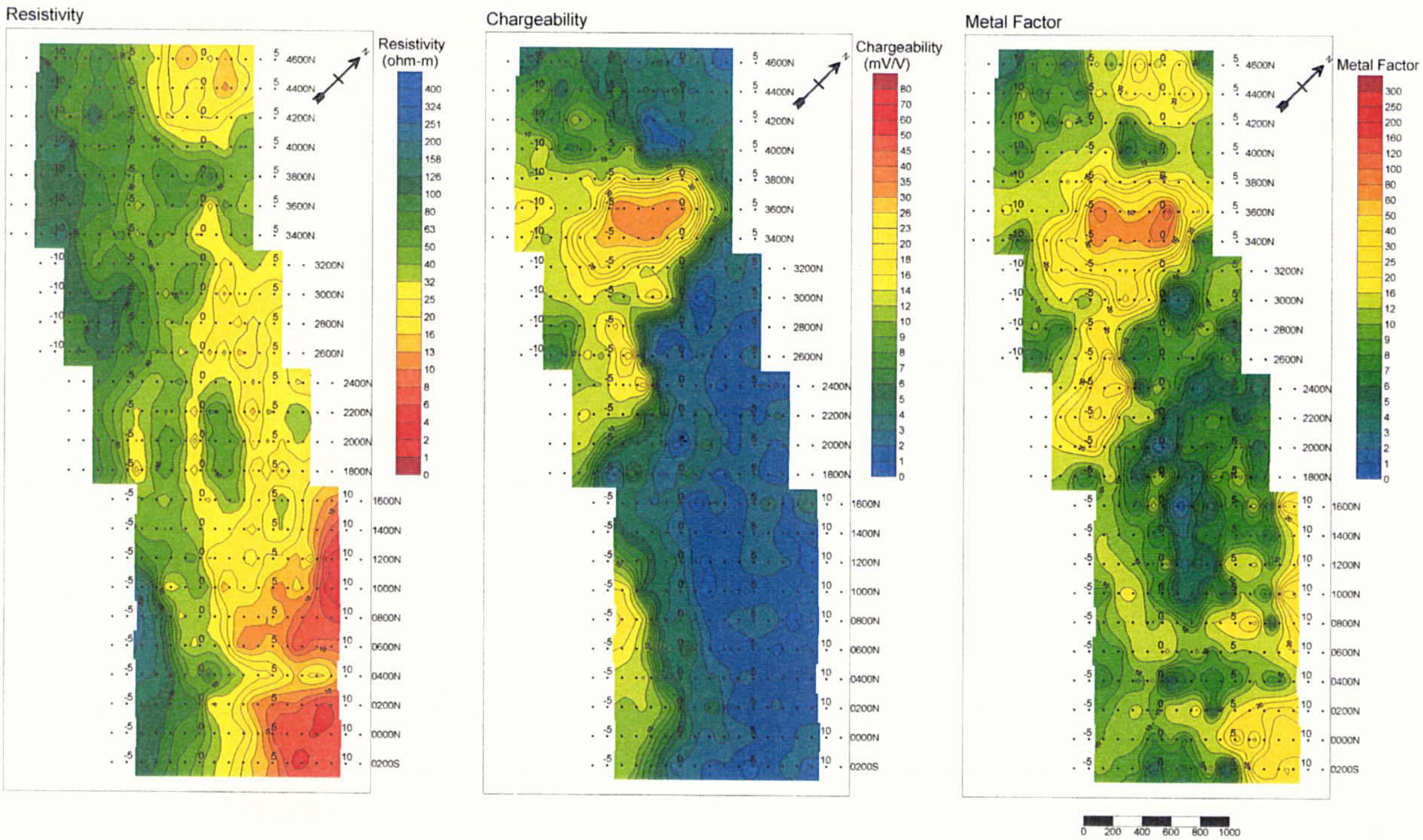


Fig.II-4-6 IP plane map for n=3 in Sarami area

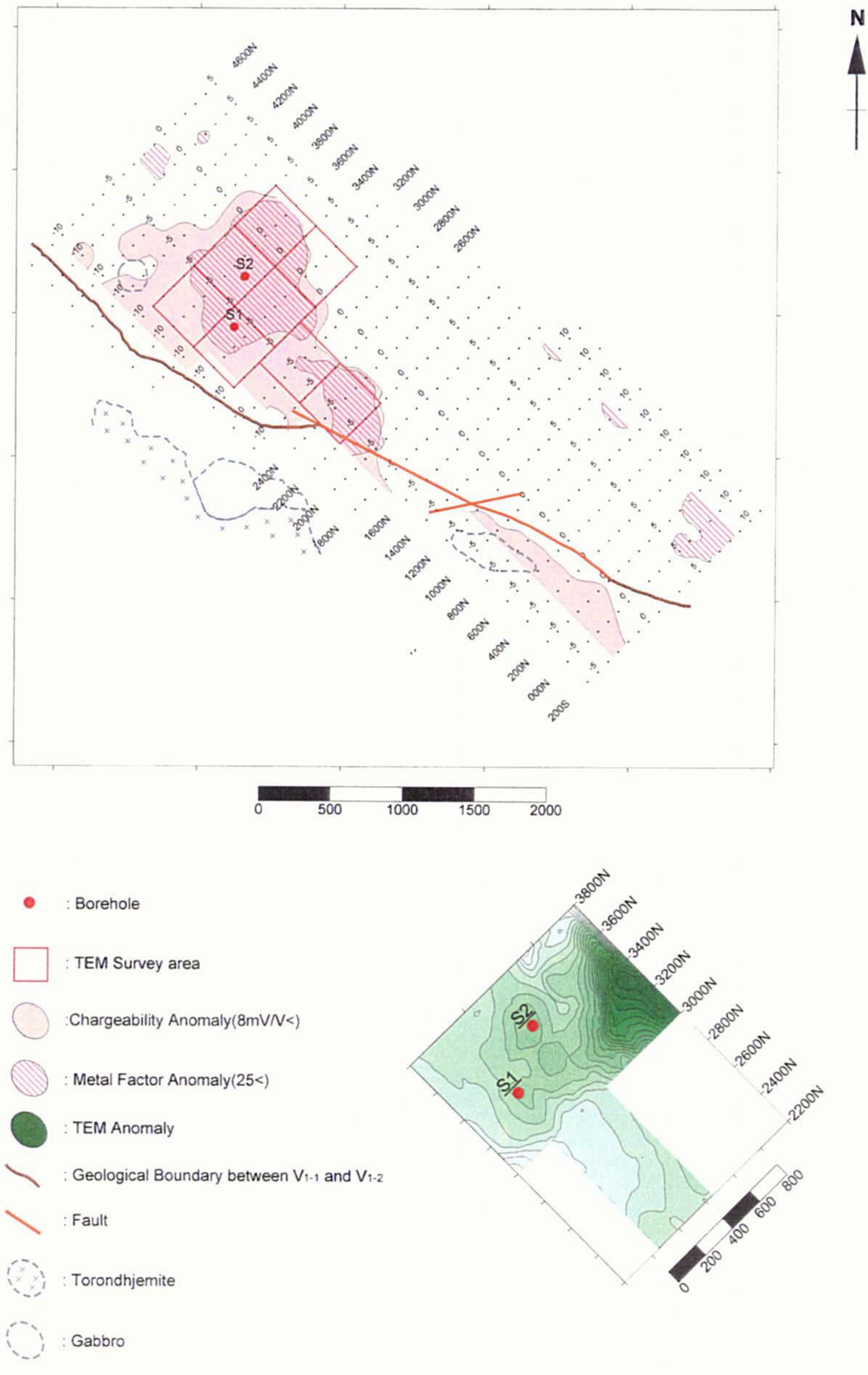


Fig.II-4-7 Compiled geophysical map in Sarami area

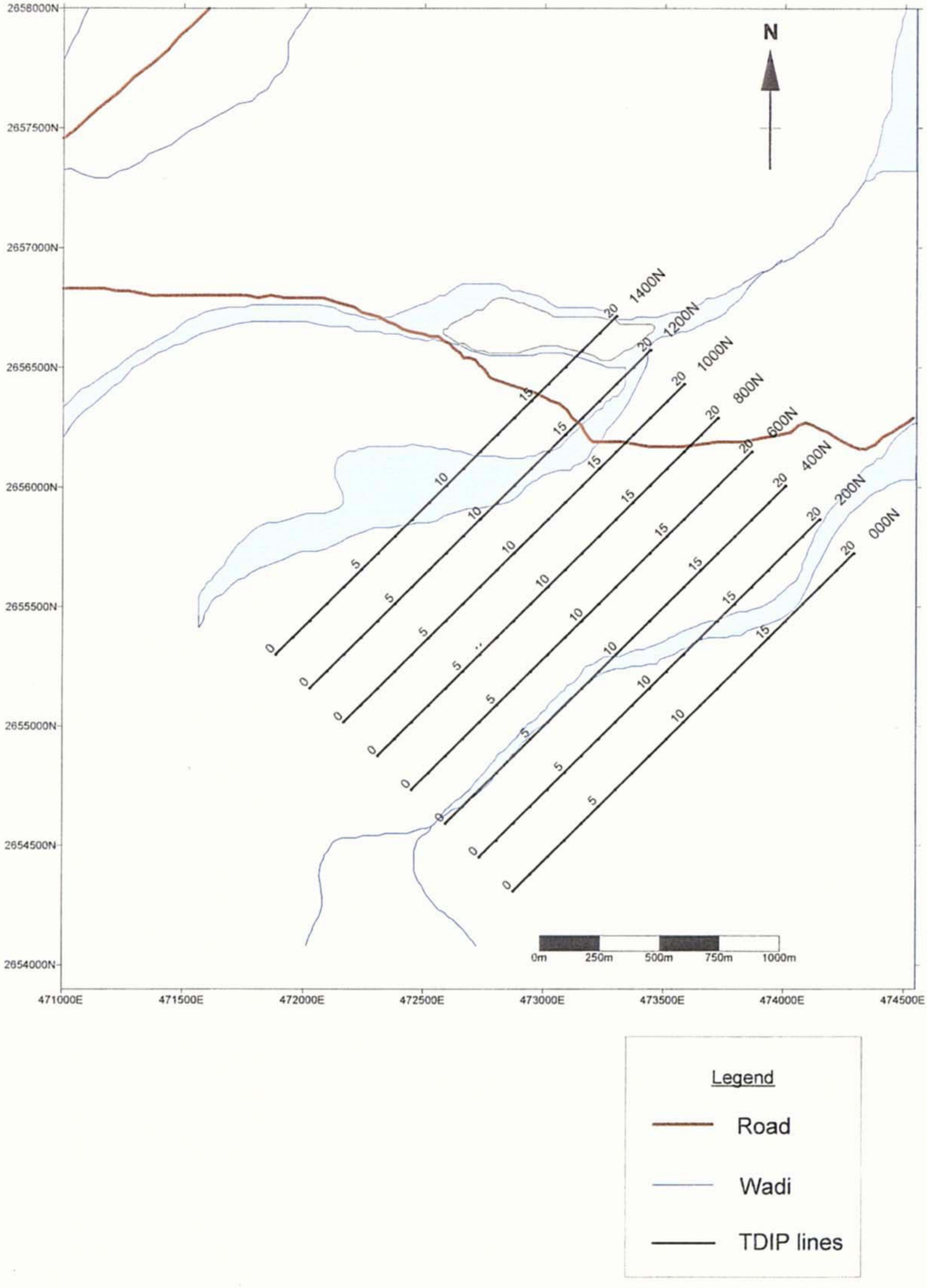


Fig.II-4-8 Geophysical survey location map in Mahab area

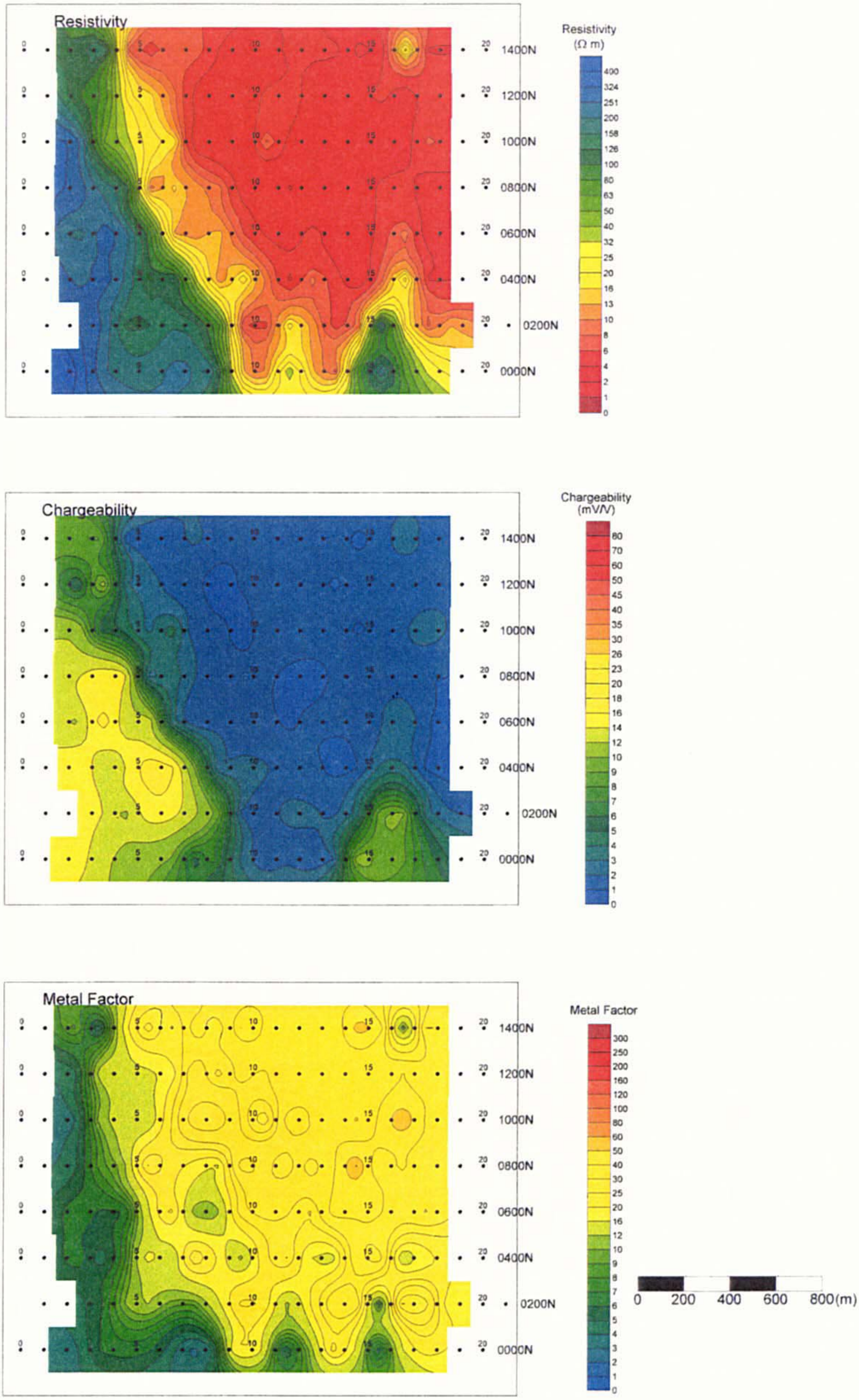


Fig.II-4-9 IP plane map for n=3 in Mahab area

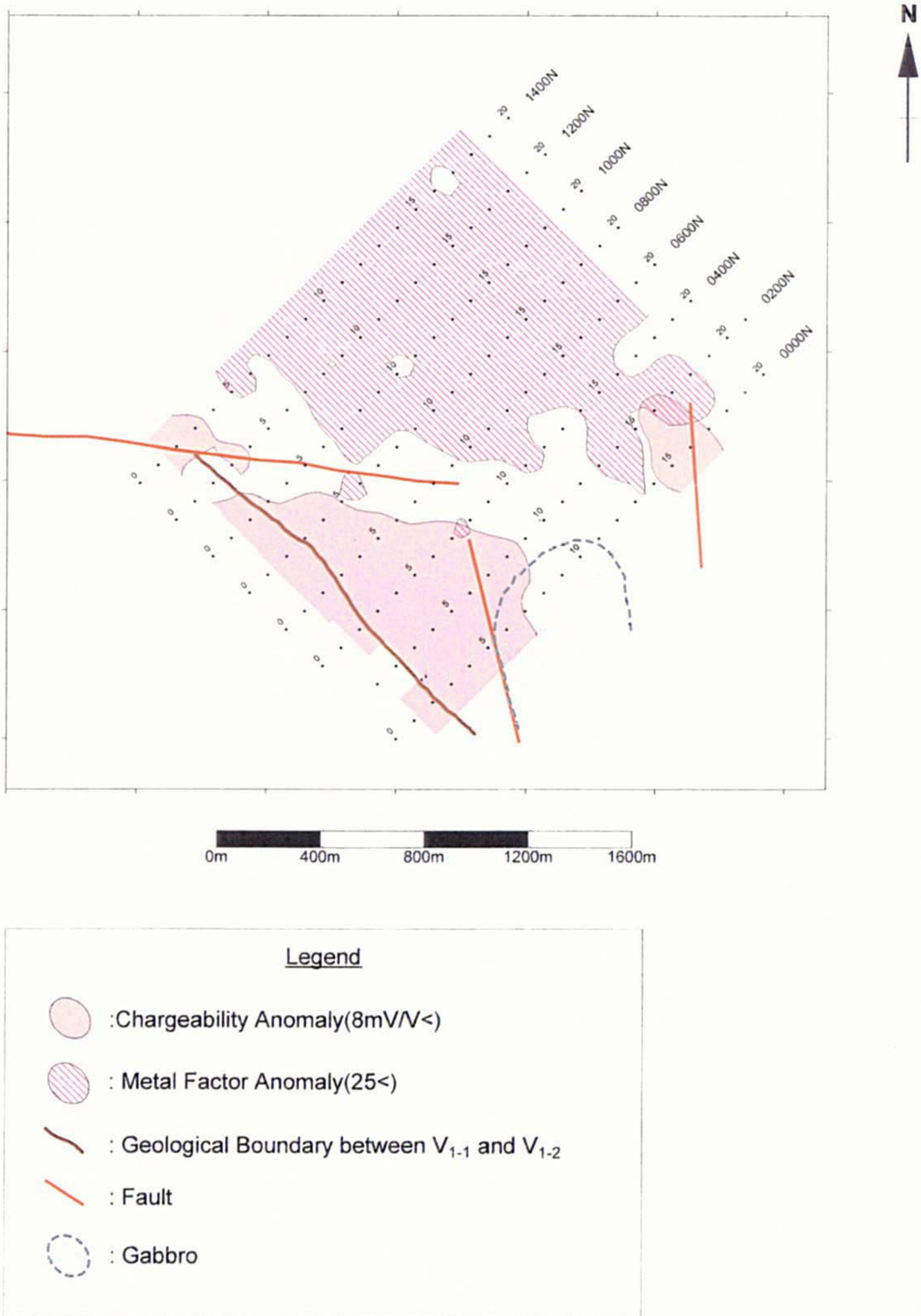


Fig.II-4-10 Compiled geophysical map in Mahab area

The chargeability distribution shows almost the same pattern as the resistivity, i.e., the south part shows high chargeabilities, while the north part low chargeabilities. The distribution of high chargeability closely corresponds to that of V1-1.

The high metal factor anomaly distributed widely in the north half of the area is likely to be due to a geological occurrence not related to mineralization, because this is not related to the occurrence of low chargeability anomalies.

4-4 Survey Results in Hara Kilab Area

4-4-1 Geophysical survey

(1) Outline of survey

Fig.II-4-11 shows the locations of the TDIP and TEM geophysical surveys carried out in this area.

TDIP survey was carried out in 1998 with a total of 44.0km line-length composed of 20 survey lines set along EW direction.

TEM survey was also carried out in 1998 on the basis of the TDIP results. Total observed stations were 405 points all located within 5 TEM loops.

(2) Survey results

The results of TDIP survey are shown in Fig.II-4-12 , and compiled geophysical map is shown in Fig.II-4-13 .

According to the Fig.II-4-12, a low resistivity structure is seen in the north of the area along an approximate NW-SE direction. High resistivities are entirely seen in the west of the area, while low resistivities in the east. The high resistivities detected in the west part seem to be due effects such as, sheeted dikes, lower extrusives, intrusive trondhjemite.

High chargeability distributions are detected in the southwestern part and at the northwest side of the central part in the area. The chargeability anomaly zones in the southwestern part are located on the boundary between V1-1 and V1-2 and in V1-1. The chargeability anomaly zone at the northwest side of in the central part is detected in V1-2 formation. The high metal factor zones are distributed in this anomaly zone associated with low resistivity.

TEM survey was carried out within the metal factor anomaly zone in the central part of the area. To further investigate the extracted TEM anomalies, the boreholes MJOB-H1 and MJOB-H2 were drilled in the north part of the loop 4 and southeast part of the loop 3, respectively, as indicated in the above-mentioned figures.

4-4-2 Drilling survey

In Hara Kilab area, drilling survey was carried out at the anomaly zone detected by TDIP and TEM survey in 1998. Intense mineralization and alteration is recognized widely on the V1-2. All boreholes intersected a stockwork ore similar to that observed just below massive sulphide ore in Ghuzayn area,

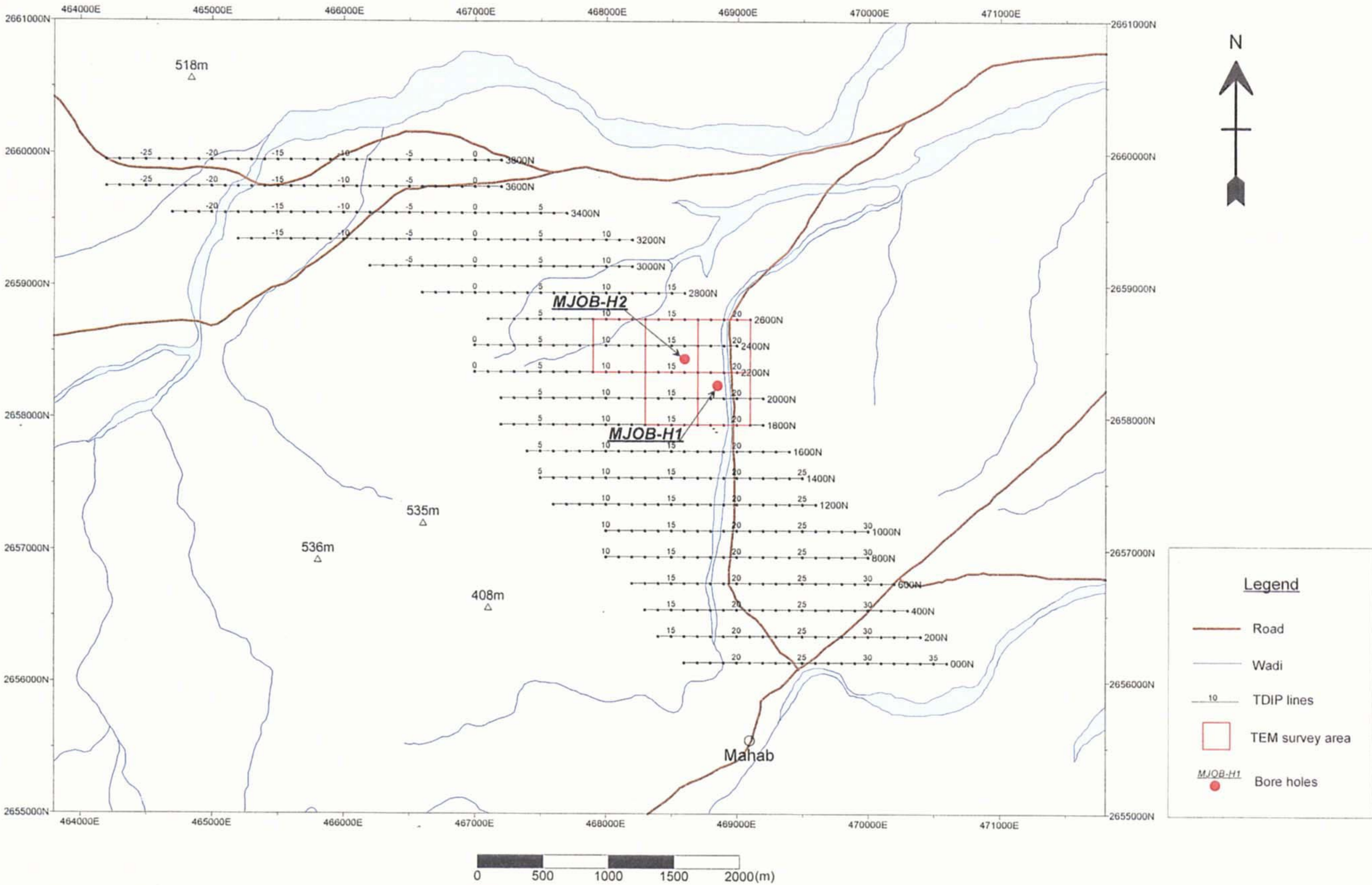


Fig.II-4-11 Geophysical survey location map in Hara Kilab area

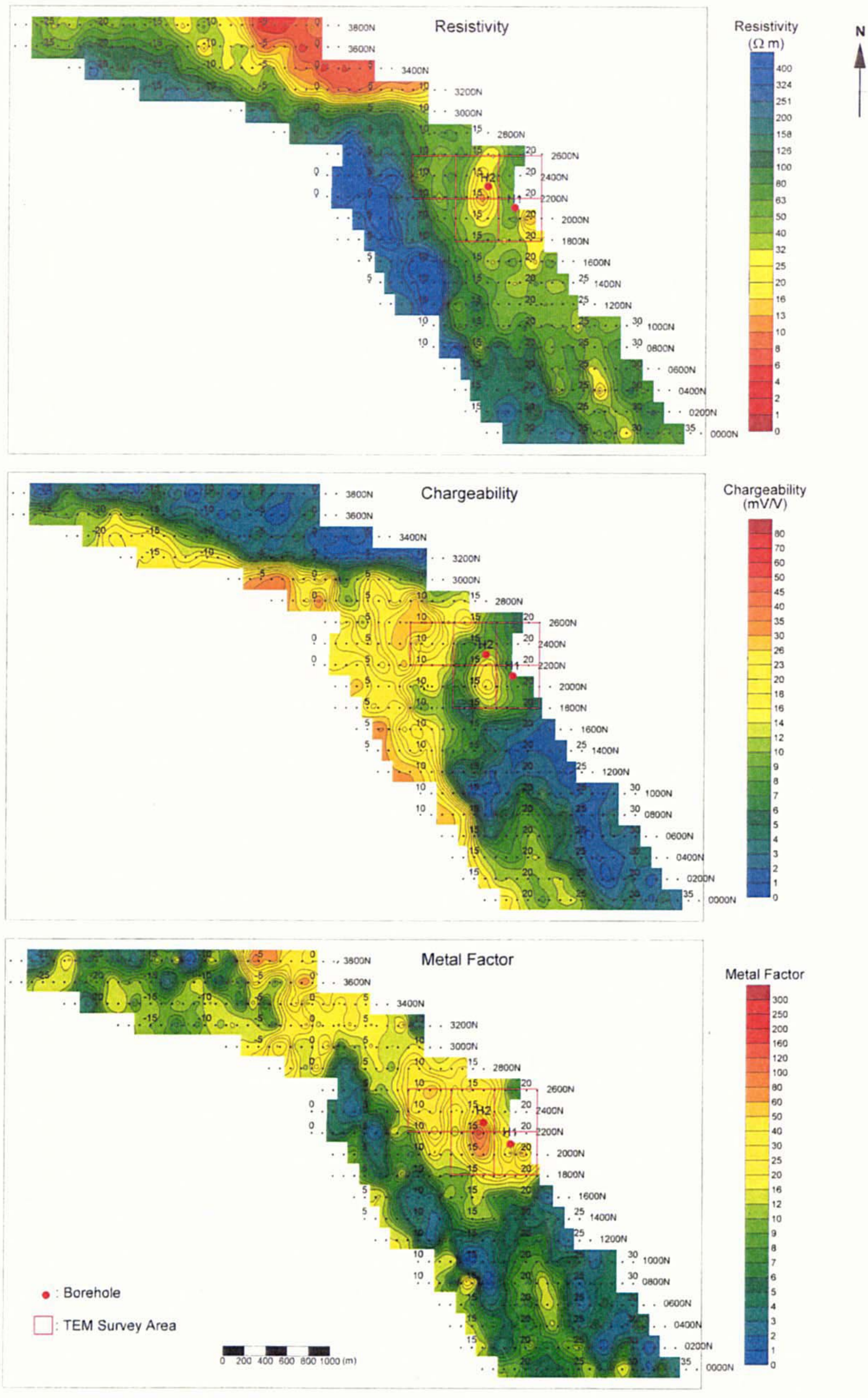


Fig.II-4-12 IP plane map for n=3 in Hara Kilab area

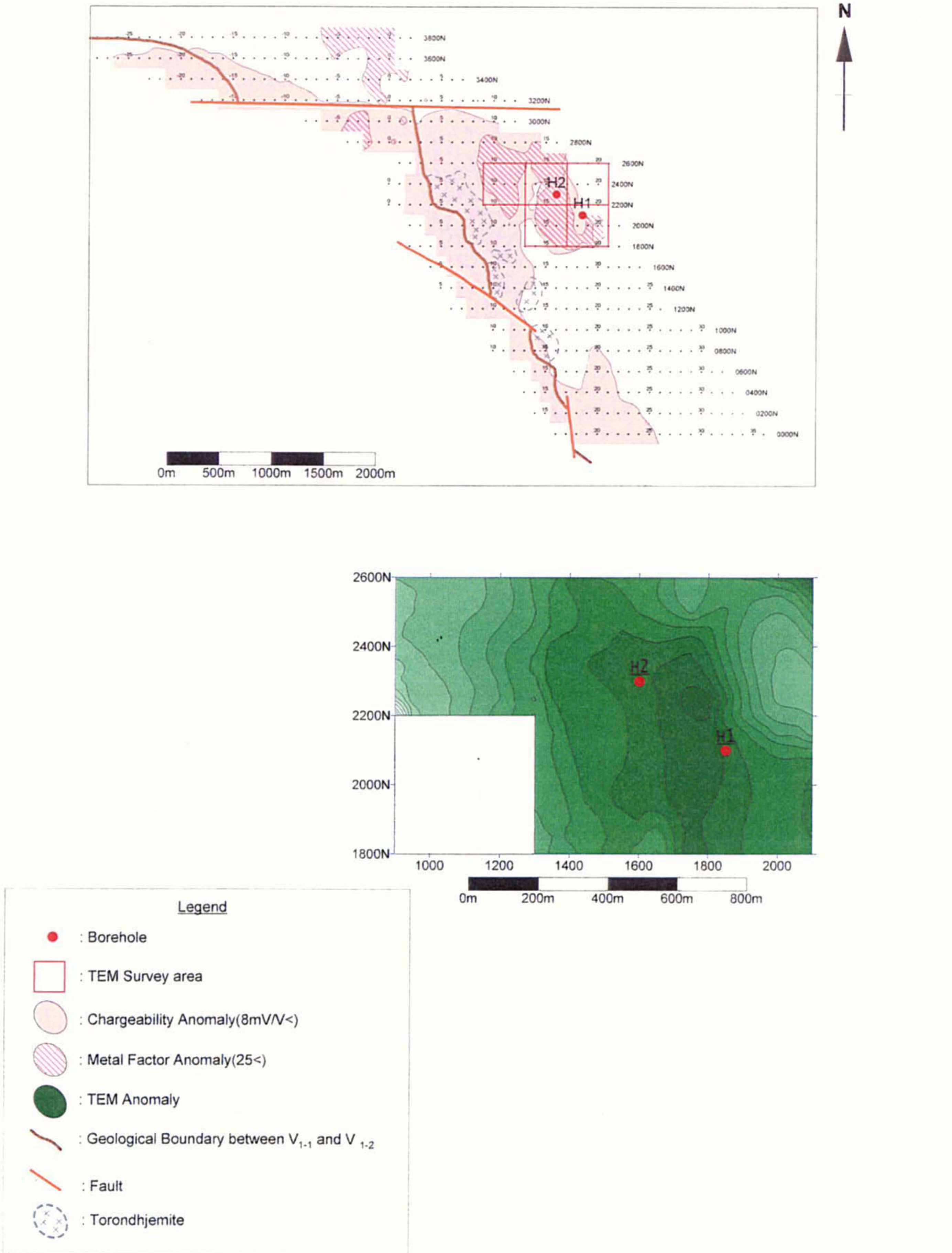


Fig.II-4-13 Compiled geophysical map in Hara Kilab area however, massive sulphide was not detected. All boreholes did not either reach the stratigraphic position of massive sulphide deposits. It is thought that this mineralization occurred after the formation of massive sulphide deposits.

CHAPTER 5　DETAILED SURVEY IN MAQAIL, SALAHI and ZUHA AREAS

5-1 Geology and Mineralization

5-1-1 Maqail area

Maqail area is located around Shibeibat village about 40km southwest of Saham.

As indicated in Fig.II-5-1, the geology of this area consists mainly of SD, V1-1, V1-2, U1, V2, bedded chart of Batinah Olistostrome, and Quaternary sediments. U1 is well exposed in this area, reaches about 2m in thickness at the western side of the central part, is well bedded and contains abundant magnetite. Many basalt and dolerite dikes are intruded into V1-2 at the central and southern parts where a NNW-SSE trending fault runs in V1-2.

Since magnetite predominates in U1 and copper mineralization can be observed in many places, it is likely that U1 graded laterally into a massive sulphide ore. Additionally, silicified zone that is exposed along the NNW-SSE trending fault mentioned above is found in places accompanied by copper mineralization.

5-1-2 Salahi area

Salahi area is located to the south of Zuha area and about 9km north of Maqail area. As indicated in Fig.II-5-2, the geology of Salahi area consists mainly of SD, V1-1, V1-2, U1, V2 of Samail Ophiolite and Quaternary sediments.

Peridotites are intruded around the boundaries between V1-1 and V1-2 in three places. Many E-W trending faults are found and a thrust fault can also be seen. A NW-SE trending fault observed in the south is considered to be formed during the formation of V1-2.

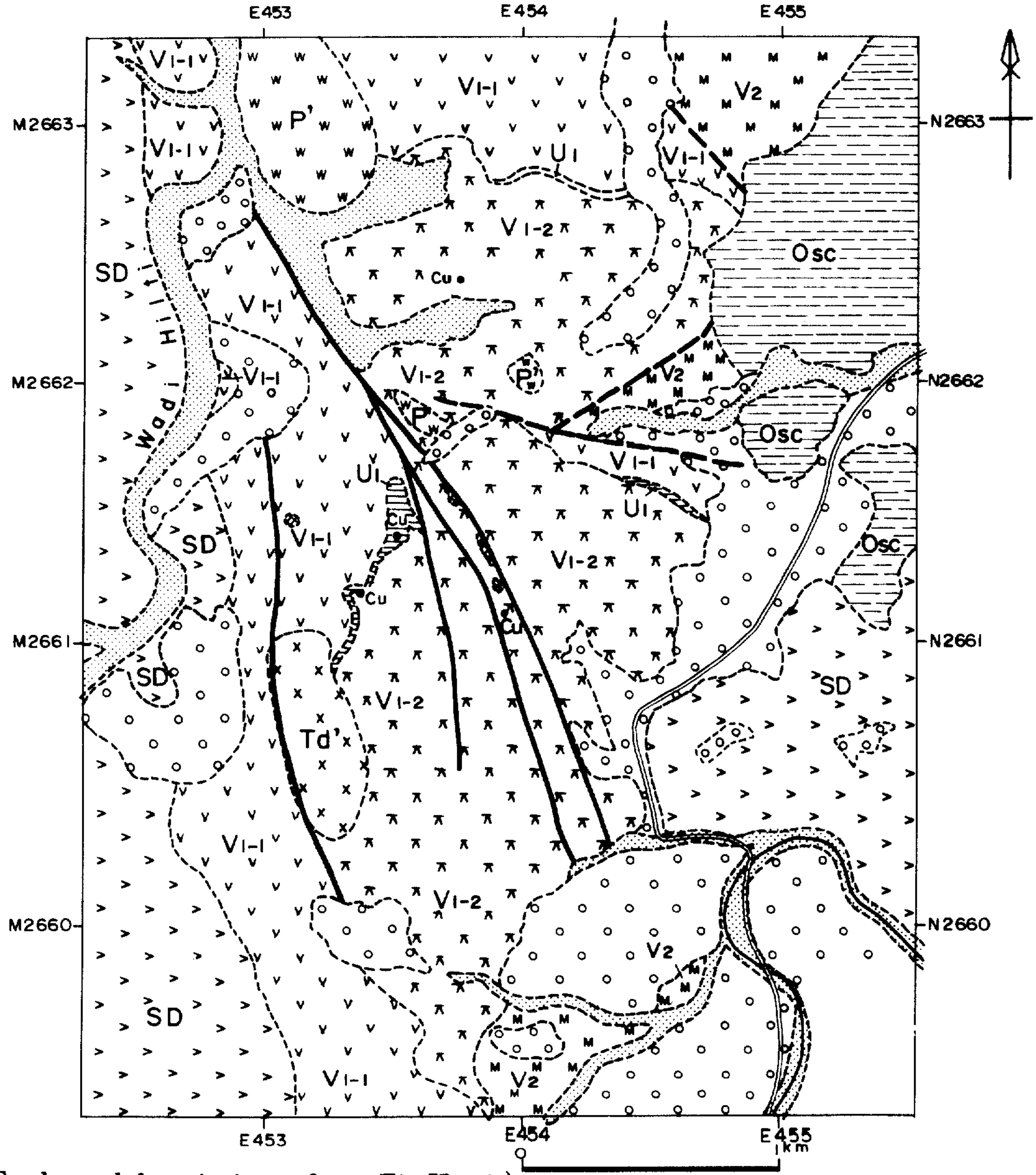
Regarding the mineral showing, U1 with copper oxides and magnetite are found in several places and intense epidotization in places. Bedded U1 observed in the north, includes abundant magnetite with copper oxides, reaches 2m in thickness and presents quite characteristics that resembles the edge of massive sulphide ore body.

5-1-3 Zuha area

Zuha area is in the northern most part of the project area and located 35km west of Saham City.

As indicated in Fig.II-5-3, the geology consists mainly of V1-1, V1-2, U1, V2, U2 and Quaternary sediments. V1-2 outcrops in the central and southern parts of the area, namely, around the Zuha mineral showing. However, V1-2 is not exposed in the northern part because V1-1 is directly overlaid by V2.

V1-2 consists of pillow lava as well as massive lava. Thick massive lava, with 5m in maximum thickness, is found directly over U1. U1 continuously crops out showing a thickness of about 30 to 50cm. The gossan located in the area graded laterally from this U1, which has a bigger thickness than U1 and is



(For legend description refer to Fig.II-4-2.)

Fig.II-5-1 Geologic map of Maqail area

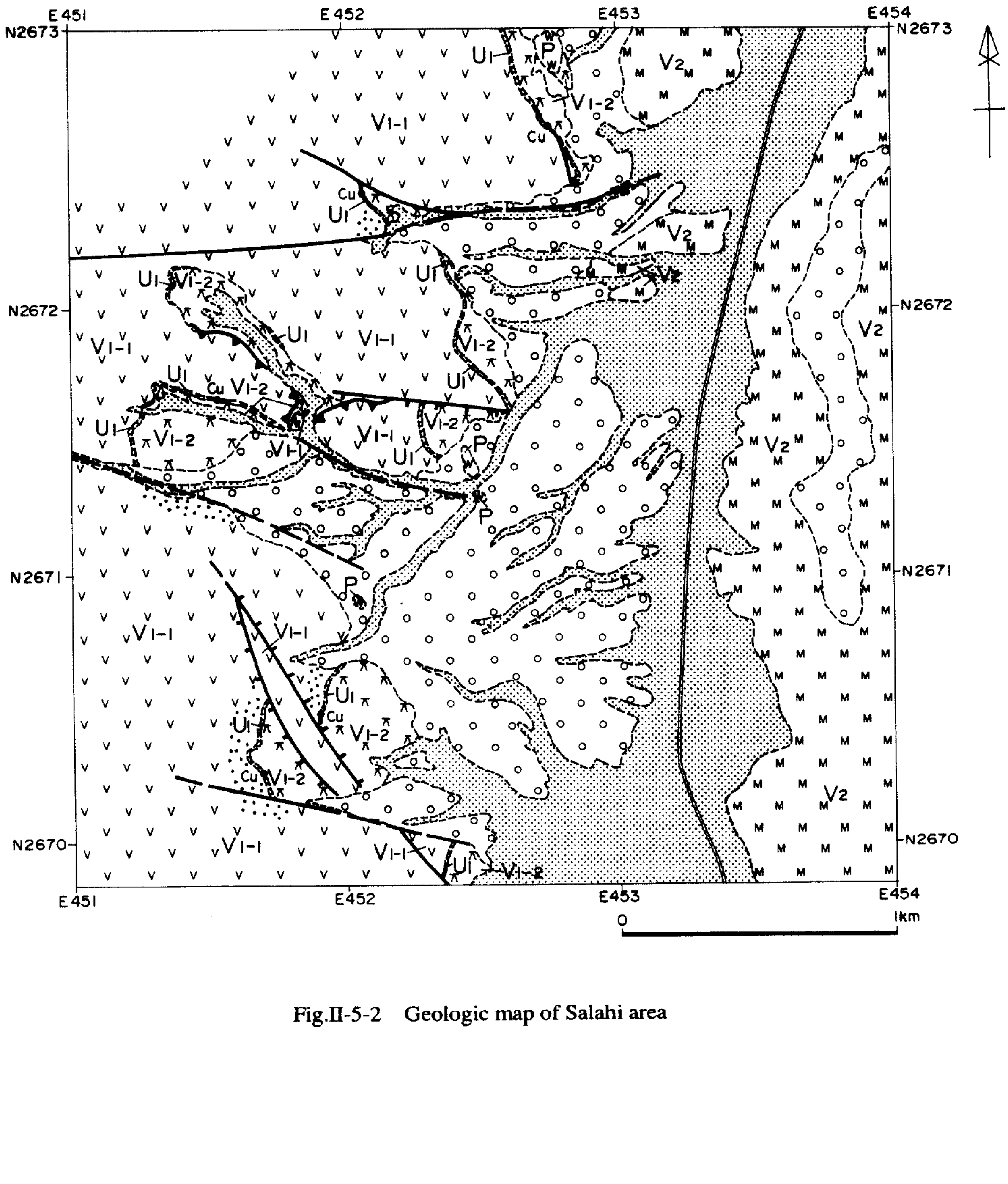
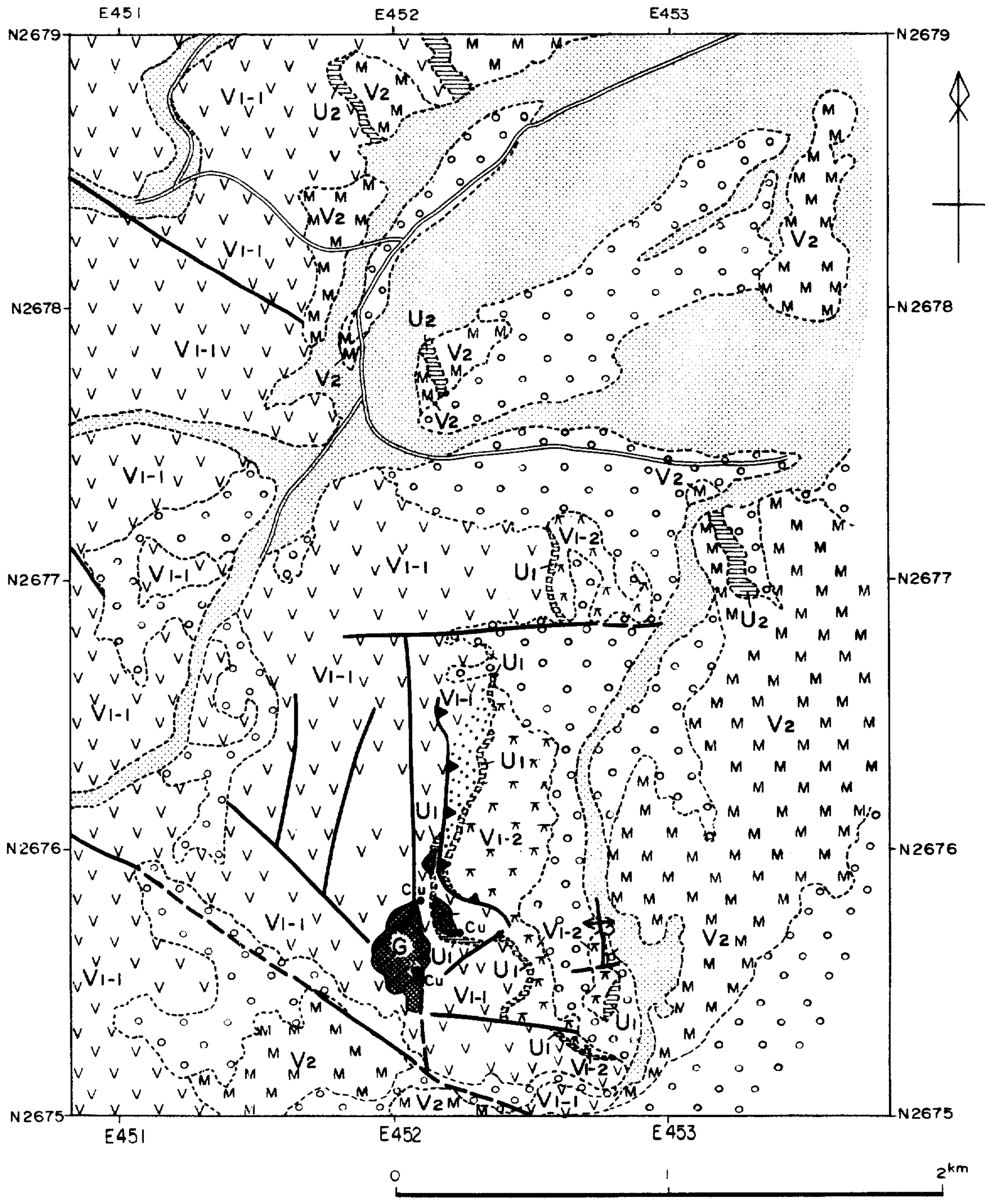


Fig.II-5-2 Geologic map of Salahi area



(For legend description refer to Fig.II-4-2.)

Fig.II-5-3 Geologic map of Zuha area

intensely brecciated. The area shows a complicated geological structure consisting of thrust fault, normal fault and folding.

The gossan in this area has almost the same scale as the one in Ghuzayn. Copper mineralization can be seen in many places around the gossan. An ancient smelting site was located in the vicinity of the gossan. Intense epidotization is observed in V1-1 at the contact with V1-2 around the gossan.

In this area from 1974 to 1976 Prospection Ltd. carried out drilling, geological, geochemical as well as geophysical surveys. In 1985 Bishimetal Exploration Co., Ltd. conducted geological and geochemical exploration works. Moreover in 1991, MPM carried out drilling survey.

5-2 Survey Results in Maqail Area

5-2-1 Geophysical survey

(1) Outline of survey

Fig.II-5-4 shows the location of the TDIP and TEM surveys carried out in this area.

TDIP survey was carried out in 1998 and 1999 with a total of 27.4km line-length composed of 15 survey lines set in the EW direction.

TEM survey was carried out in 1999 by observing 243 stations set within 3 loops.

(2) Survey results

The results of TDIP survey are shown in Fig.II-5-5, and the compiled geophysical map is shown in Fig.II-5-6.

As compared with other areas, the resistivity distribution in the whole area presents in general higher values. However, a relatively low resistivity distribution is recognized in the northeast part of the area where Quaternary sediments are cropped out.

The chargeability distribution shows the same pattern as the resistivity. High chargeability zone above 8mV/V is widely detected in the central and northwest part of the area.

High metal factor anomaly zone within the chargeability anomaly zone is detected around the west side of the central part of the area.

TEM survey was carried out within the metal factor anomaly zone. To verify the extracted TEM anomalies, the boreholes MJOB-M2 and M3 were drilled in the north part of one of the 3 loops.

5-2-2 Drilling survey

Drilling survey was carried out at three boreholes placed in the TEM and IP anomaly zones. Though intense silicification and pyrite dissemination are observed in V1-2 and V1-1 in all boreholes, massive sulphide ore is not recognized.

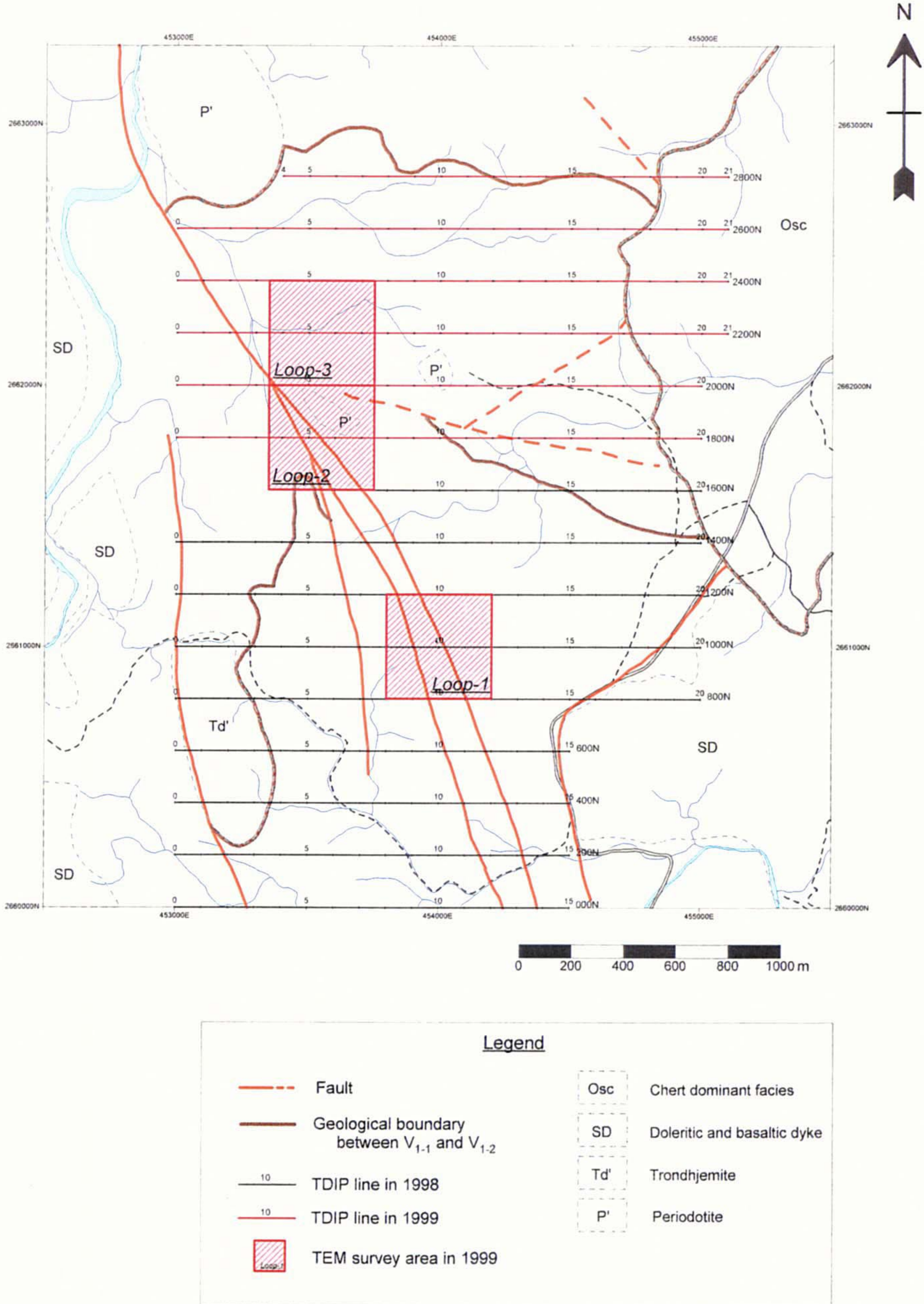


Fig.II-5-4 Geophysical survey location map in Maqail area

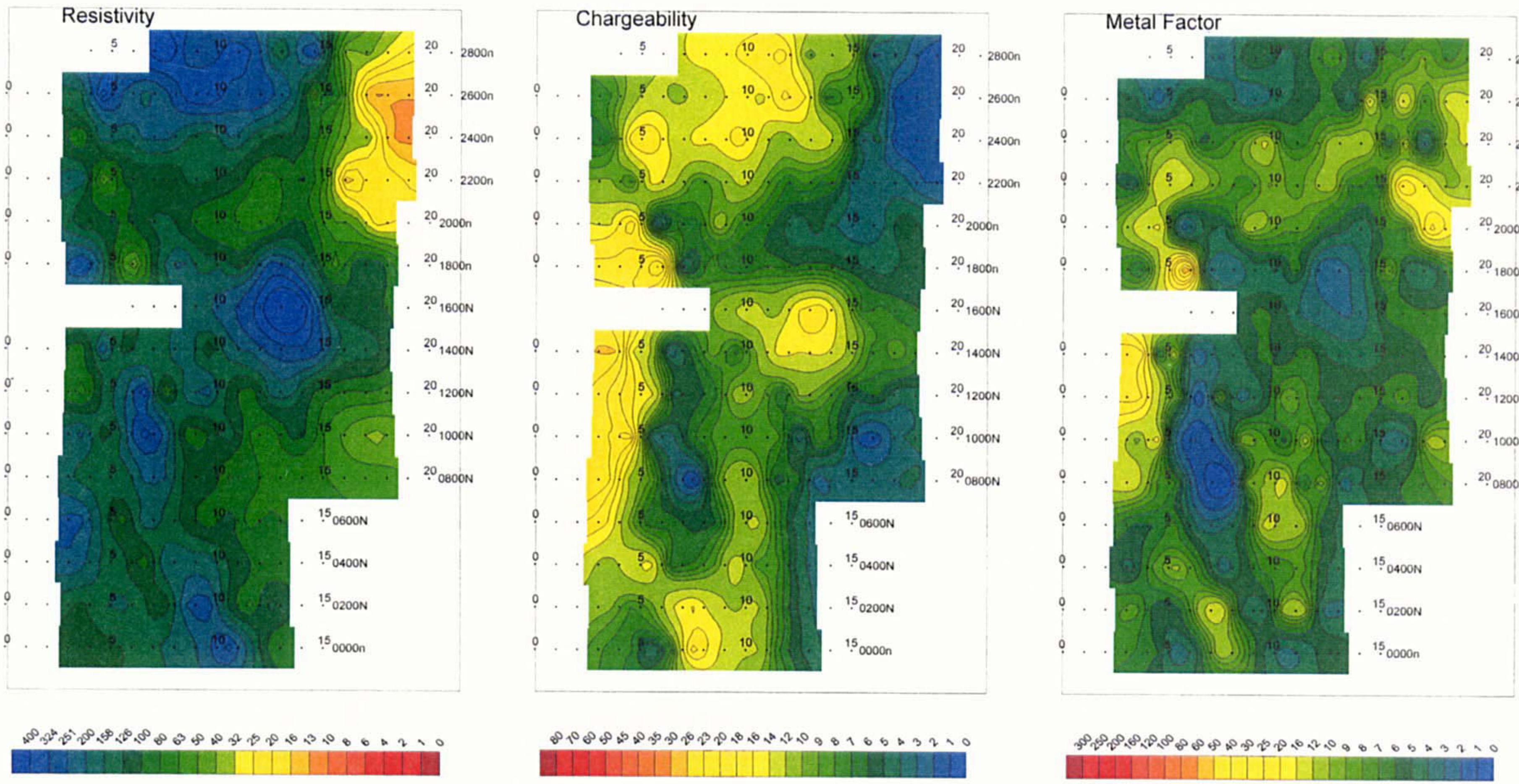


Fig.II-5-5 IP plane map for n=3 in Maqail area

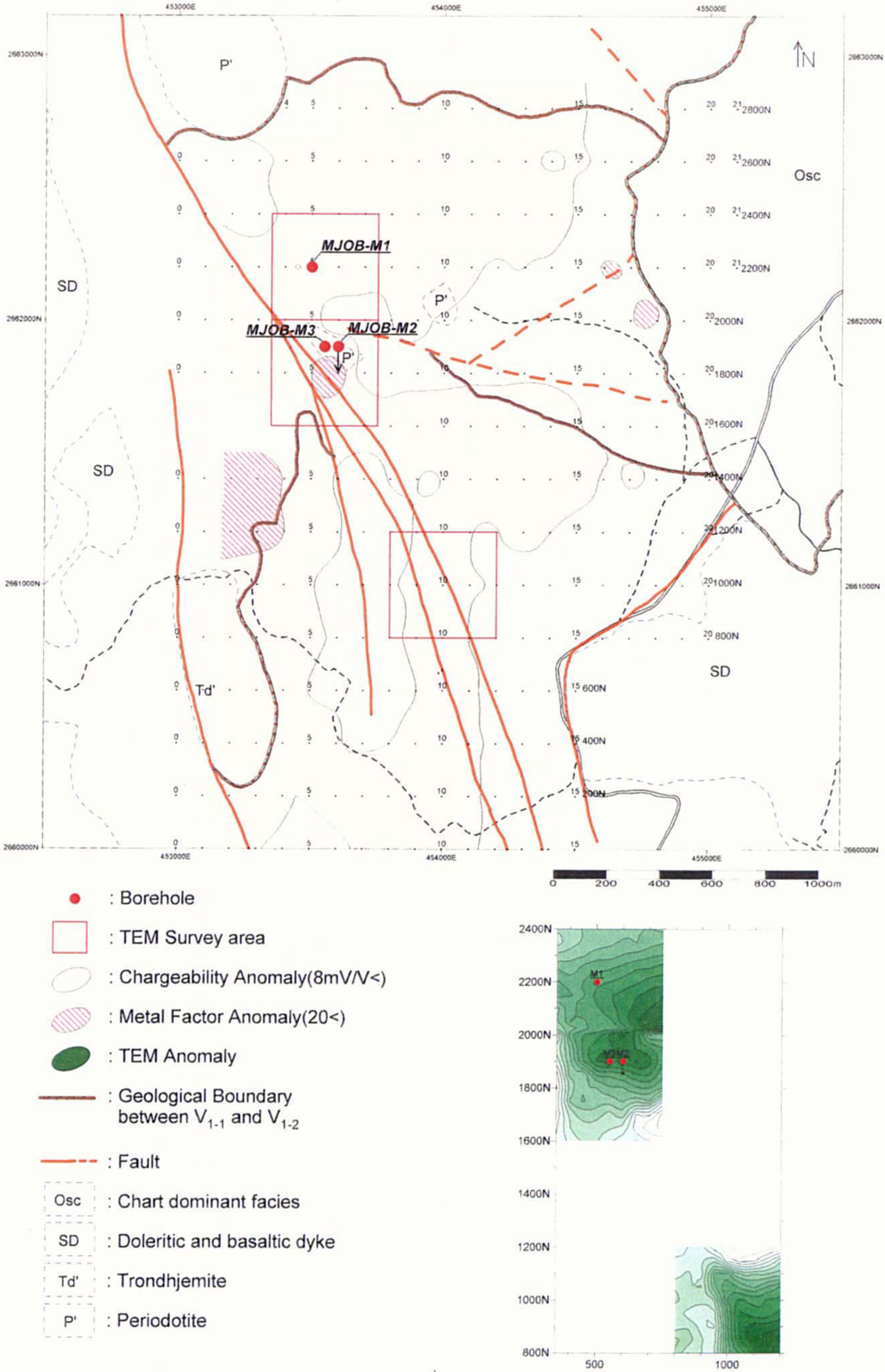


Fig.II-5-6 Compiled geophysical map in Maqail area

5-3 Survey Results in Salahi Area

5-3-1 Geophysical survey

(1) Outline of survey

Fig.II-5-7 shows the location of the TDIP survey carried out in 1999 in this area. A total of 21.6km line-length composed of 15 survey lines were set in the EW direction.

(2) Survey results

The results of TDIP survey are shown in Fig.II-5-8, while the compiled geophysical map is shown in Fig.II-5-9.

High resistivity values are seen in the west part, while low resistivity values in the east of the whole survey area. The resistivity results indicates that at shallow levels and in the south side of the central east part of the area, low resistivity anomaly of values less than 20Ω-m can be recognized. However, this anomaly distribution presents chargeability values lower than 5mV/V. Furthermore, in the north east part of the surveyed area, relatively high metal factor values are detected, but they can not be related to any massive sulphide mineralization, because these values are likely to correspond geologically to the V1-1 formation.

5-4 Survey Results in Zuha Area

5-4-1 Geophysical survey

(1) Outline of survey

Fig.II-5-10 shows the location of the TDIP and TEM geophysical surveys carried out in 1999 in this area. The TDIP survey had a total line-length of 34.5km that consisted of 16 survey lines set in the EW direction. The TEM survey consisted of 576 points measured within 7 loops.

(2) Survey results

The results of TDIP survey are shown in Fig.II-5-11, while a compiled geophysical map is shown in Fig.II-5-12.

In the southwest part of the surveyed area relatively low resistivity values are distributed. However, the chargeability distribution shows almost same distribution pattern as the resistivity, for instance, in the gossan and its surroundings where chargeabilities higher that 10mV/V were detected, the resistivity showed also high values and in other places where low resistivities were found the chargeability were also low.

In the west part of the gossan, high metal factor values were found due to the relatively low resistivity found in this part. The TEM carried out in the west part of the gossan detected some high TEM response, however, this anomaly does not show indications for the existence of any massive sulphide deposit since

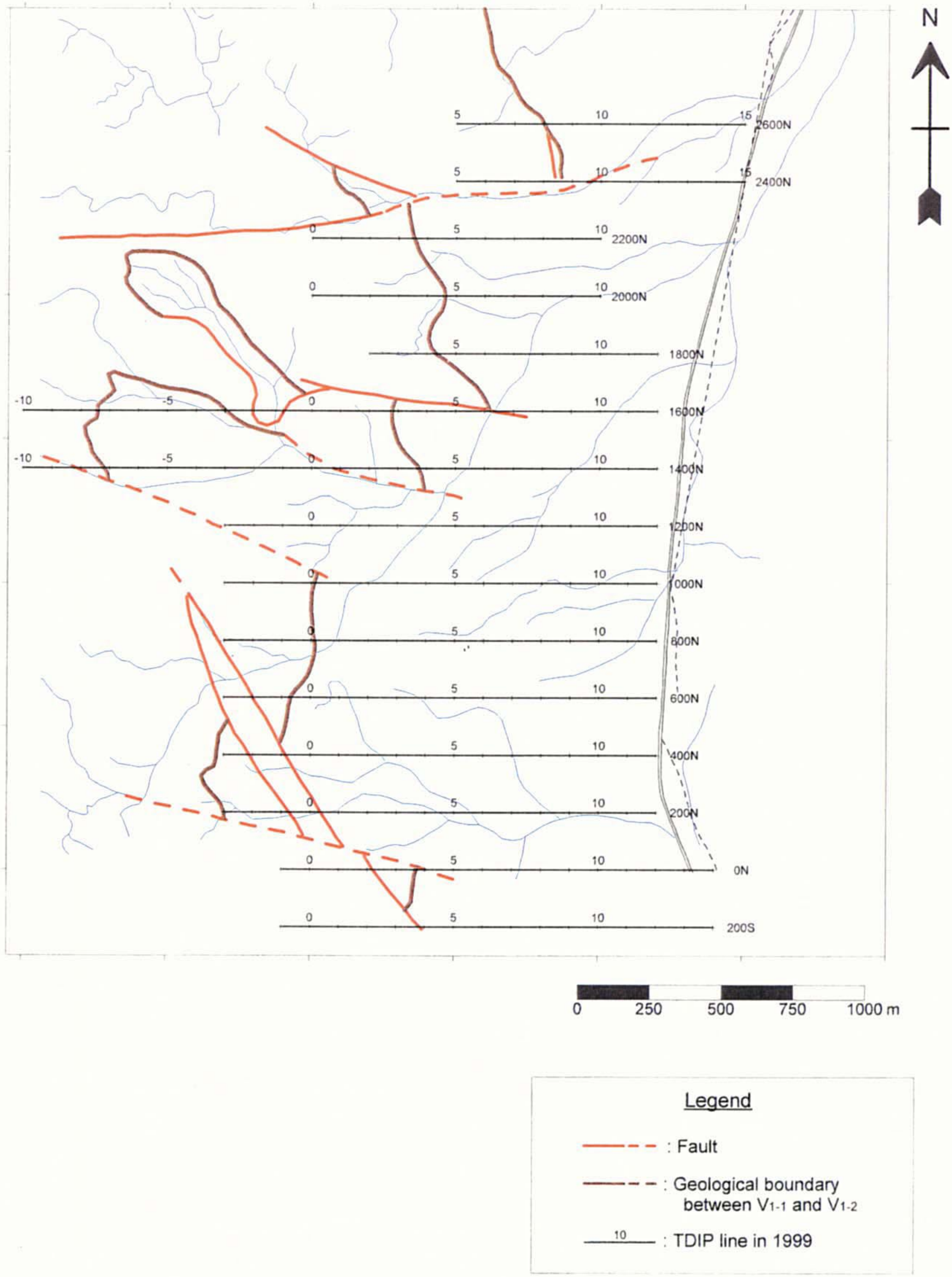


Fig.II-5-7 Geophysical survey location map in Salahi area

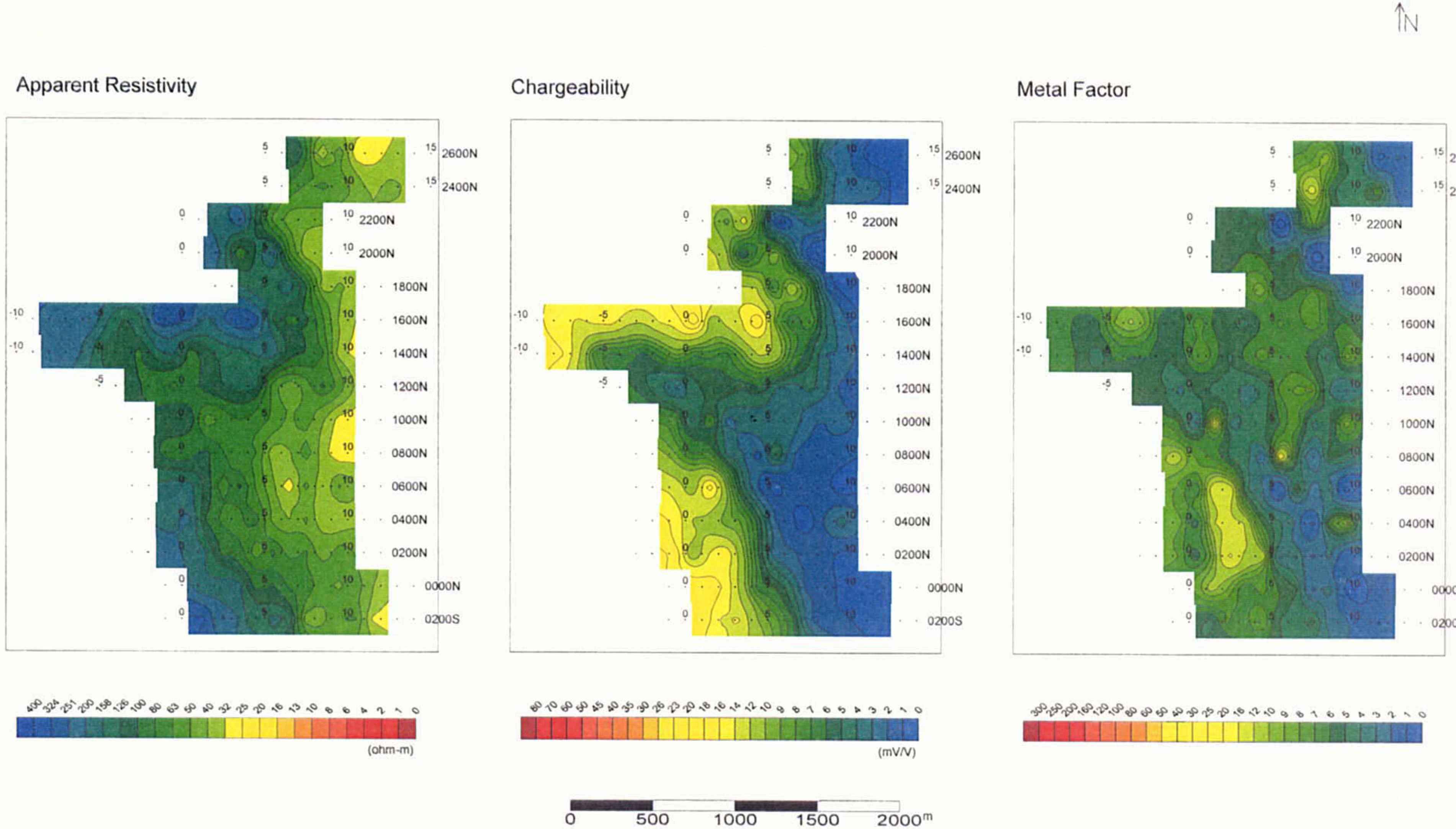


Fig.II-5-8 IP plane map for n=3 in Salahi area

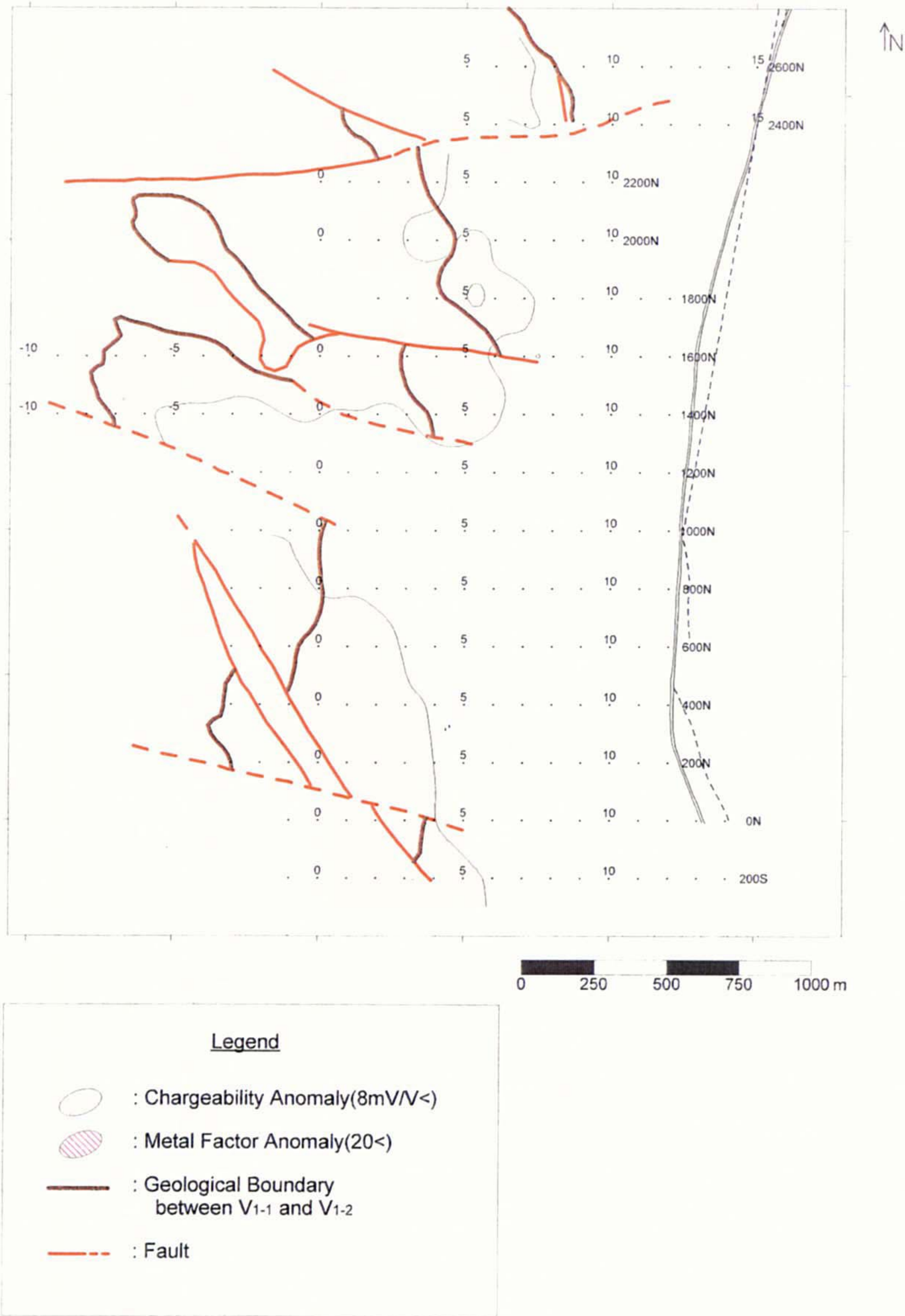


Fig.II-5-9 Compiled geophysical map in Salahi area

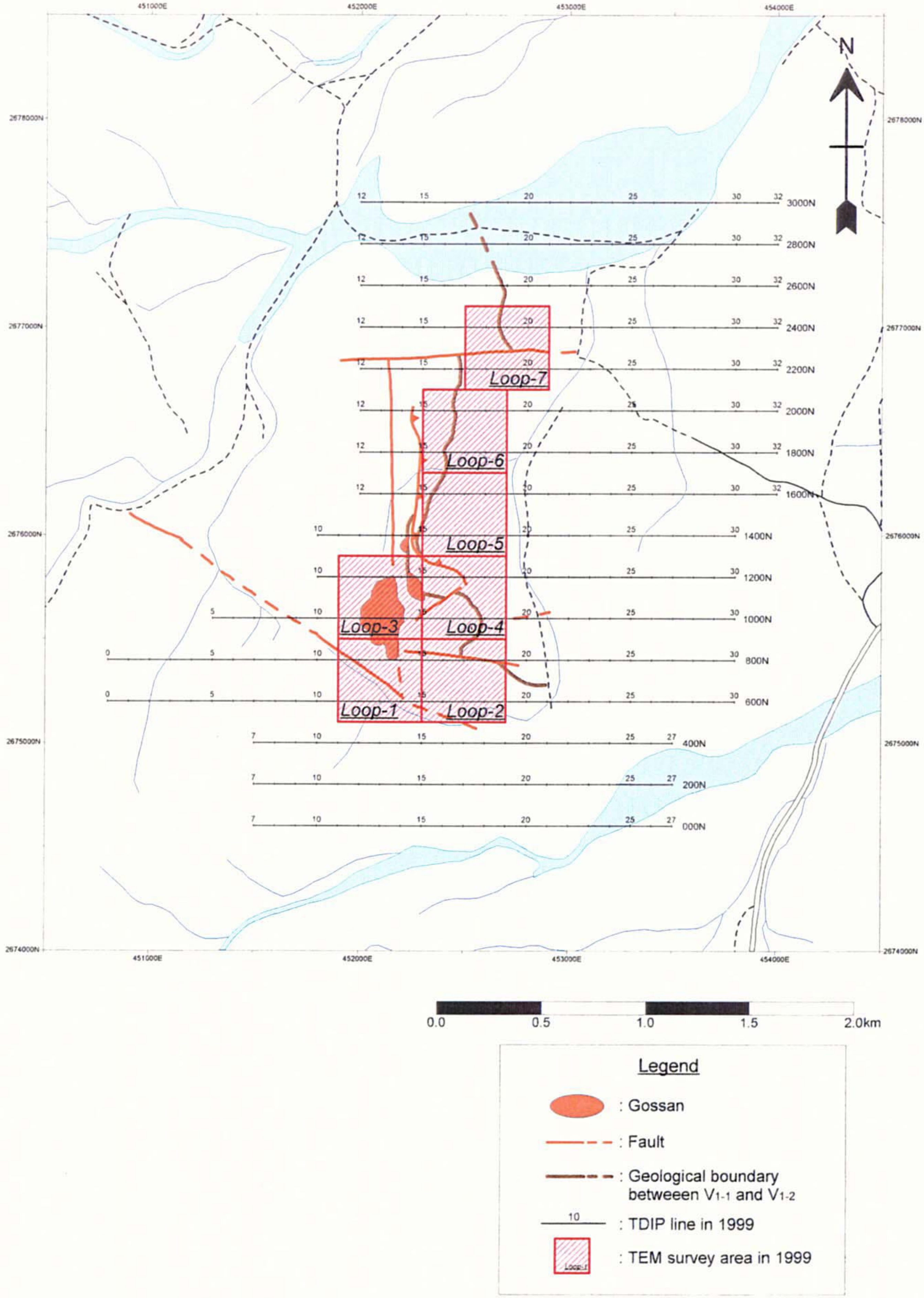


Fig.II-5-10 Geophysical survey location map in Zuha area

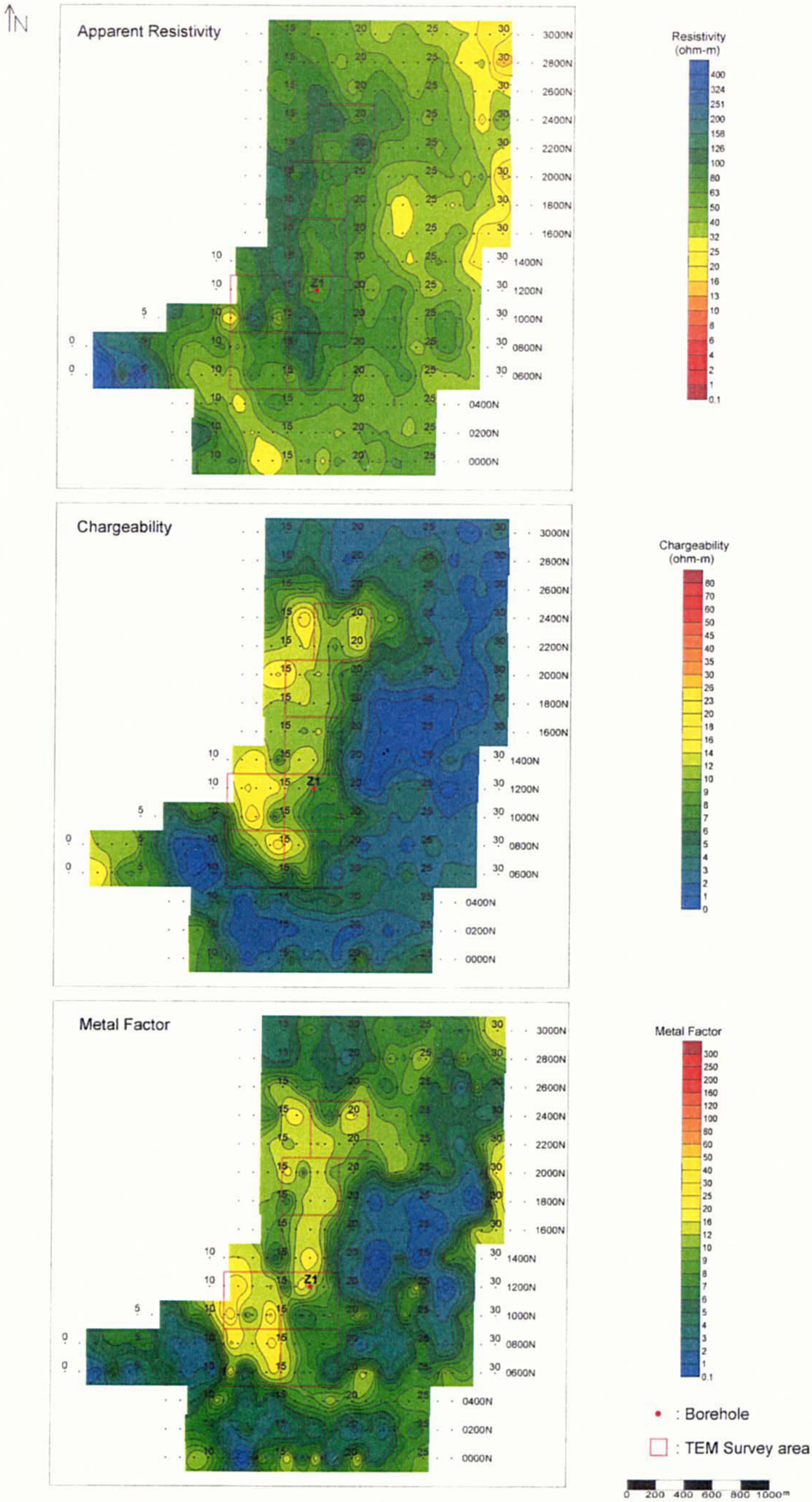
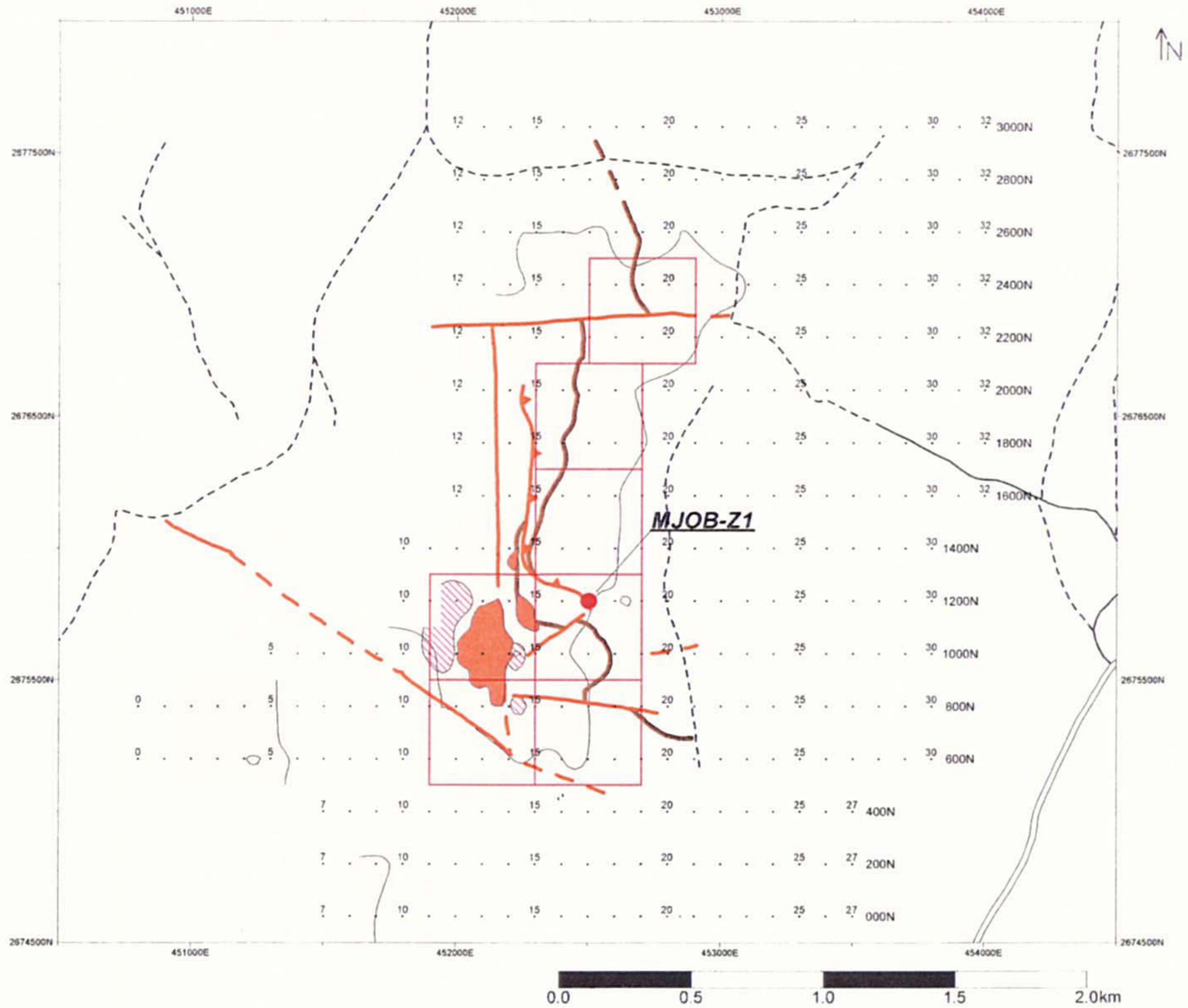
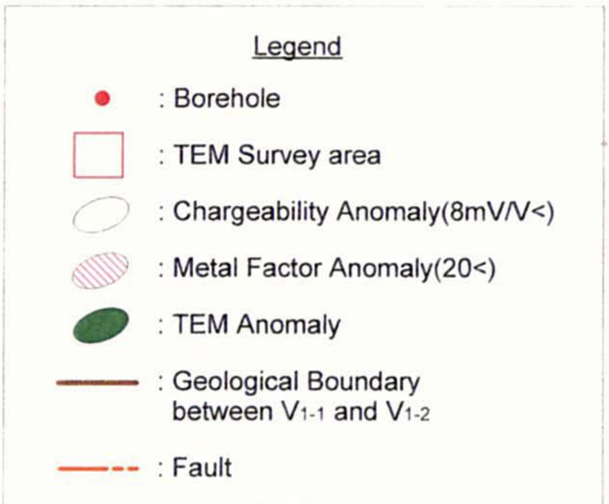


Fig.II-5-11 IP plane map for n=3 in Zuha area





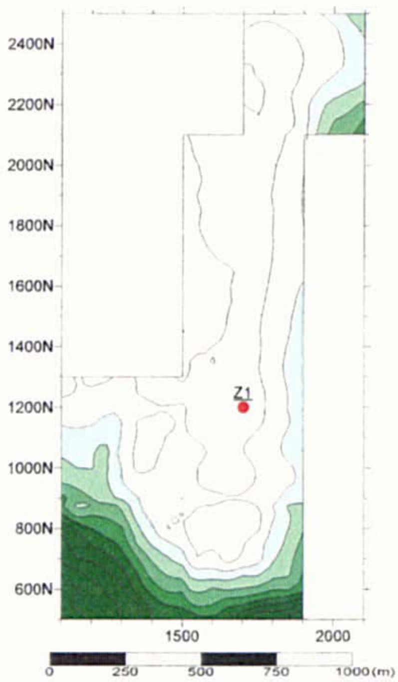


Fig.II-5-12 Compiled geophysical map in Zuha area it is detected within the V1-1 formation.

5-4-2 Drilling survey

Drilling survey was carried out at one borehole in the IP anomaly zone to the east of the Gossan. Though intense pyritization and alteration such as silicification or epidotization are observed in V1-1, massive sulphide ore was not recognized.

CHAPTER 6 FURTHER CONSIDERATIONS

6-1 Ore body Distributions in South Batinah Coast Area

Among the many places where mineral showings are seen in South Batinah Coast area, it can be mentioned the big scale gossan in Zuha area and the Hara Kilab area where massive sulphide was confirmed but in small scale. After Ghuzayn, both of these areas are also considered as areas of high potentiality for bearing massive sulphide deposits. Clear indications for the existence of mineral showings indicative of massive sulphide deposits are also seen in Salahi, Maqail, Mahab and Sarami.

A third massive sulphide ore body (ore body No.3) was discovered in Ghuzayn area in this project. Although copper mineralization consisting of disseminations and veinlets are seen in many other areas, no new massive sulphide ore body could be found. From our investigations, it was clear that small scale deposits can be possible found in these area, but only the ore body discovered in Ghuzayn area presents characteristics for an economical development.

6-2 Mineralization of Ghuzayn Ore Body

6-2-1 Ore body formation

As it was mentioned in Chapter 1, the massive sulphide deposits distributed in Oman are of the Cyprus-type copper deposits. In Ghuzayn area, it is confirmed that the generation of the massive sulphide ore bodies No.1 and No.3 are limited by the fault formed before the ore body.

In ore body No.2, the almost vertical fault confirmed by the borehole MJOB-G21 is thought to form the eastern boundary of the ore body and believed to be the main pass of the hydrothermal fluid that generated the ore body.

In relation to the ore body No.3, about 50m to the south of the borehole MJOB-G30, V1-1 is exposed and contacts to V1-2 by an E-W trending fault. The vertical displacement of this fault can be estimated in more than 100m on the basis of the drilling results and because of the intense alteration and dense stockwork observed close to this fault at the footwall of the boreholes MJOB-G30 and G31, it can be inferred that this fault, which limits the south edge of ore body No.3, can be regarded as the main passage of the hydrothermal fluids that generated the ore body. From the relative location of this fault on the surface and its intersection by the borehole MJOB-G34, it can be estimated a dip of about 80oN.

It should be mentioned here that the thickest part of the ore bodies No.2 and No.3 are found near the fault and it is within this part that the highest grade of copper is detected.

6-2-2 Ore grade and reserves

As illustrated in Fig.II-6-1 and Fig.II-6-2, copper assay and isopack distribution maps were estimated for the ore bodies No.2 and No3 from the results of the drilling survey.

According to the plan map of copper assay in ore body N.2, it can be observed that the highest value is located in borehole MJOB-G22 and decrease towards the north. In relation to the vertical distribution of the assay in each hole, it is observed that its variation is considerably big and therefore, a uniform trending cannot be estimated. Based on the information of 10 boreholes drilled for the ore body No.2, it was estimated that this ore body has an approximate extension of 400m by 200m and an average of about 20m in its thickness. Its geological reserves and average copper grade can be roughly estimated in 5 million tons (stockwork excluded) and 1.2%, respectively.

In relation to the ore body No.3, the distribution of average copper assay shown in Fig.II-6-2 shows a maximum value around the borehole MJOB-G30 and decreases everywhere away from this borehole. In the borehole MJOB-G37, a high values is also observed, even though it is located at the edge of the ore body. And just as observed in ore body No.2, no general trend can be found in the vertical distribution of copper assay because their changes are big among the boreholes. Based on the information of 8 boreholes drilled for the ore body No.3, it was estimated that this ore body has an approximate extension of 200m by 300m and an average of about 33m in its thickness. Its geological reserves and average copper grade can be roughly estimated in 8.6 million tons (stockwork excluded) and 1.5%, respectively.

From the results of the drilling survey in ore body No.1, it was estimated that this ore body has an approximate scale of 100m by 100m and an average of about 6m in its thickness. Its geological reserves and average copper grade can be roughly estimated in 0.2 million tons and 3.0%, respectively.

6-2-3 Alteration

In Ghuzayn deposits, the alteration due to mineralization consists of silicification, chloritization (chlinochlore) and epidotization. The alteration shows stronger intensities when closer to the ore body and it is also stronger at the footwall side than in the hanging wall side. Very clear silicification and chloritization can be confirmed in the central part of the deposit (near the black smokers). Epidotization can not be seen in the central part, but it is stronger at the edge of the deposit. Regarding silicification and epidotization in the hanging wall, silicification appears in a rather wide area. and seen from 70 to 100m above the ore body, while epidotization from 30m to 50m. Epidotization, which was formed with the relation of mineralization, is presented in veinlets and in some circumstances, it is with quartz, calcite and ore minerals such as pyrite and chalcopyrite. There are some places where it can be found massive and disseminated epidote very near the ore body and interpillows.

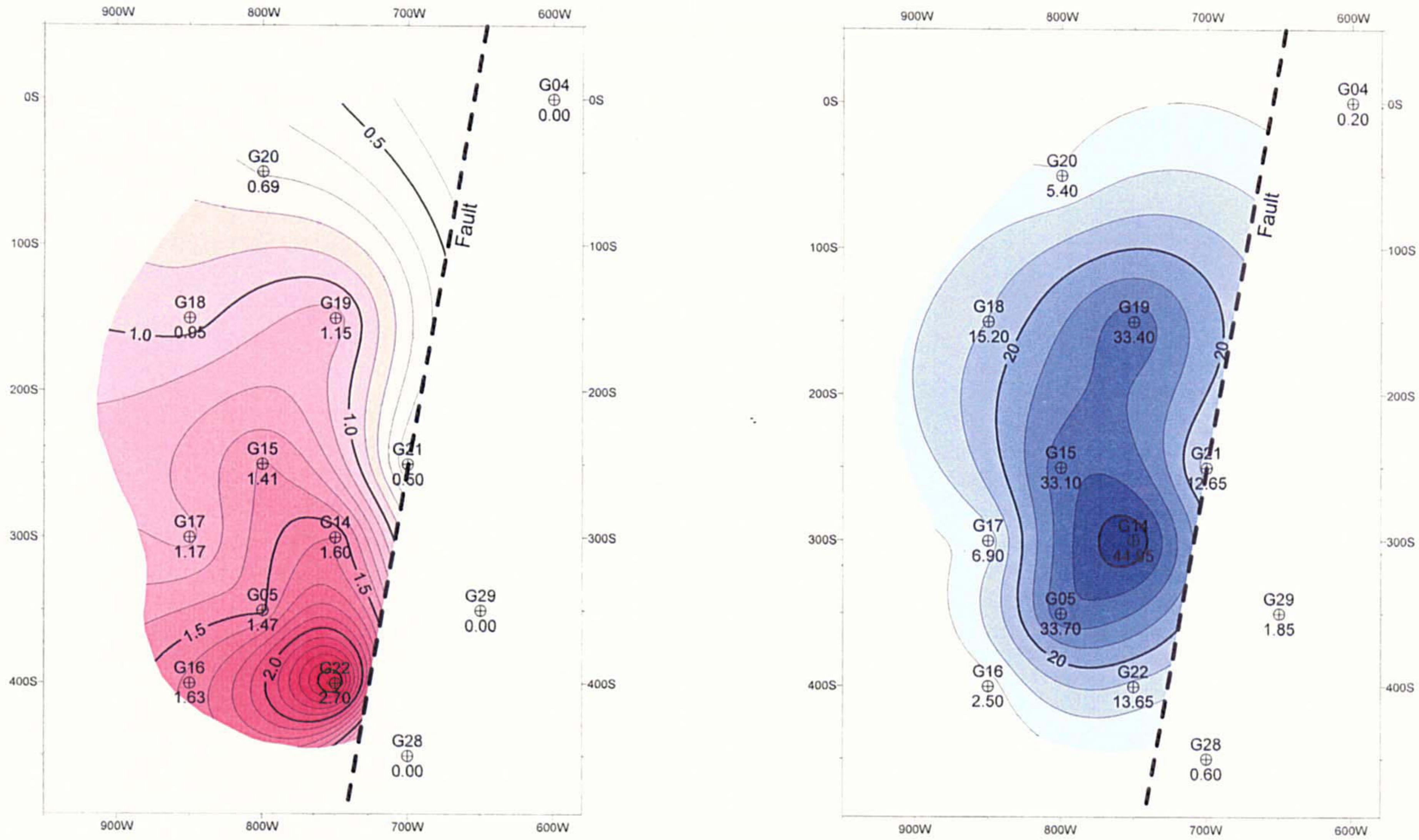


Fig.II-6-1 Copper assay distribution(left) and Isopack map(right) of Ghuzayn Body No.2

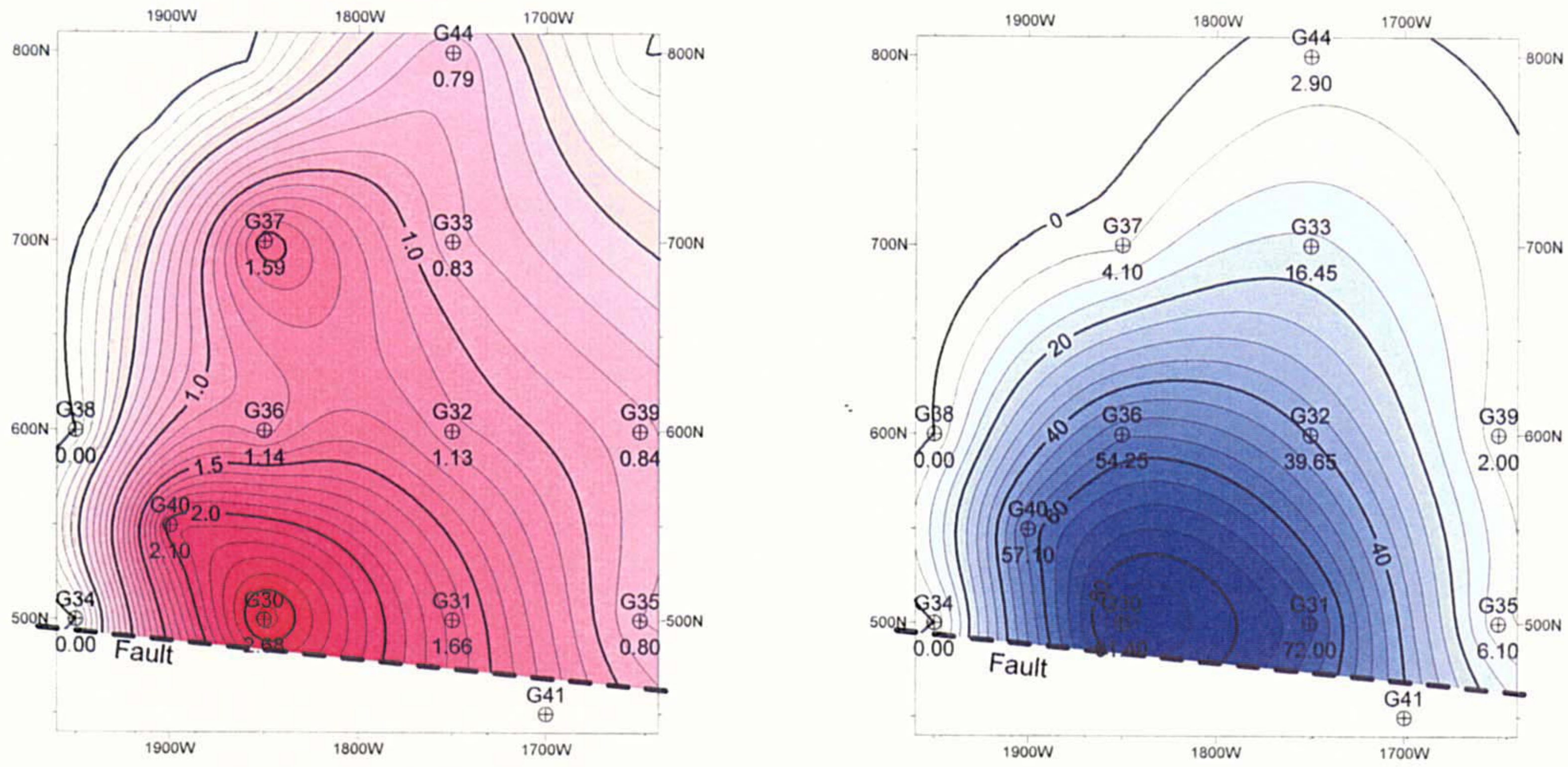


Fig.II-6-2　Copper assay distribution(left) and Isopack map(right) of Ghuzayn Body No.3

6-3 Discussion on the Evaluation of Ghuzayn Ore Body

Table II-6-1 shows a comparison of preliminary results of the 3 ore bodies intersected by drilling in Ghuzayn area. This table shows only a preliminary estimation of massive ore, however, stockwork ore was not taken into consideration because the extension of the stockwork distribution is narrow and the information is not enough at the present time.

Table II-6-1 Comparison of ore bodies in Ghuzayn area

(Cut off grade: 0.5% x 4m)

Ore Body Name	Ore Body No.1	Ore Body No.2	Ore Body No.3
Geologic ore reserves (t)	180,000	5,000,000	8,650,000
Average Cu grade (%)	3.0	1.2	1.5
Average Au grade (g/t)	0.1	0.1	0.1
Average thickness (m)	6	20	33
Areal extension (m^2)	9,000	73,000	74,000

(Cut off grade: 1.0% x 4m)

Ore Body Name	Ore Body No.1	Ore Body No.2	Ore Body No.3
Geologic ore reserves (t)	180,000	3,600,000	7,430,000
Average Cu grade (%)	3.0	1.4	1.6
Average Au grade (g/t)	0.1	0.1	0.1
Average thickness (m)	6	22	46
Areal extension (m^2)	9,000	47,000	47,000

As seen in Table II-6-1, a total reserve of 14 million tons for the ore bodies No.2 and No.3 can be inferred as a result of the exploration studies. However, if mine development takes place only for them, several difficulties are likely to be faced. Main economical reasons to be cited are:

a) The ore body is at a depth of 100m and the waste ratio for open pit is as high as 6 to 7.
b) Considering the mining cost, the grade of 1.4%Cu is low and the gold grade is very low.
c) The scale of the ore reserve is small and the mining operation is limited to a maximum of 3000t/day.

To make feasible the development, it is therefore important to discover a new ore body to develop together with the ore bodies No.2 and No.3. Additionally the new ore body should be found at a depth nor less than 100m and with a gold content of at least 0.5g/t. If these conditions are not met, the scale of the new deposit should have at least a double scale of the already estimated. However and to be on the realistic side, to discover a new ore body with the above mentioned economical requirements in Ghuzayn and its surroundings presents very low possibilities according to the results of this project.

Now the government of Oman is discussing about the promotion of exploration of new areas and the development of Rakah deposit. There are some potential areas that remain yet unexplored, such as areas in Rakah, Sohar old mines or other areas surroundings the Oman Mountains. From this point of view, it seems necessary to think about resource evaluation and development in a global view and within a whole strategy for the entire country of Oman. For instance, a marginal deposit may become feasible if the totality of its initial costs and operation costs are decreased by developing the deposit together with the mine development of another area, thereby enlarging the scale of the operation and minimizing the common expenditures.

About Ghuzayn deposit only the first exploration has been finished and therefore studies towards the mine development will be a task for the future. As a conclusion of the above discussion, the economical evaluation of Ghuzayn deposit must be considered together with the mine development in Rakah and Hayl as Safil deposits in Yanqul area.

6-4 Survey Methods

Fig.II-6-3 and Fig.II-6-4 compare respectively, the results of the TDIP and TEM surveys with that of drilling survey for ore body No.3.

Though the anomaly zone seems to be relatively wide, the result of TDIP survey presents good correlation with the position and dip of the ore body. The IP anomaly is detected in a wider range in the central part of the area where intense pyrite and chalcopyrite dissemination are also observed on the hanging wall side at some boreholes that did not intersect massive sulphide ore. It is thought that IP anomaly represents entire mineralization zone including the dissemination zone around the ore body. The fact that the dissemination part around the ore body No.3 is not developed, explain the reason because the IP anomaly is not so widely distributed around the body.

It is clear from Fig.II-6-4 that the result of TEM survey indicates a good correlation with the location of the center as well as the outline and thickness of the ore body.

It is then reasonable to ascertain that the TDIP and TEM methods are effective to the exploration of massive sulphide deposits in Oman, and that the TEM survey should be carried out at the anomaly zone detected by the TDIP survey.

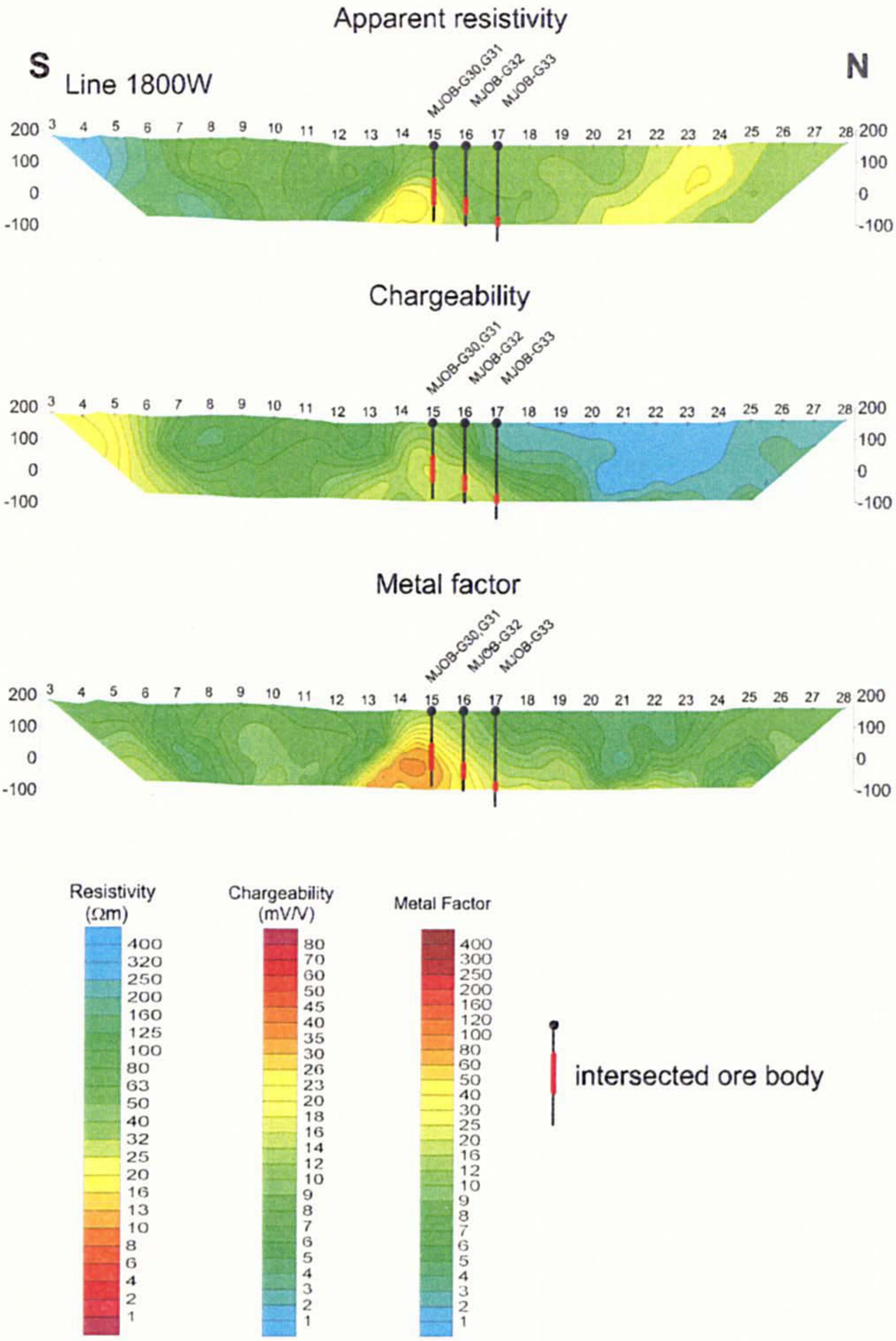


Fig.II-6-3 Correspondence between IP and drilling results in Ghuzayn Body No.3

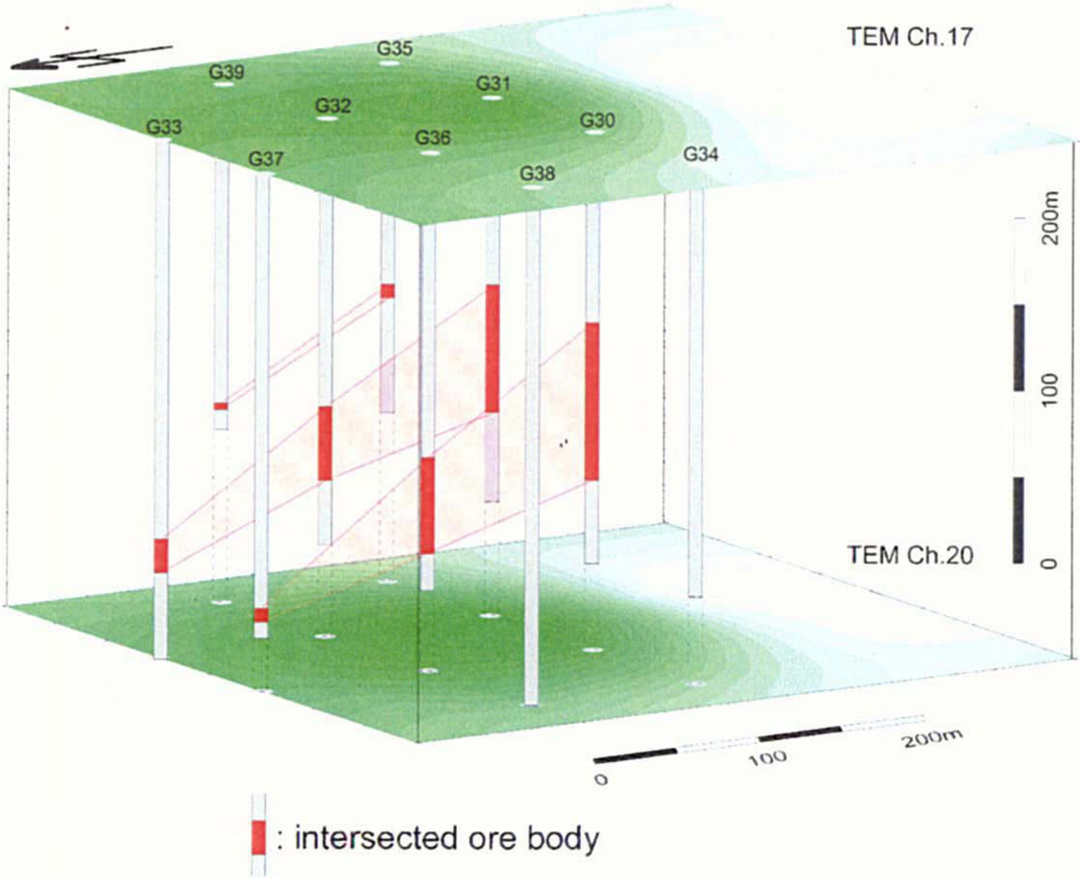


Fig.II-6-4 Correspondence between TEM and drilling results in Ghuzayn Body No.3