PHASE 3 GEOPHYSICAL STUDIES IN THE WADI BIDAH DISTRICT, KINGDOM OF SAUDI ARABIA

by

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ABSTRACT

Detailed geophysical measurements have been made in the Rabathan area, Wadi Bidah district, Kingdom of Saudi Arabia, at the site of diamond drill holes RAB-1, -2, and -3; these measurements suggest that the causative source for the anomalous EM (electromagnetic) and SP (self-potential) responses is probably highly conductive zones of Precambrian siliceous-carbonaceous rocks. Although many of the zones are no more than a few meters wide, they commonly contain 50 to 80 percent carbonaceous material and locally abundant pyrite. In places, several thin layers of highly concentrated carbonaceous material interlayered with chert form a multiple conductive zone that is seen in the geophysical data as complex anomaly patterns. In the geologic environment of Wadi Bidah, massive sulfide-bearing zones cannot be distinguished from siliceous-carbonaceous zones on the basis of the EM-SP responses. In North America in similar environments, complex resistivity methods used in experimental research have successfully discriminated between sulfide and carbonaceous conductors. Tests of such methods in the Wadi Bidah district are recommended.

Geologic, geochemical, and geophysical data at the Jabal Mohr prospect suggest the possibility of mineralized rocks at depth over a possible strike length of 400 m.

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INTRODUCTION

The Wadi Bidah district is located about 350 km by road southeast of Jiddah (fig. 1) and is in a belt of Precambrian metavolcanic and metasedimentary rocks approximately 15 km wide and 80 km long. This report presents the results of the 1980 phase 3 geophysical studies, which are part of an integrated study aimed at evaluating the resource potential of the district. The work on which this report was based was performed in accordance with a cooperative agreement between the U.S. Geological Survey (USGS) and the Saudi Arabian Ministry of Petroleum and Mineral Resources.

Prior to the beginning of this district-wide study by the USGS in 1977, considerable progress had been made in defining the geologic environment and the estimated ore reserves of a dozen or more prospects in the district. In a summary report on studies made prior to 1976, Kiilsgaard and others (1978) concluded that continued exploration in the district might increase the total known tonnage of potential ore reserves. However, they concluded that the expected new reserves probably would not be substantially larger or higher grade than those already known to exist in several of the most promising ore deposits in the district.

Geologists from the Riofinex Geological Mission arrived at essentially the same conclusion on the basis of a study made in the northern part of the Wadi Bidah district in 1978 (Riofinex Geological Mission, 1979).

The Wadi Bidah district was one of the target areas selected for an airborne electromagnetic (AEM) survey made in the Kingdom in 1977. A preliminary assessment of the AEM survey by Wynn and Blank (1979) indicated that more than 50 discrete electromagnetic (EM) conductors were recognized in the district.

An integrated geophysical, geologic, and geochemical ground followup study to the 1977 AEM survey began in 1978 (phase 1). EM and SP (self-potential) methods were used to verify on the ground the location of the AEM conductors. Reconnaissance geologic and geochemical sampling in the areas of anomalous AEM response established a priority list of target areas for further study. Work conducted during 1979 (phase 2) included extensive ground EM-SP surveys in six of the target areas (fig. 2): Rabathan (B-29), B-13, B-25 and -26, B-24, B-35, and the Wadi al Khadra prospect. Geologic, geochemical, and geophysical studies in these six areas resulted in recommendations for additional detailed studies of them, in an attempt to better understand the geologic sources of the anomalous EM-SP responses (Flanigan and others, 1982). In addition, Smith and Waters (1979, unpub. data) proposed a drilling program to test at depth the source of geophysical

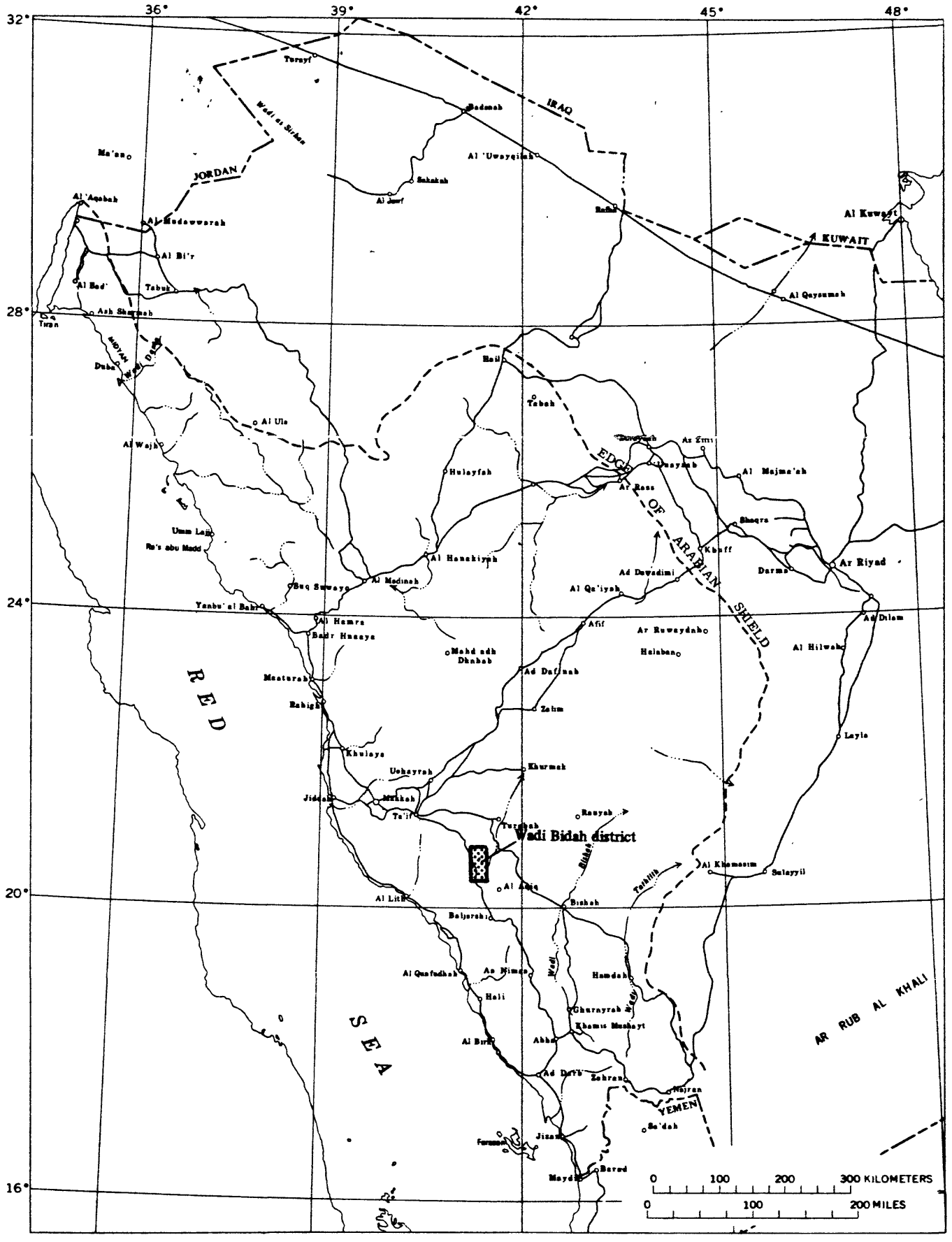


Figure 1.–Index map of the western part of the Kingdom of Saudi Arabia showing the location of the Wadi Bidah district.

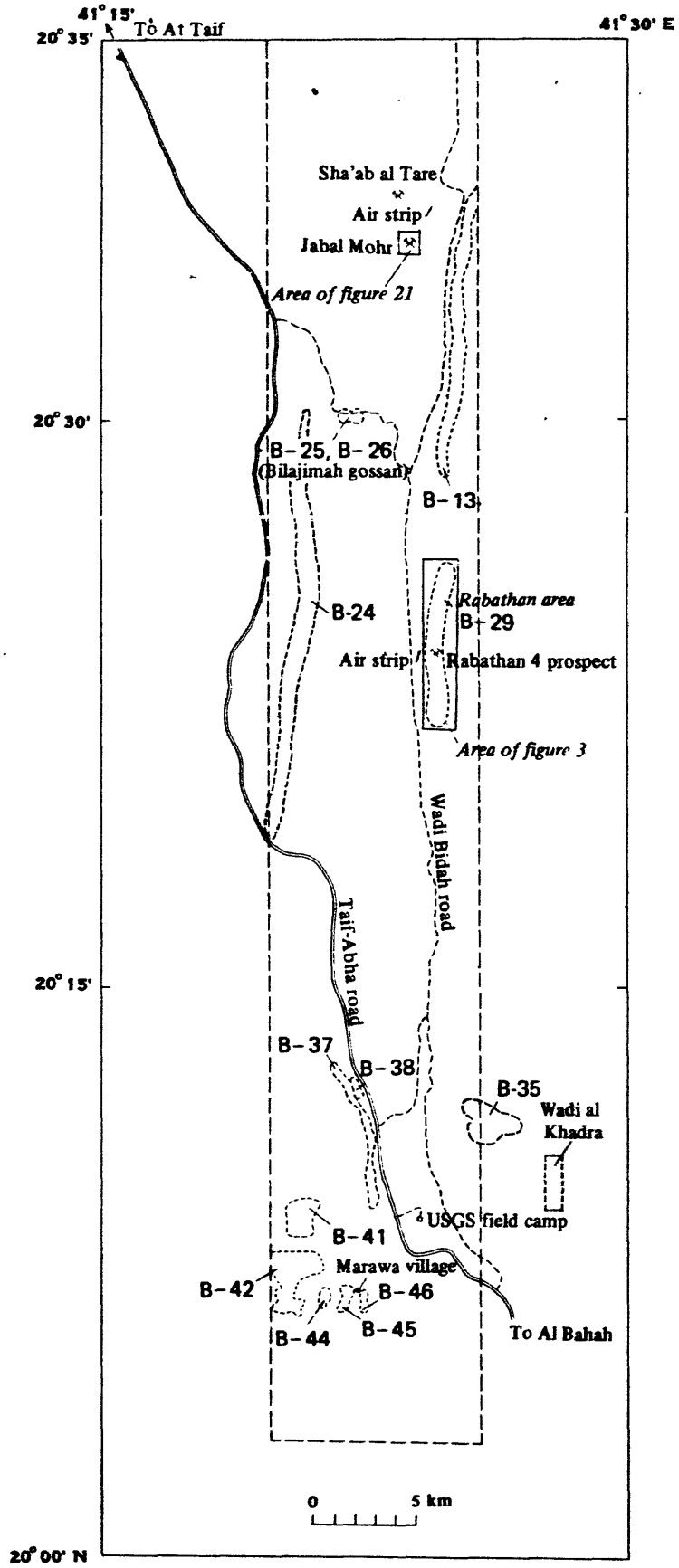


Figure 2.–Map of the Wadi Bidah district showing the location of the phase 3 geophysical studies.

and geochemical anomalies in the Rabathan (B-29) and the Bilajimah gossan (B-25 and 26) areas.

Phase 3 studies conducted during the 1979-1980 field season included geologic mapping, geochemical sampling, and additional geophysical studies. This report presents the results of detailed geophysical studies in the Rabathan area (AEM anomaly B-29), at AEM anomaly B-13, and at a heretofore unstudied prospect named Jabal Mohr, located several kilometers south of the Sha'ab al Tare prospect (fig. 2). Other work conducted during phase 3 studies, not included in this report, included reconnaissance geophysical traverses in several areas in the southern part of the district. In addition, induced-polarization measurements were made of the Bilajimah gossan (B-25 and 26) and Wadi al Khadra areas.

DETAILED GEOPHYSICAL STUDIES

Rabathan area

The Rabathan area is in the east-central part of the Wadi Bidah district and includes the Rabathan 4 copper deposit, one of the most promising in the district (fig. 2). The 1977 AEM survey showed the Rabathan area to be part of an EM conductive zone that is 23 km long (B-29 and B-13) (Wynn and Blank, 1979). The length and width of the AEM anomaly suggest the causative source is most likely associated with geologic formations or structures. Gossan outcrop patterns, surface copper contents, reconnaissance mapping, and diamond drilling all indicate that the geologic environment is favorable for the occurrence of sulfide mineral deposits. It was felt that if several low-tonnage, low-grade deposits could be found at shallow depth in the area, they might be mined economically in the future if the price and demand for copper should increase significantly.

During phase 2 studies in the Rabathan area, ground slingram EM traverses were made at 200-m intervals, with a 200-m coil separation and a 50-m measurement interval. These traverses delineated a major conductor and several minor conductors that trend north through the area. SP measurements made at 50-m intervals along the same EM traverse indicated a broad anomaly with discrete areas of high values superimposed upon it (Flanigan and others, 1982). In order to better understand the geophysical and geological spatial relationships, slingram measurements were made in the phase 3 study with a smaller coil separation and measurement interval. By decreasing the coil separation (L) from 200 m to 100 m and the measurement interval (X) from 50 m to 25 m, we found the resolution better and the amplitude response satisfactory, although it was lower than phase 2 measurements. The SP measurement interval was reduced to 12.5 m.

Four detailed geophysical traverses (360 N-390 N) were made in the area of the Rabathan 4 deposit, and three (130 N, 550 N, 770 N) were made along the vertical projection of the phase 3 exploratory holes drilled in the Rabathan area (fig. 3).

Traverse 130 N was made in an east-west direction along phase 2 geophysical traverse 130 N and passed near drill hole RAB-3. The geophysical data for traverse 130 N indicate the complex geology in the area (fig. 4). Two main EM conductors were crossed. One is centered about 40 m west of the base line, and a small SP anomaly (about -50 mV) is offset about 25 to 30 m to the east of the EM anomaly. The second EM anomaly is complex; it extends from about 80 m east of the base line to 210 m east of the base line and indicates at least three conductive zones. A broad SP anomaly, composed of three minima, is associated at least in part with this EM anomaly. The EM conductive zone centered about 80 m east of the base line clearly does not have a SP anomaly associated with it and probably represents a fault or shear zone, on which conductivity is increased because of the presence of clays, fault gouge, or moisture. Similar EM responses were encountered in earlier work in AEM anomalies B-7 and B-8, which are in the northern part of the district where major faults were mapped (Flanigan and others, 1981).

Of particular interest is the area from 100 to 400 m east of the base line. EM-SP data in this area are shown in expanded form on figure 5 along with the lithologic log of drill hole RAB-3. The drill hole, which was located partly on the basis of SP and geochemical data and partly on surface geology, tested only part of the EM-SP anomaly. From 39 to 47 m (inclined depth), the drill hole penetrated a zone containing 10 to 15 percent carbonaceous material. From 70 to 90 m, the drill hole intersected another carbonaceous zone containing 60 to 70 percent carbonaceous material. These carbonaceous zones were intersected below the weathered zone and are the most likely cause of the SP and weak EM anomalies seen in the geophysical data for the area (fig. 4).

The second drill hole (RAB-2) was sited along phase 2 geophysical traverse 550 N and was designed to test at depth the source of the EM and SP anomalies, as well the possible northward extension of a sulfide body intersected by an earlier drill hole in the area (R-3, Earhart and Mawad, 1970). Detailed geophysical data along traverse 550 N indicate coincident EM and SP anomalies centered about 210 m east of the base line (fig. 6). The EM conductor is about 15 m wide and has an estimated vertical dip; the conductance is estimated to be 4 to 5 mohs, and the depth to the top of the conducting body is about 36 m. The drill-hole log (fig. 7) shows that a zone of carbonaceous rocks, 19 m wide and containing 80 to 90 percent carbonaceous material with minor

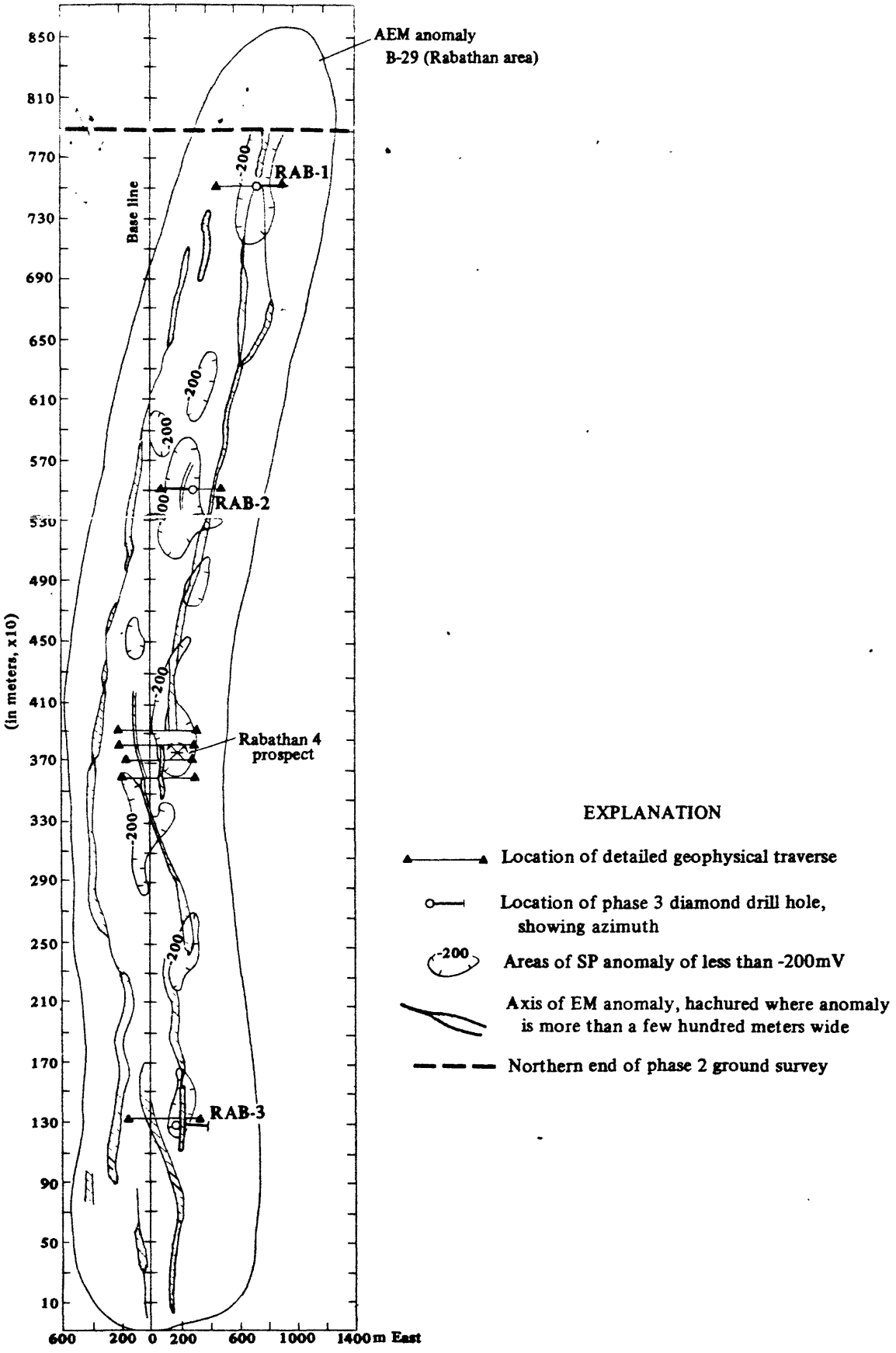


Figure 3 –Map of the Rabathan area showing the location of AEM anomaly, detailed geophysical traverses, phase 3 drill holes (RAB-1, -2, and -3), areas of SP anomaly of less than -200 mV, and axis of EM conductors.

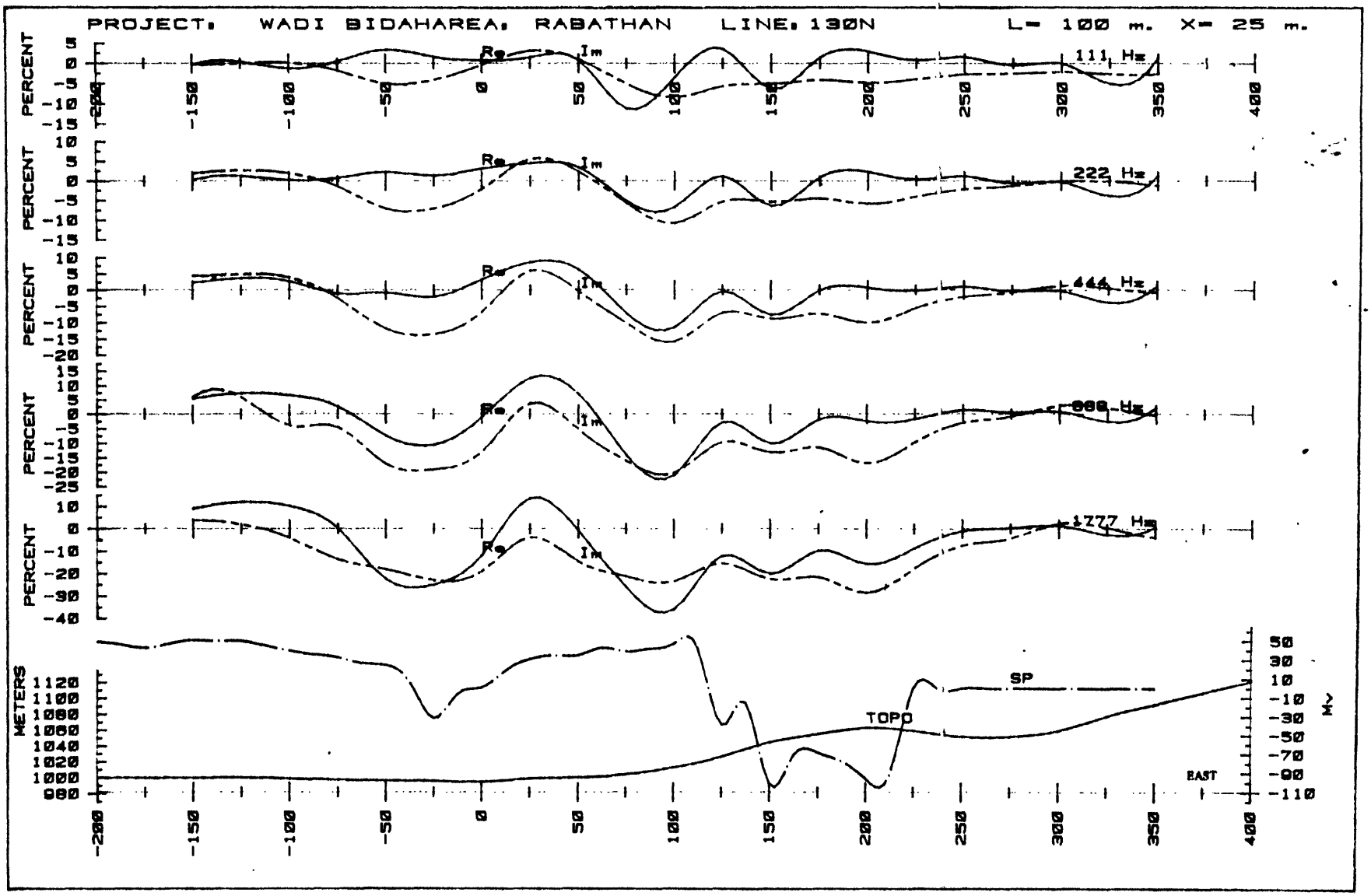


Figure 4.--Profile showing geophysical data along traverse 130 N in the Rabathan area. Re = real component; Im = imaginary component; L = coil separation; X = measurement interval.

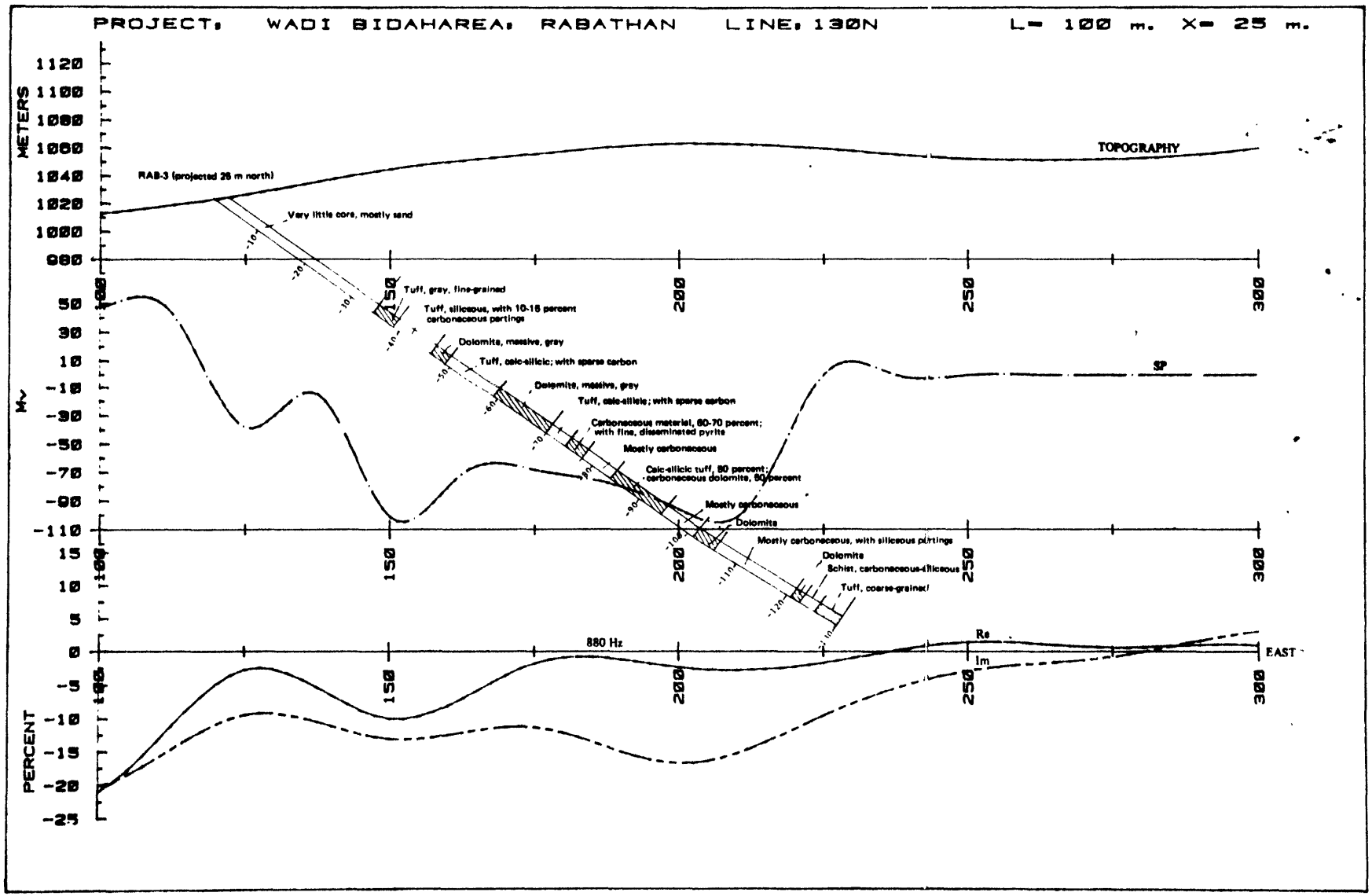


Figure 5.–Profile showing geophysical data from part of traverse 130 N with simplified drill-hole log of RAB-3. Re = real component; Im = imaginary component; L = coil separation; X = measurement interval.

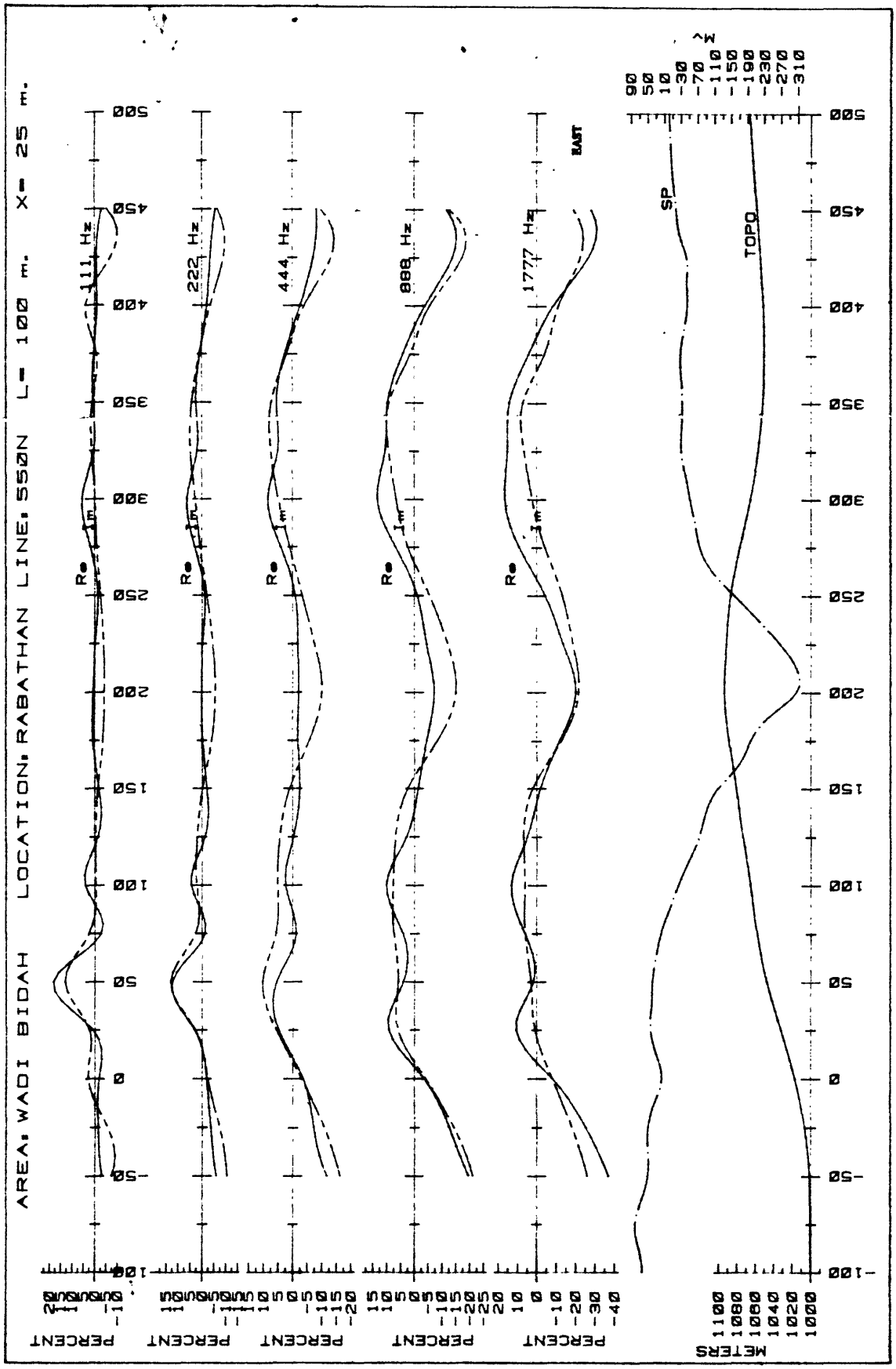


Figure 6.–Profile showing geophysical data along traverse 550 N in the Rabathan area.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

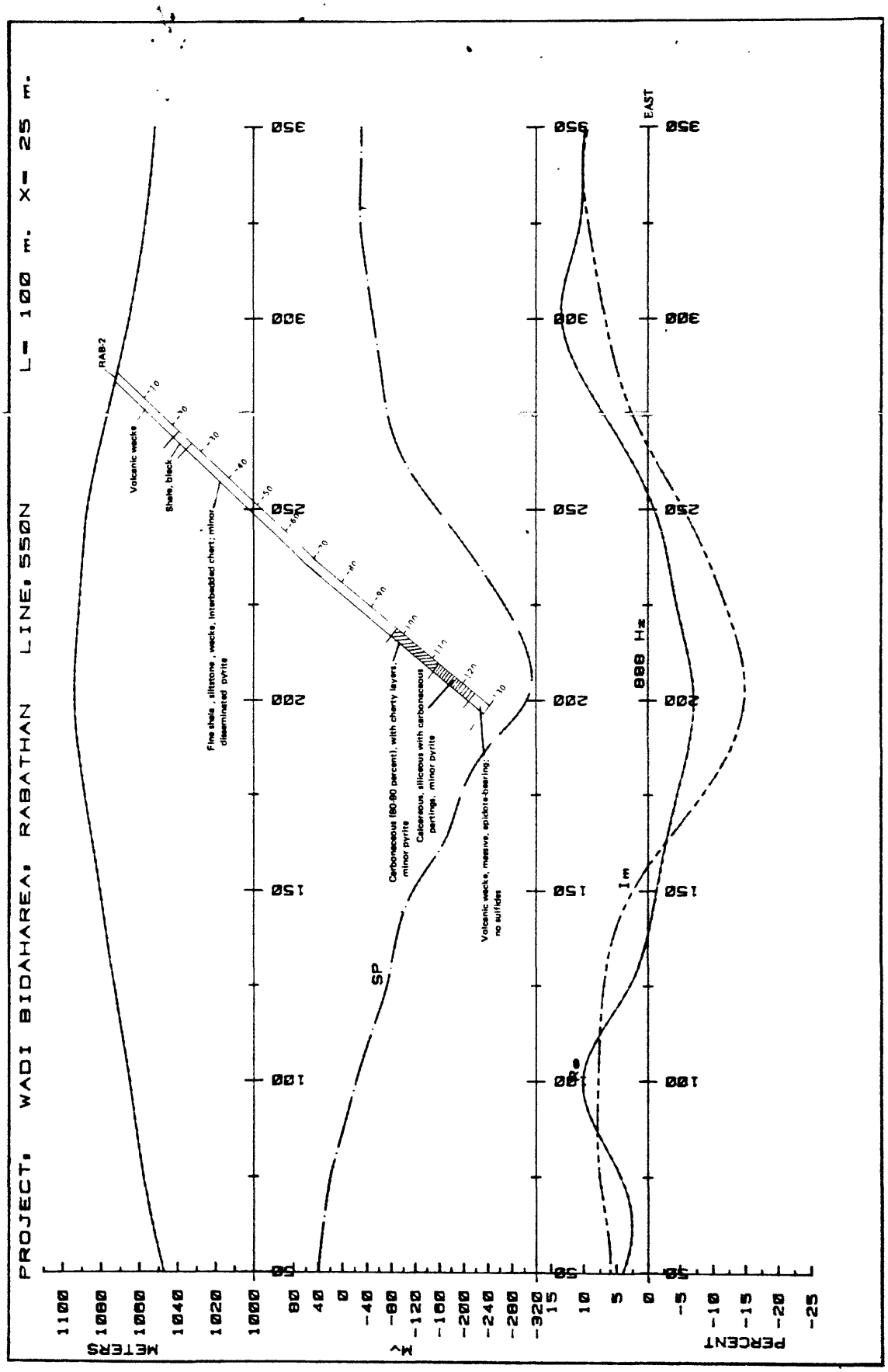


Figure 7.--Profile showing geophysical data from part of traverse 550 N with simplified drill-hole log of RAB-2. Re = real component; Im = imaginary component; L = coil separation; X = measurement interval.

pyrite, was intersected from 99 to 126 m (inclined depth). It seems likely that these rocks are the source of the EM anomaly.

Drill hole RAB-1 was sited along traverse line 750 N. Phase 3 data along this traverse show a complex EM anomaly (two or more conductors) 600 to 800 m east of the base line (fig. 8). No reliable estimates of the parameters of the individual conductors can be made because of the interaction of multiple responses. The centers of three EM conductors are estimated to lie 635, 700, and 750 m east of the base line. A broad SP anomaly, which has an amplitude of almost -320 mV, covers approximately the same interval as the EM anomaly. SP data from known carbonaceous environments indicate much higher SP responses (>-300 mV) than might be expected over a sulfide body with limited depth and strike length (Flanigan and others, 1981). The magnitude of the SP anomaly on traverse 750 N almost certainly precludes such a sulfide body as the source; the most likely source is several carbonaceous units. Drill hole RAB-1 apparently intersected the conductive zone at 635 m east within the oxidized zone (fig. 9); therefore, a clear determination of the causative source could not be made. At greater depth, between 89 and 112 m, the drill hole intersected a zone of banded siliceous tuff 16 m wide that contains 20 to 30 percent carbonaceous material; this zone is probably the source of the EM anomaly located about 700 m east of the base line. The drill hole ended before reaching the source of the EM anomaly located 750 m east of the base line.

The phase 3 drill holes in the Rabathan area were located primarily to test geologic and geochemical indications of possible sulfide-bearing zones and obtained negative results; however, they did intersect carbonaceous zones that are believed to be the cause of the coincident EM and SP geophysical anomalies. The drilling did not test any EM anomalies that have no associated SP anomaly; these are interpreted to be caused by shear or fault zones. It seems reasonable to assume that most of the coincident EM and SP anomalies in the Rabathan area are caused by carbonaceous units that have undergone regional metamorphism. However, some sulfide deposits in the Rabathan area presumably do have some geophysical expression, although this expression is probably masked by the higher amplitude anomalies produced by the carbonaceous units.

In order to test this possibility, four detailed EM-SP traverses were made across the Rabathan 4 deposit. The locations of the four traverses (360 N-390 N) are shown on figure 10. Also shown are the locations of the diamond drill holes in the area and vertical projections to the surface of the major massive sulfide intercepts in the drill holes. The dip

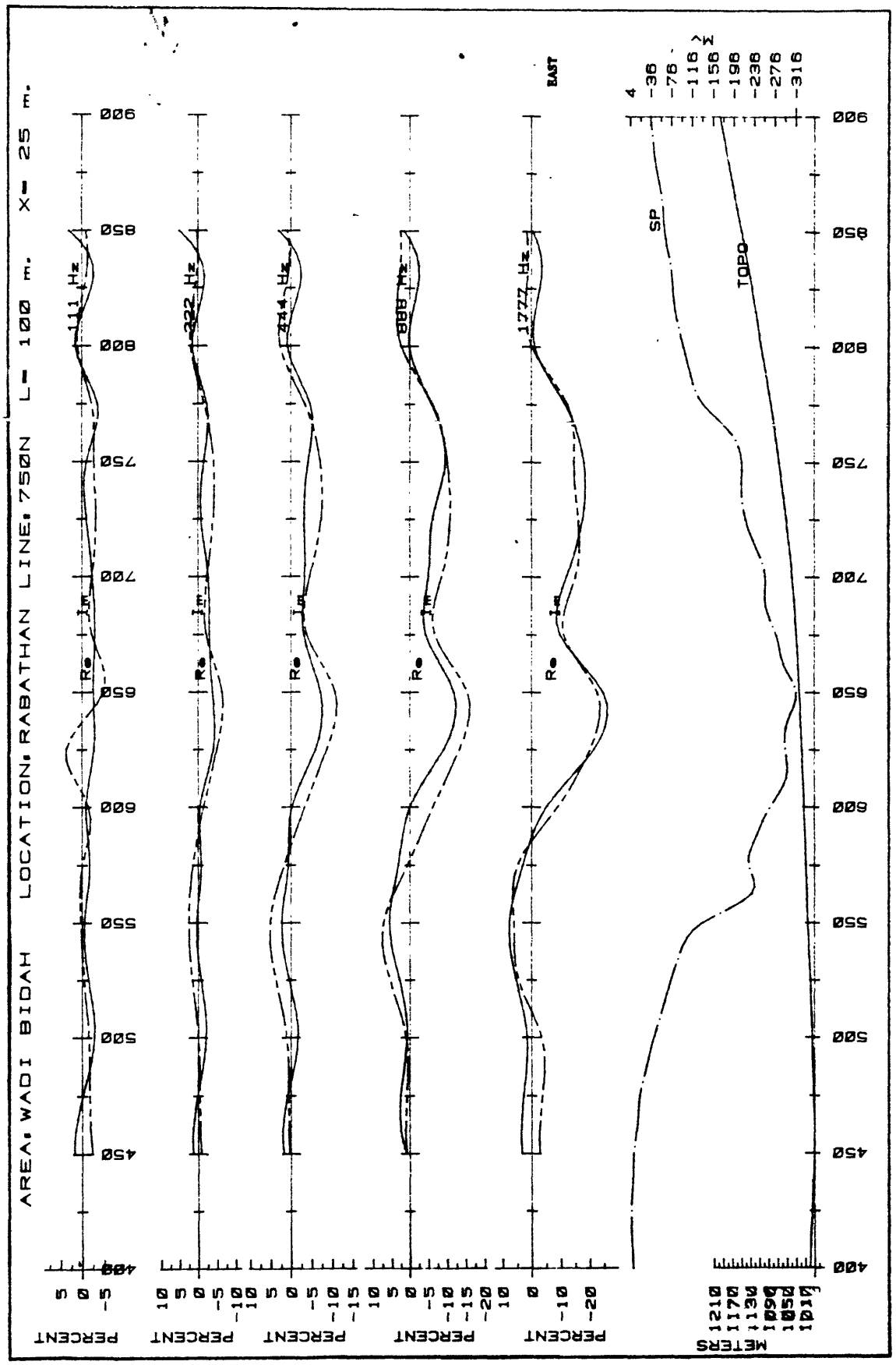


Figure 8.--Profile showing geophysical data along traverse 750 N in the Rabathan area. Re = real component; Im = imaginary component; L = coil separation; X = measurement interval.

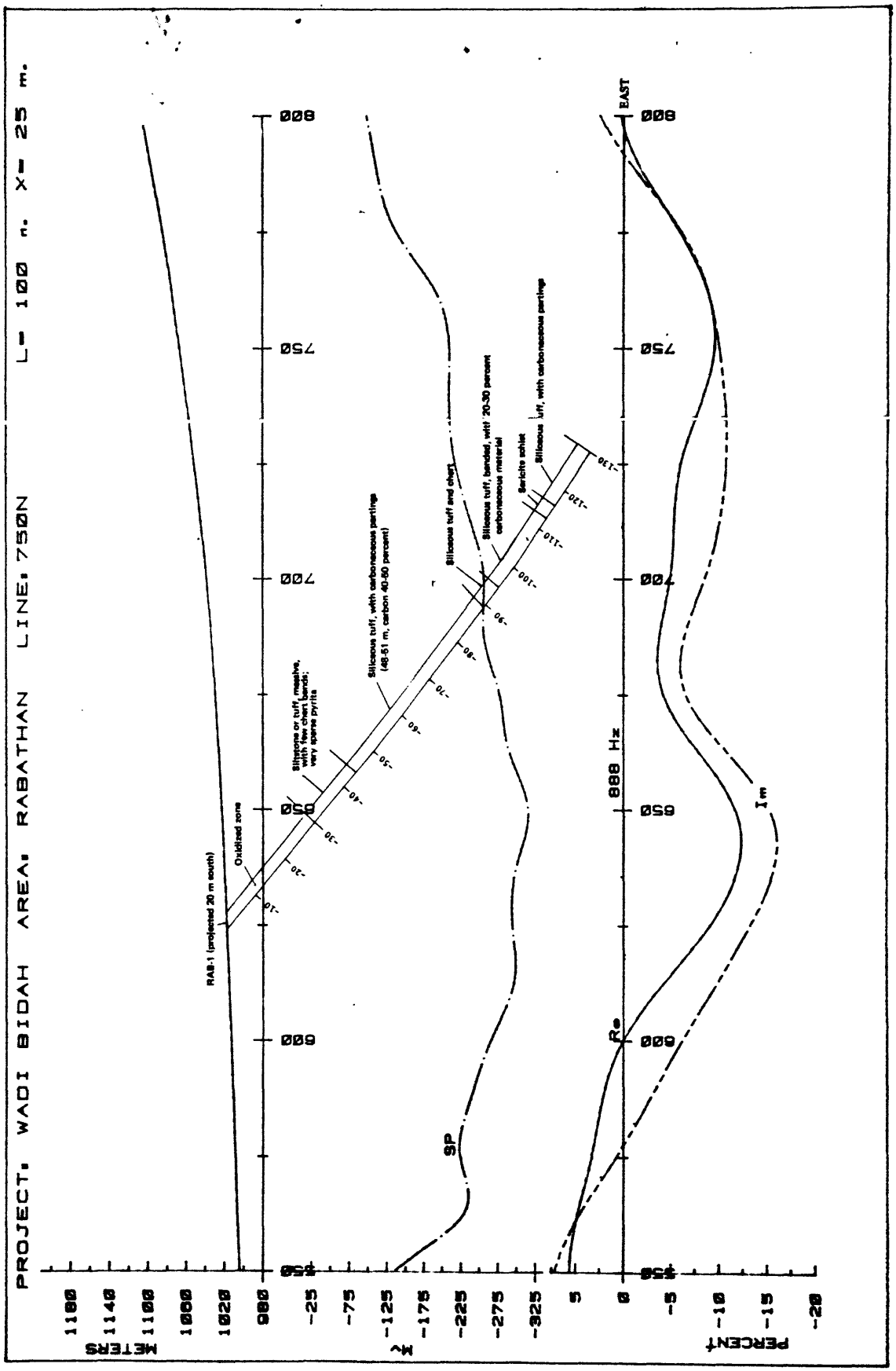


Figure 9.–Profile showing geophysical data from part of traverse 750 N with simplified drill-hole log of RAB-1.

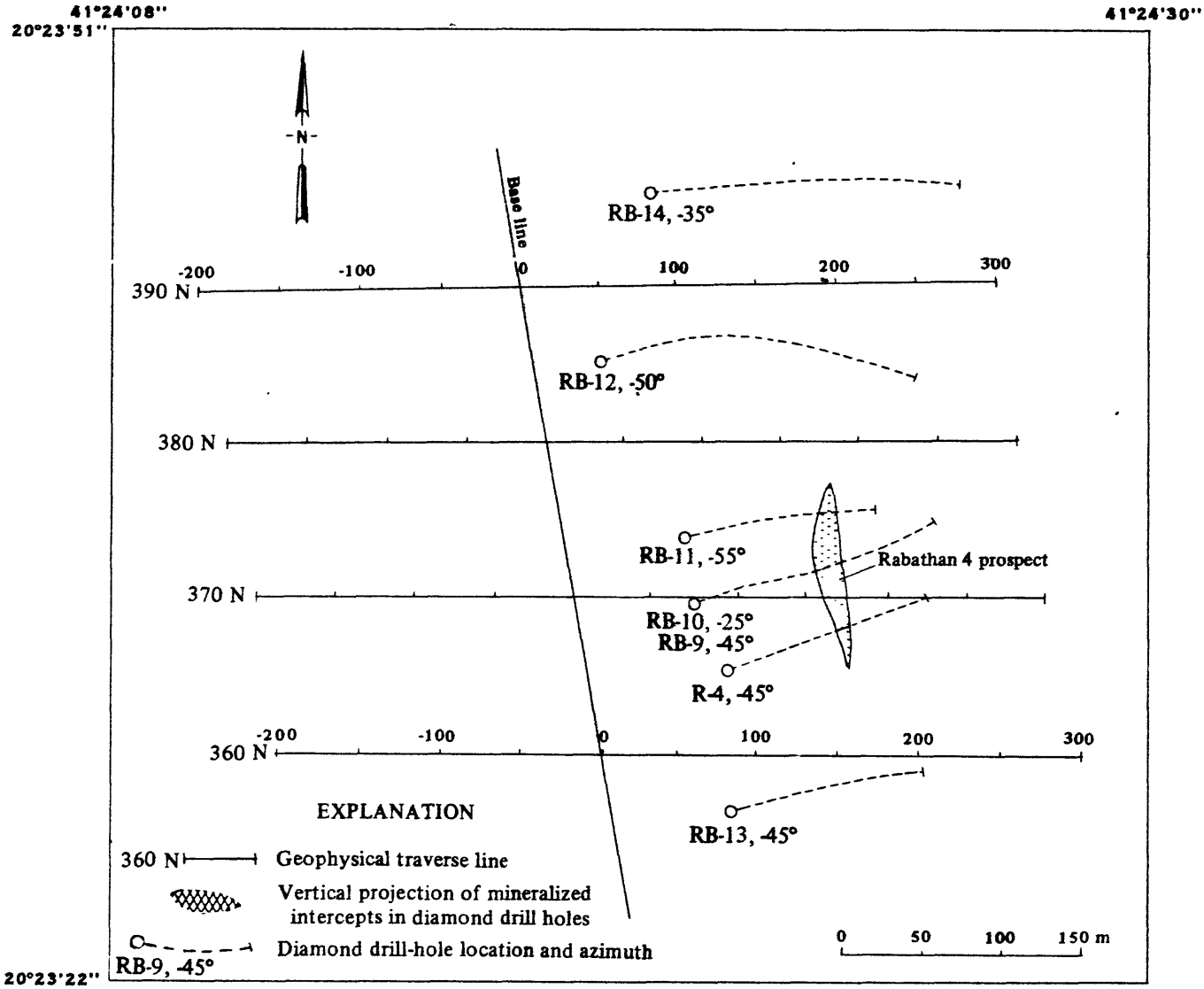


Figure 10.–Map showing the location of detailed geophysical traverses and diamond drill holes in the central part of the Rabathan area. Also shown are the vertical projections of the mineralized intercepts in diamond drill holes R-4, RB-9, RB-10, and RB-11.

of the Rabathan 4 deposit, as determined by previous drill intercepts, is nearly vertical (Earhart and Mawad, 1970; Kiilsgaard and others, 1978).

The EM data shown on profile 360 N (fig. 11) indicate two major conductive zones. One extends from about station -75 (75 m west of the base line) to about station 75 (75 m east of the base line), and the other begins at about station 160 and extends beyond the end of the profile at station 250. The more westerly conductive zone probably reflects the EM response of at least three conductors within the zone. The conductive area is covered with an unknown thickness of alluvium and talus derived from the slopes to the east and south. Results from diamond drill hole RB-13, located about 20 m south of station 100, indicate that the near-surface material consists of alluvial debris and carbonaceous schist. The SP data along traverse 360 N (fig. 11) show three zones of anomalous SP response: one begins at station -150 and extends beyond the western end of the traverse; the second, a complex anomaly consisting of at least two zones, extends from station 50 to station 150; and the third extends from station 180 to east of station 300. The third zone is also a complex anomaly consisting of several discrete zones of response and is seen most clearly on traverse 370 N (fig. 12).

The EM data from traverse 370 N are particularly interesting in the interval between stations 150 and 250. In this area, the data show two discrete conductors, one at station 160 and the other at station 210. The EM response at station 160 is seen only at the three lower frequencies (111, 222, and 444 Hz) and is masked at the two higher frequencies by the response to the conductor at station 210. The EM response centered at station 160 fits quite nicely with the location of the Rabathan 4 deposit, which, therefore, may be the cause at depth for the EM response.

With the exception of the anomaly just discussed on traverse 370 N, the detailed geophysical data from profiles 370 N, 380 N, and 390 N (figs. 12-14) show the same general EM-SP patterns. From a comparison of the position of the massive sulfide body (fig. 10) and the position of the second complex SP response on profile 370 N (fig. 12), it seems likely that part of the complex SP response results from the sulfide deposit that is known to be present from drill-hole data; however, by use of the geophysical data alone, it would be impossible to identify the location of the massive sulfide body.

Detailed work in the Rabathan area has shown that it is essential to interpret geophysical data in conjunction with geologic and geochemical data. In the geologic environment of Wadi Bidah, where carbonaceous rocks are pervasive, any EM-SP response associated with a sulfide body is probably

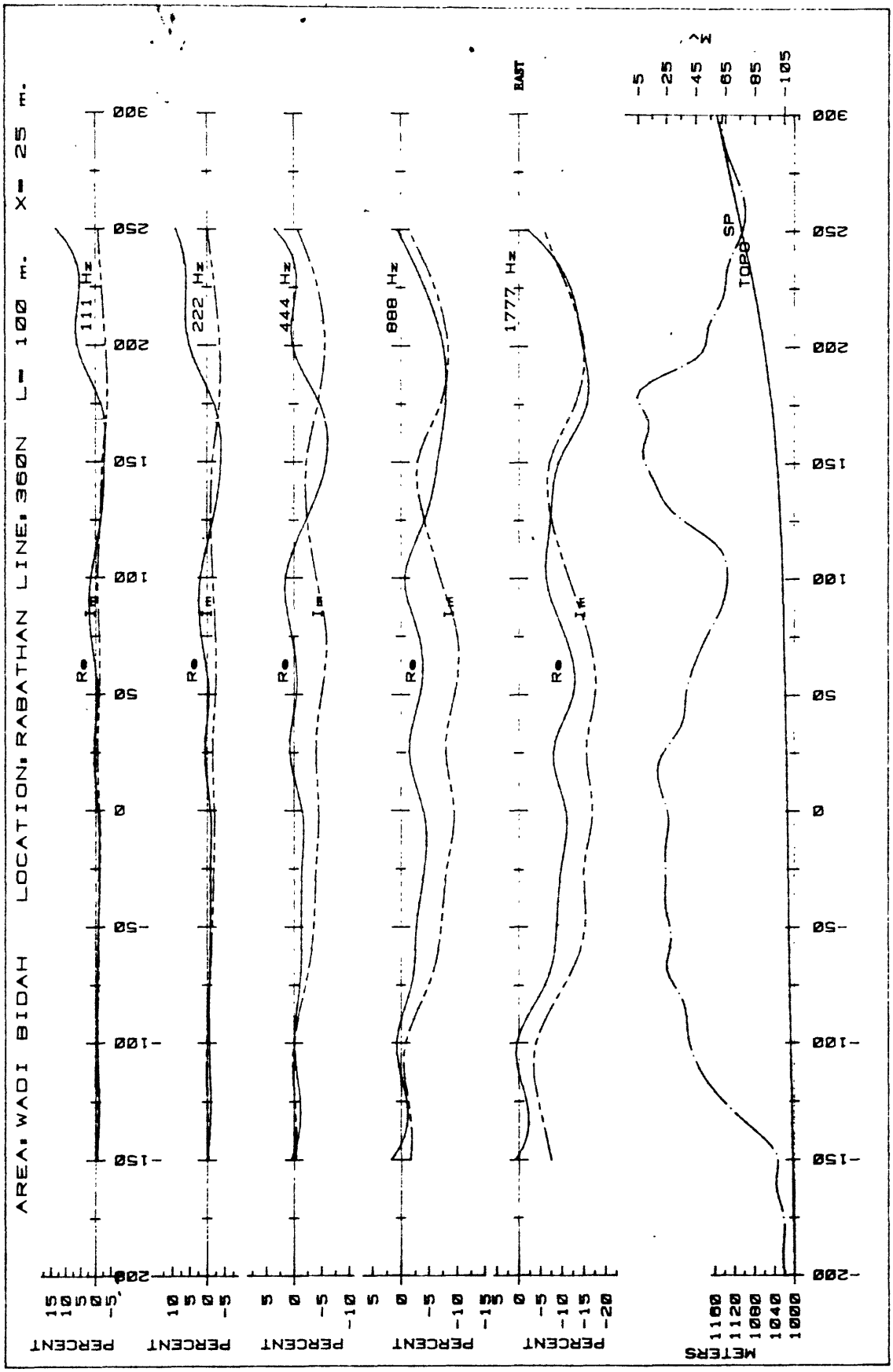


Figure 11.–Profile showing geophysical data along traverse 360 N in the Rabathan area.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

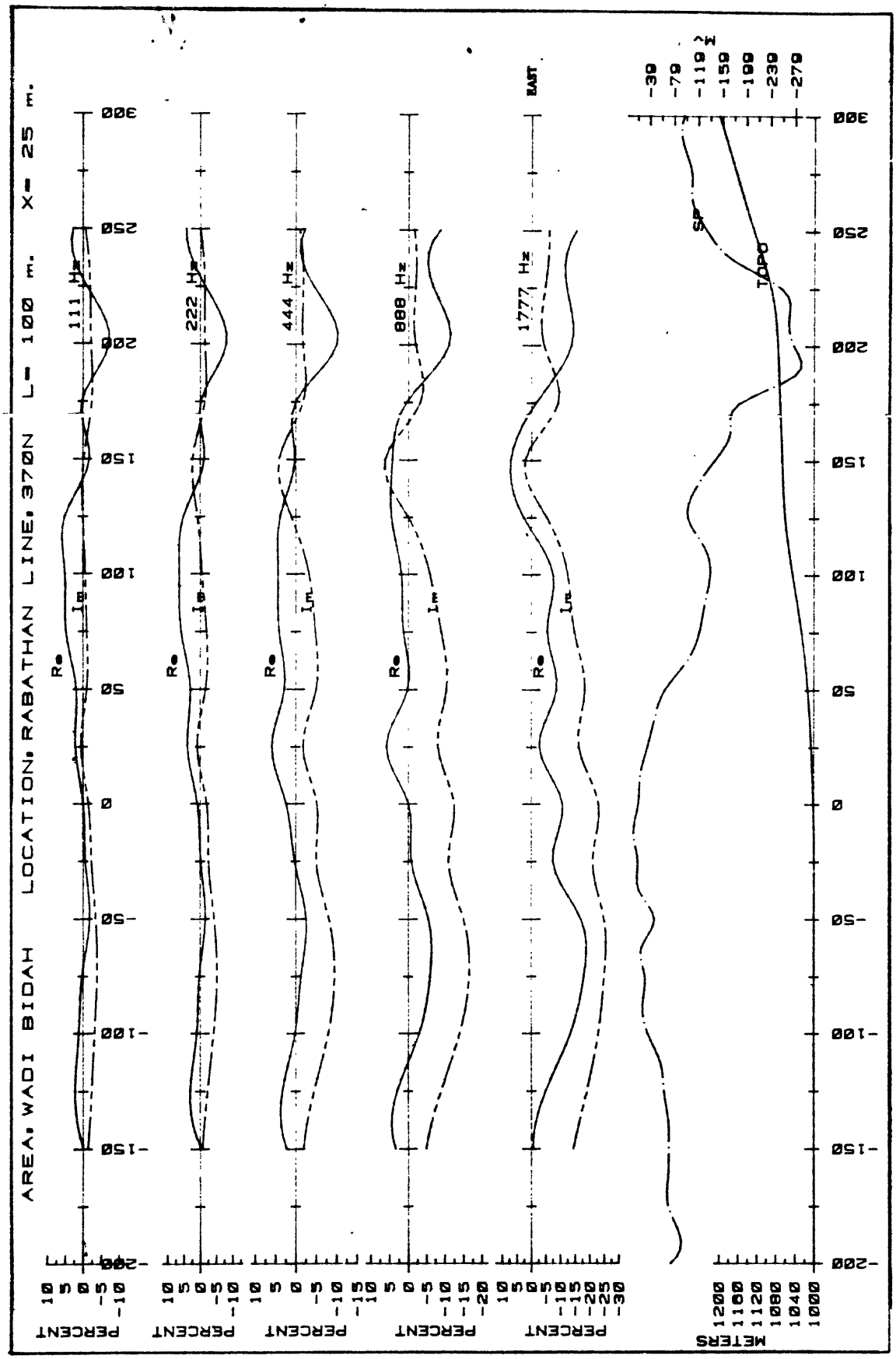


Figure 12.–Profile showing geophysical data along traverse 370 N in the Rabathan area.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

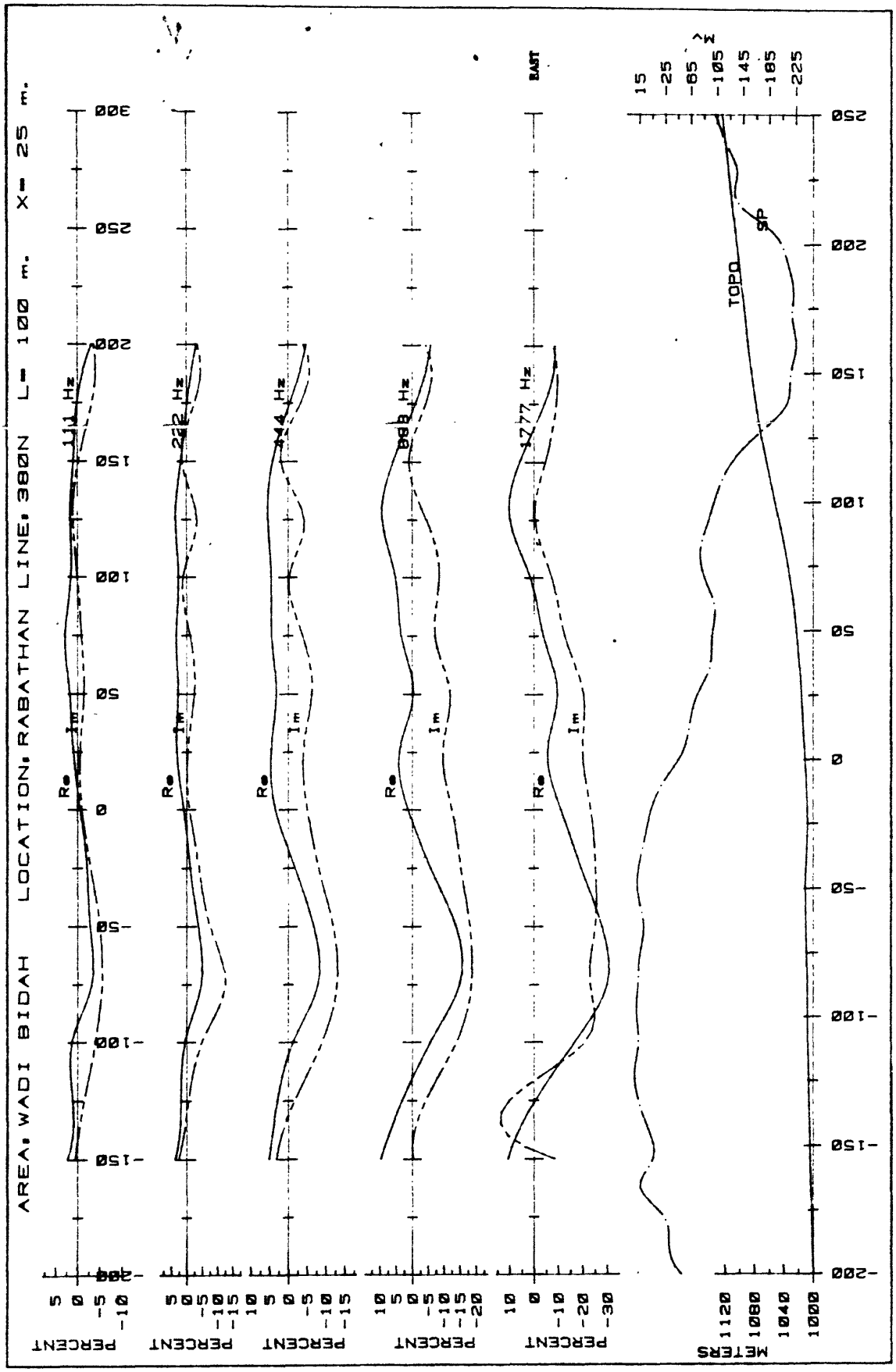


Figure 13.–Profile showing geophysical data along traverse 380 N in the Rabathan area.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

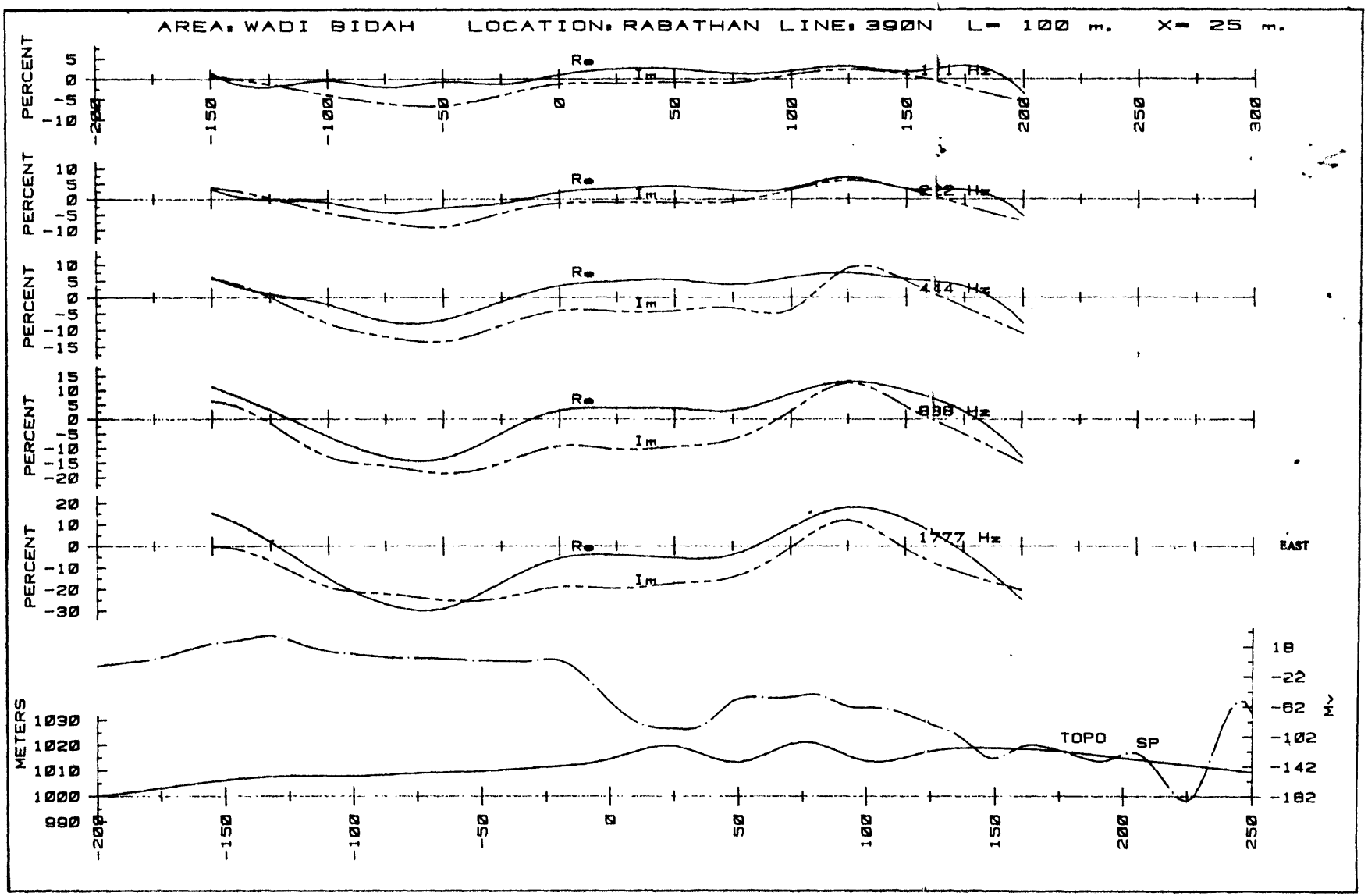


Figure 14.–Profile showing geophysical data along traverse 390 N in the Rabathan area.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

part of a complex response caused primarily by the carbonaceous rocks. A high-amplitude SP anomaly (>-200 mV) and a coincident EM anomaly probably are the geophysical response of a highly conductive carbonaceous rock unit. However, small SP peaks within a complex anomaly pattern could be caused by a sulfide body and might be revealed by close examination of geophysical data in geologically and geochemically favorable areas.

In order to ascertain the nature of the surface outcrops in the area of the small SP peaks discussed above, a study was made of profile 440 N in the B-13 area, where phase 2 geophysical data revealed several discrete SP anomalies comprising a broad, complex high-amplitude anomaly. Close examination of the surface rocks in the vicinity of one of the smaller SP peaks showed a lenticular zone of cherty rocks several meters wide and about 40 m long. The cherty zone is interpreted to be the weathered residual of an interlayered siliciceous-carbonaceous unit in the area. Heretofore, the authors had not associated these cherty outcrops with the carbonaceous rocks because they contain no carbonaceous material where they crop out.

In the Wadi Bidah district the carbonaceous environment renders geophysical data from EM, SP, or DC (direct-current) methods ambiguous in the search for massive sulfide deposits, and only experience and indirect associations, such as those mentioned earlier, will be of use in the interpretation of the geophysical data. The integration of geological and geochemical data in the interpretation of geophysical data is essential for successful exploration. Inasmuch as all of the various data sources have their limitations, it seems likely that some deposits will go undetected.

In the past decade or so, induced polarization (IP) has become the leading geophysical ground-prospecting method used in the discovery of many new mineral deposits in Precambrian areas of North America (Sumner, 1976). However, the IP method is beset with the same problem as EM-SP methods used in the Wadi Bidah followup work, that is, the inability to distinguish between sulfide-mineralized zones, graphitic schists, and other geologic conductors. Recently, considerable research using multifrequency IP or complex-resistivity methods has indicated that the spectral IP responses of massive sulfide bodies can be distinguished from the spectral IP responses of graphitic sources (Pelton and others, 1978). It would be extremely useful to carry out a complex-resistivity experiment in the Wadi Bidah district to ascertain the usefulness of the method in this environment. A time-domain EM method might also be tested at the same time; it should yield useful information, particularly if the sulfide deposit is somewhat more conductive than the carbonaceous rocks associated with it.

Jabal Mohr

EM-SP measurements were made in a 500-m by 500-m area known as Jabal Mohr, located about 2 km south-southeast of the Sha'ab al Tare prospect on the western side of Wadi Bidah (fig. 2). The rocks in the area include metavolcanic schist, basalt, and tuff (Riofinex Geological Mission, 1979). The main hematitic and goethitic gossan crops out over an area that is 4 to 5 m wide and 30 to 40 m long; minor gossan zones crop out for several hundred meters north and south of the main gossan.

The EM and SP data for the six traverses (figs. 15-20) show a much weaker response than those in the Rabathan area. Maximum SP response is only -50 mV, as compared to more than -300 mV in the Rabathan area. This lower SP response is encouraging, inasmuch as the source of the large SP anomalies in the Rabathan area is most certainly the carbonaceous rocks. Carbonaceous rocks were not identified in the Jabal Mohr area nor have they been in previous work at Sha'ab al Tare, which is in a similar sequence of volcanic rocks (Earhart and Mawad, 1970; Kiilsgaard and others, 1978).

The locations of the geophysical traverses, the areas of gossan outcrop, and the nearby geology are shown in figure 21. The locations of the primary EM and SP anomalies are also shown for comparison with the geology. SP anomalies and gossan outcrops are nearly coincident on traverses 00 S, 100 N, and 200 N. On traverses 100 S and 300 N, the SP anomaly lies 20 to 50 m east of the gossan outcrop. The EM data contain some apparent field-position errors, which are a result of the very rough topography. These errors are more apparent in the inphase (real) component and have little effect on the out-of-phase (imaginary) component. Based on the interpretation of conductor position from the imaginary component only, the EM conductor lies from 10 to 50 m east of the gossan outcrop on traverses 100 S to 100 N. It is nearly coincident with the gossan outcrop on traverses 200 N and 300 N. This divergence of anomaly position could easily be explained if the EM conductor dips to the east on traverses 100 S to 100 N and is nearly vertical on traverses 200 N and 300 N, The EM response is weak, which suggests a poor conductor, and the shoulders of the EM response are poorly developed, so a reliable estimation of the dip of the conductor cannot be made. No EM or SP anomalies appear on traverse 400 N (fig. 20), a fact that suggests that the conductive zone does not continue to the north beyond traverse 400 N. Conductors may possibly extend south of traverse 100 S, beyond the southern end of this survey. The geophysical data suggest the possibility that sulfide-bearing rocks extend at least 400 m along strike. The width and grade of any mineralized body would probably be similar to those at the

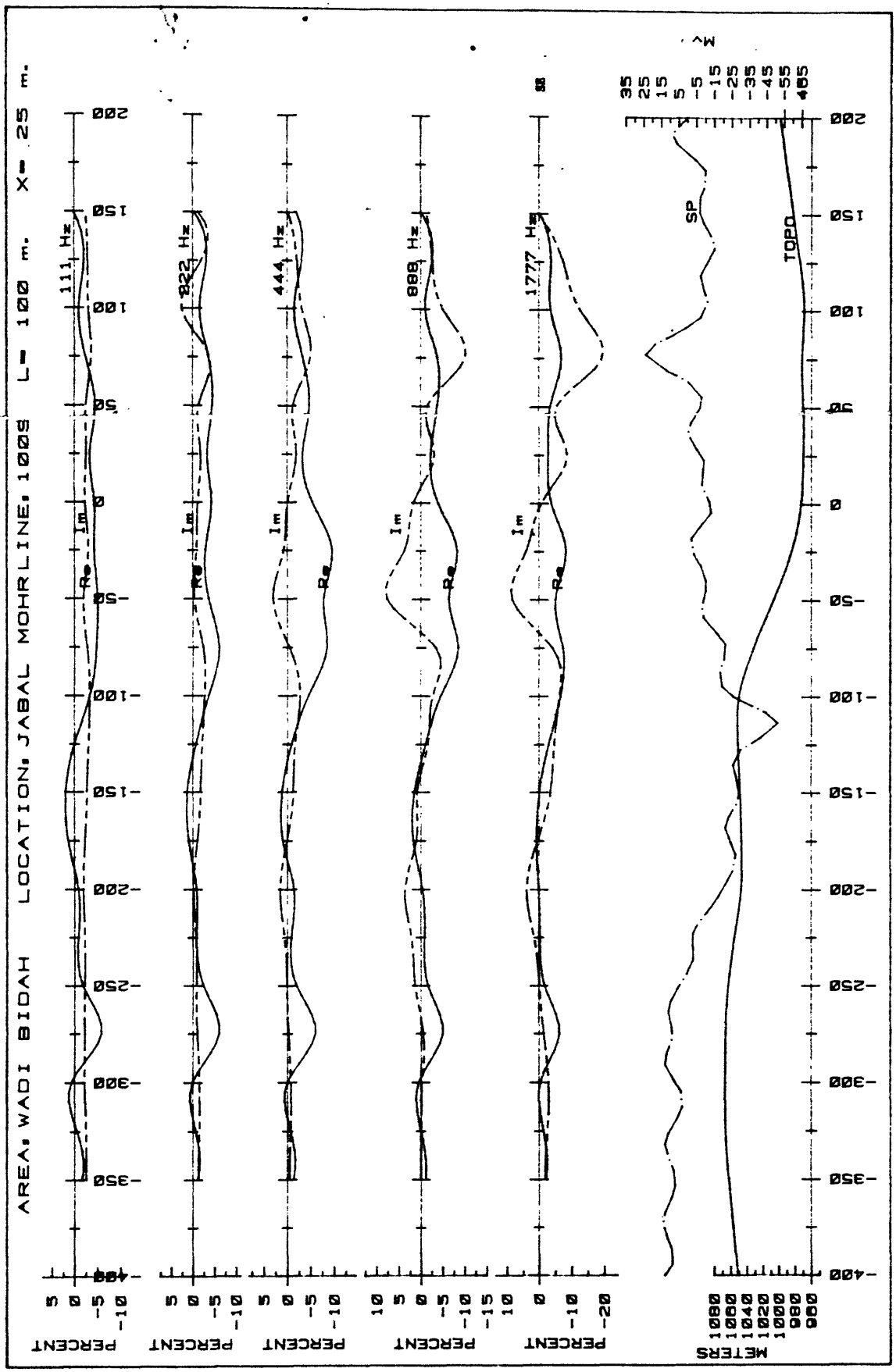


Figure 15.–Profile showing geophysical data along traverse 100 S at the Jabal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

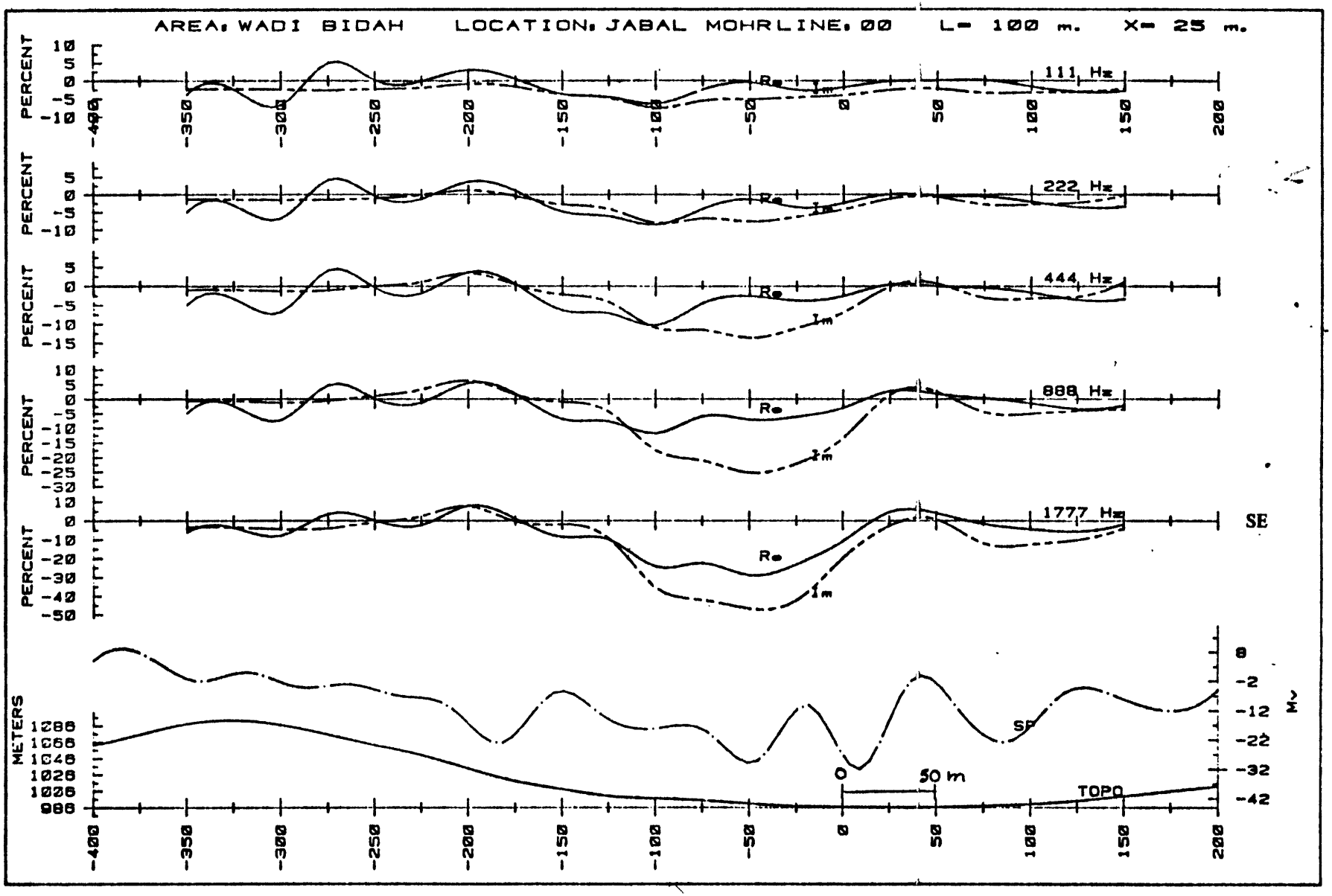


Figure 16.--Profile showing geophysical data along traverse 00 at the Jabal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

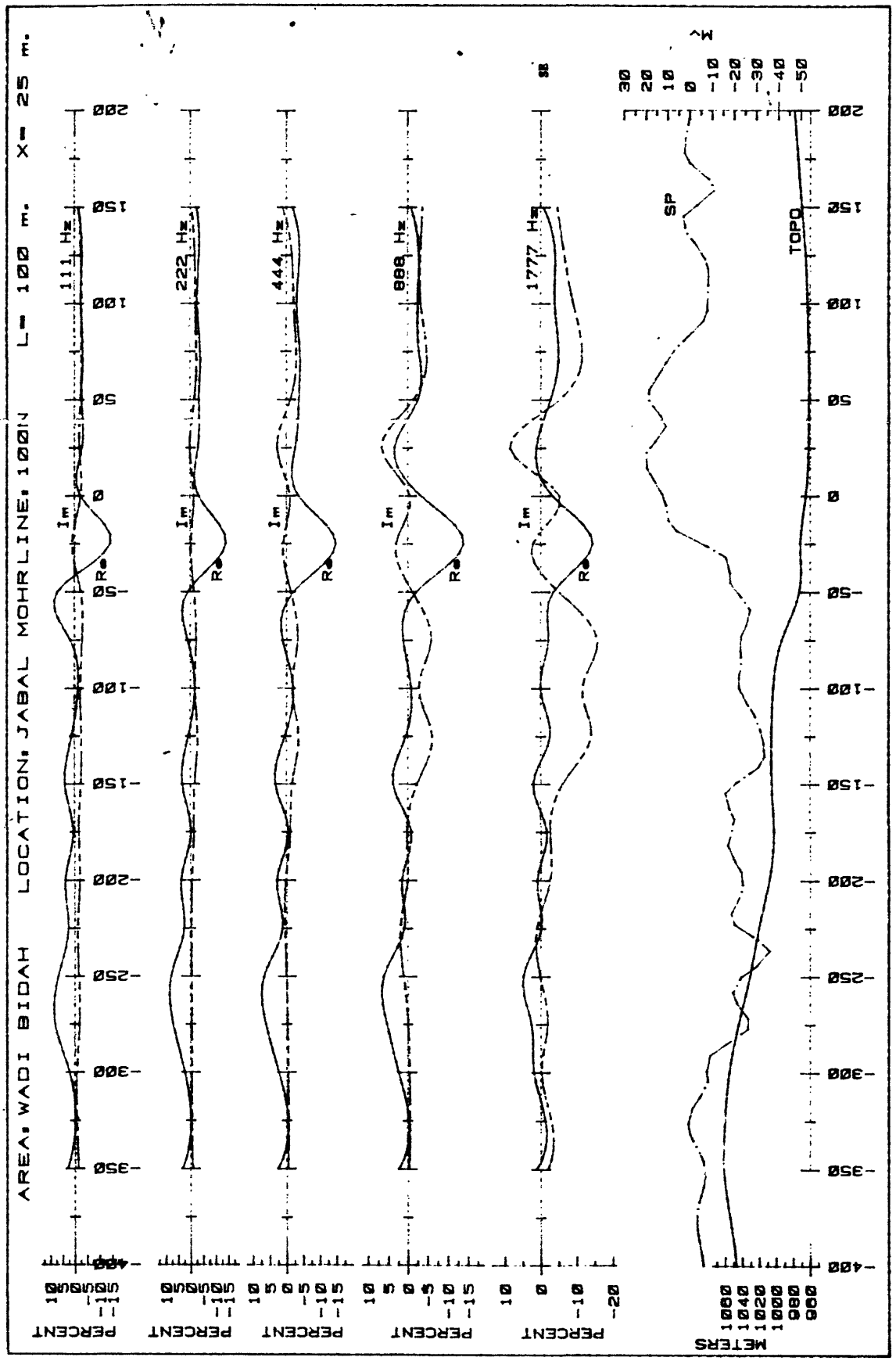


Figure 17.–Profile showing geophysical data along traverse 100 N at the Jabal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

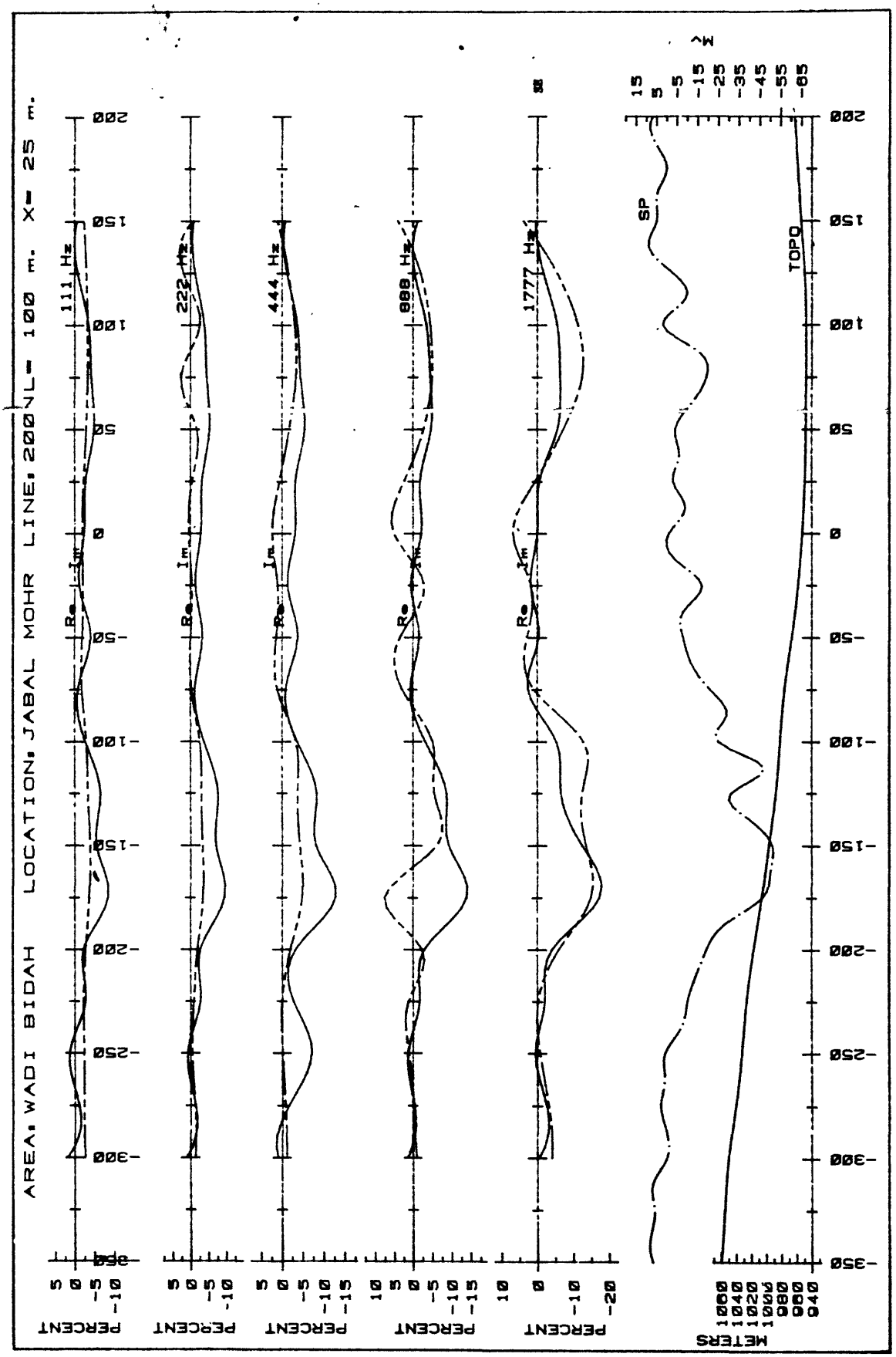


Figure 18.–Profile showing geophysical data along traverse 200 N at the Jabal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

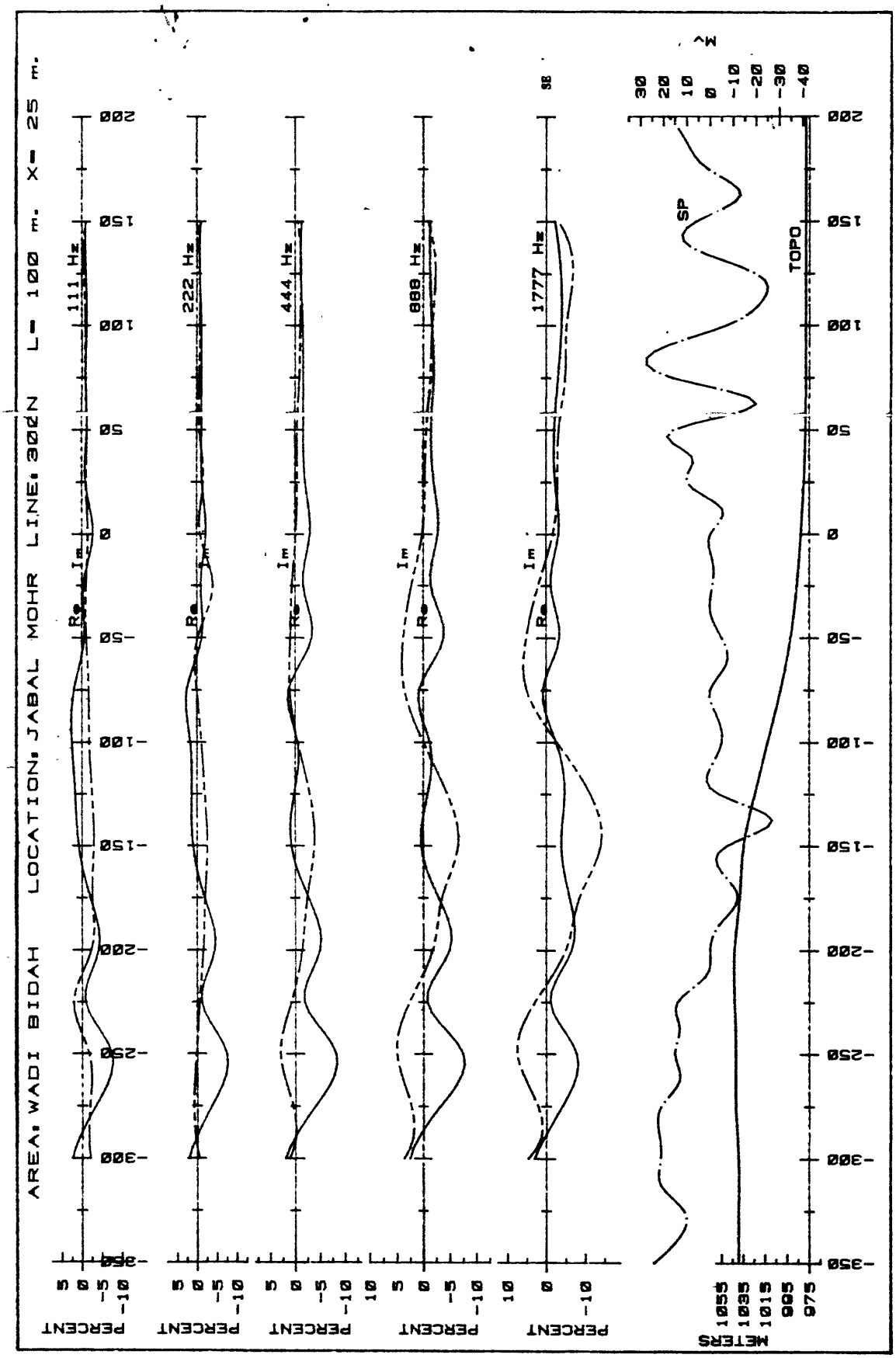


Figure 19.–Profile showing geophysical data along traverse 300 N at the Jilbal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.

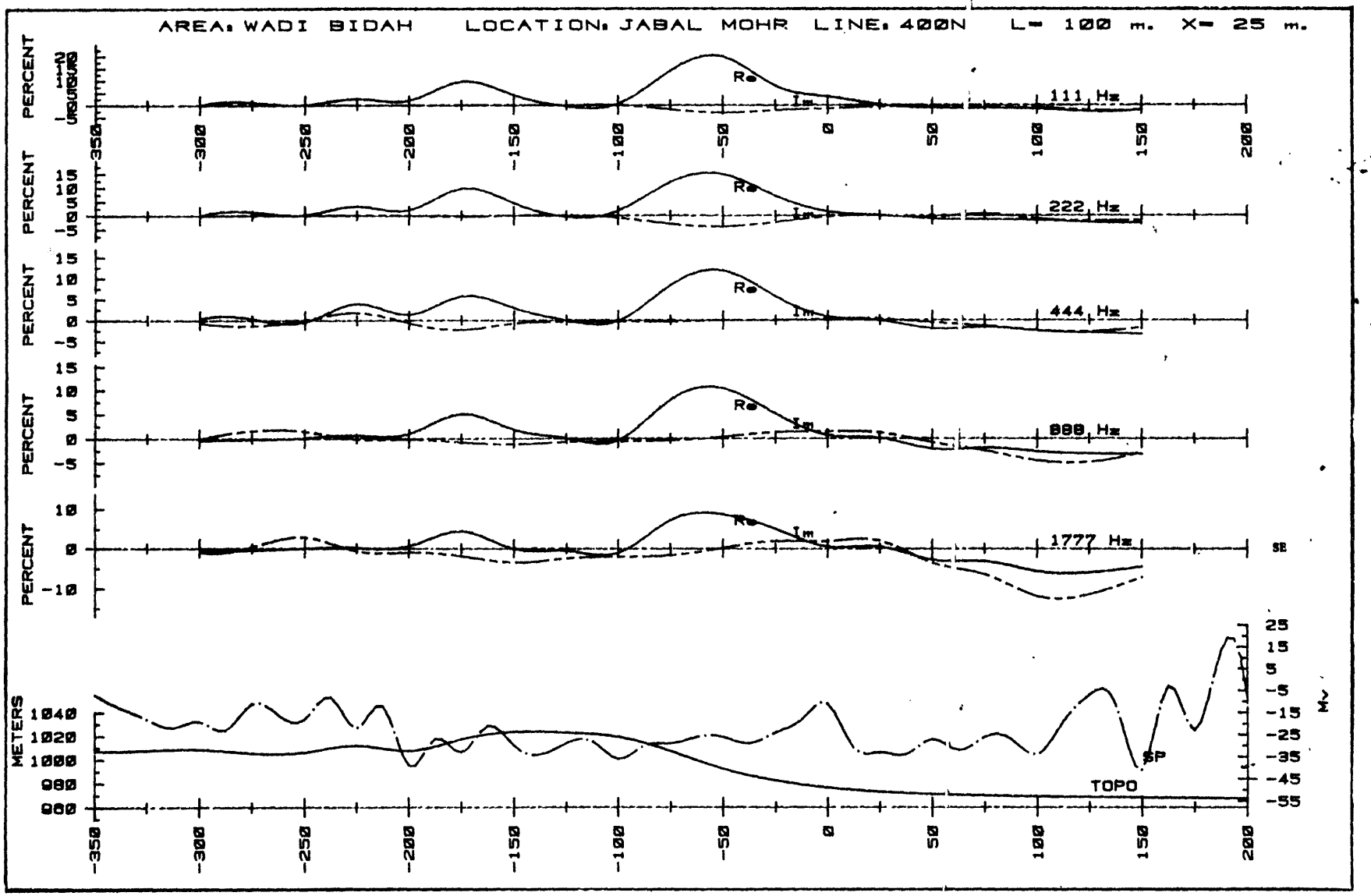
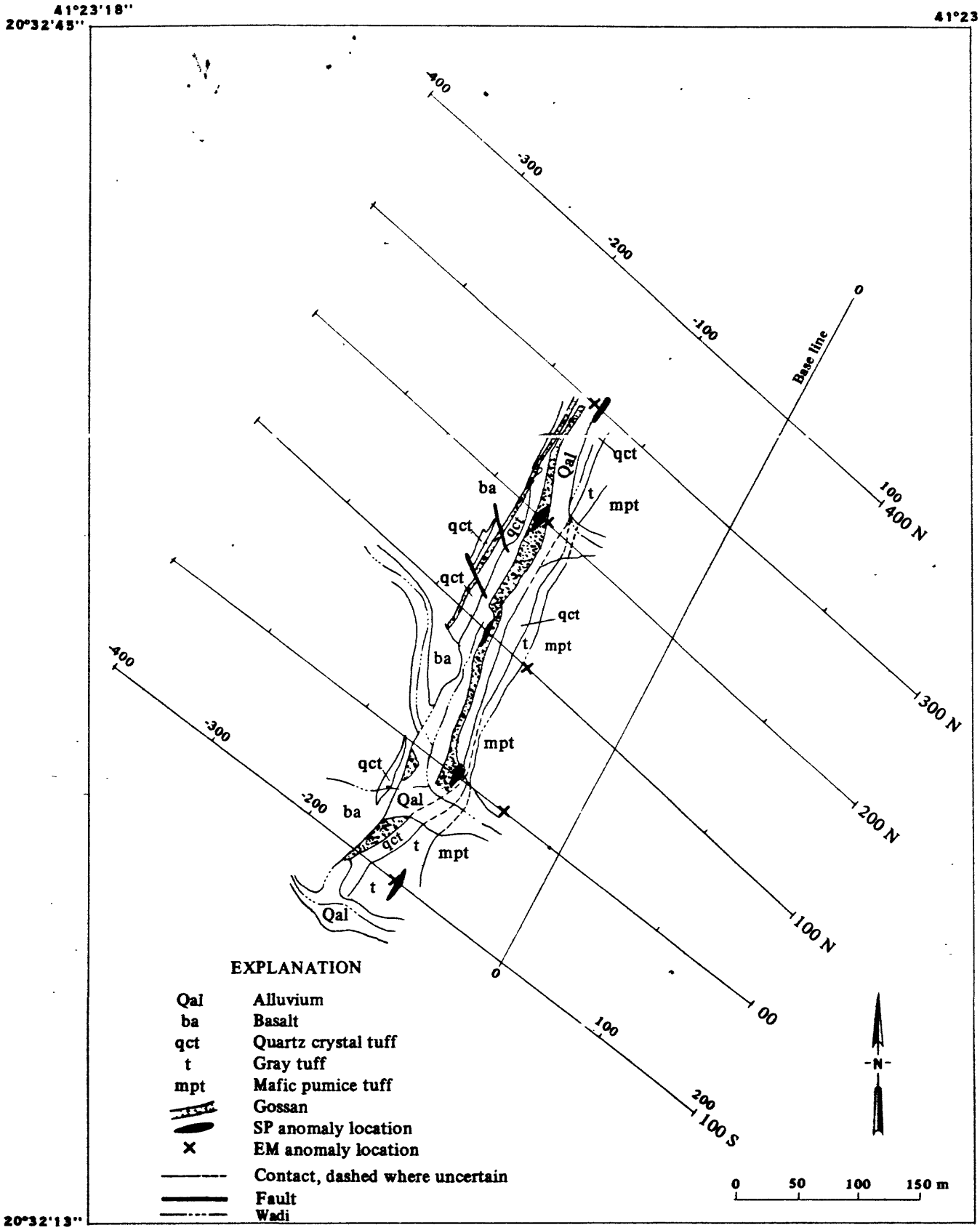


Figure 20.–Profile showing geophysical data along traverse 400 N at the Jabal Mohr prospect.
Re = real component; Im = imaginary component; L = coil separation;
X = measurement interval.



Geologic base by C.W. Smith, U.S. Geological Survey Saudi Arabian Mission, 1980.

Figure 21.–Map showing location of geophysical traverses and schematic geology at the Jabal Mohr prospect. Also shown are the locations of the main EM-SP anomalies.

Sha'ab al Tare prospect to the north. One or two drill holes would be necessary to confirm these surmises.

RECONNAISSANCE GEOPHYSICAL SURVEY

In further ground followup of the 1977 AEM survey of the district, AEM anomalies not previously studied were located on the ground and a brief geologic examination was made of the area of each. These AEM anomalies are in the southern part of the Wadi Bidah district, south, west, and northwest of the USGS field camp at Al Bahah (fig. 2). Anomalies B-37, B-38, and B-41 received no further geophysical study, either because the most probable cause of the electromagnetic response is the carbonaceous rocks visible at the surface or because no surface indications of anomalous mineralized rocks were seen. In the areas of AEM anomalies B-42, B-44, and B-45, located west of the village of Marawa, evidence of ancient mining, gossan outcrops, and other surface indications enhance the potential for mineralized rocks at depth. Reconnaissance EM and SP traverses were made over the principal parts of those areas in an attempt to locate the anomalous zones on the ground. Geologic mapping and geochemical sampling were also carried out. The results of these studies will be the subject of a separate report (Sadek and Flanigan, unpublished data).

CONCLUSIONS AND RECOMMENDATIONS

Detailed geophysical data and diamond drill-core logs indicate that carbonaceous rocks are the most probable source of the EM and SP anomalies in both the Rabathan area and area B-13 to the north. The Rabathan 4 deposit has a geophysical expression, but the mineralized rocks are so intimately associated with carbonaceous rocks that it is impossible to separate the larger response of the carbonaceous material from that of the massive sulfide deposit. Complex-resistivity measurements might be successful in discriminating between various types of geologic conductors in this carbonaceous environment, and an experimental test of the method at the Rabathan 4 deposit would be worthwhile.

Geologic and geophysical data from the Jabal Mohr prospect indicate the possibility of a massive sulfide body at depth that extends some 400 m in strike length. The geophysical anomalies coinciding with the gossan outcrop along geophysical traverse 200 N could be tested at depth by a single drill hole.

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Appendix 1.--*Profile data listing for Rabathan area*

FILE> RAB-13 PROJECT> WADI BIDAH LINE> 130N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-200.0											49	1000	
-187.5											46		
-175.0											43	1000	
-162.5											47		
-150.0	-.4	-.3	.3	2	2.3	4.5	5.5	5.5	9	3.8	51	1000	
-137.5											50		
-125.0	.41	0	1.3	2.8	3.7	5.0	7.5	7.5	12.	2.0	50	1000.39	
-112.5											45		
-100.0	-1.	.20	.24	2.0	2.7	4.0	6.7	6.7	10.	-4.	40	998.82	
-87.5											36		
-75.0	.53	-1.	.83	-1.	-1.	-2.	2.6	2.6	.13	-13	33	997.641	
-62.5											27		
-50.0	3.4	-5.	2.3	-7.	-.7	-11	-7.	-7.	-22	-18	25	996.462	
-37.5											7		
-25.0	1.6	-4.	1.4	-7.	-2.	-13	-10	-10	-24	-23	-31	996.069	
-12.5											-6		
0.0	.76	-.4	3.1	-2.	3.2	-6.	-1.	-1.	-11	-19	1	995.284	
12.5											19		
25.0	1.5	3.1	4.5	6.5	8.6	6.0	12.	12.	13.	-3.	31	999.243	
37.5											35		
50.0	.73	1.0	3.5	2.4	6.4	-.4	7.1	7.1	-.8	-14	35	1000.42	
62.5											43		
75.0	-11	-5.	-5.	-5.	-7.	-10	-13	-13	-25	-21	39	1004.38	
87.5											42		
100.0	-3.	-8.	-6.	-10	-11	-15	-21	-21	-35	-23	47	1012.34	
112.5											43		
125.0	3.5	-5.	1.2	-5.	-.4	-6.	-2.	-2.	-12	-15	-38	1026.69	
137.5											-15		
150.0	-6.	-4.	-6.	-5.	-7.	-8.	-10	-10	-20	-22	-101	1044.85	
162.5											-71		
175.0	1.4	-4.	.93	-4.	-.1	-7.	-1.	-1.	-9.	-21	-68	1055.67	
187.5											-77		
200.0	2.9	-4.	2.2	-5.	.71	-10	-2.	-2.	-15	-28	-96	1063.36	
212.5											-92		
225.0	.79	-3.	.38	-4.	-.2	-5.	-1.	-1.	-8.	-17	0	1059.4	
237.5											0		
250.0	1.5	-2.	1.2	-2.	1.0	-2.	1.4	1.4	-.9	-7.	0	1052.14	
262.5											0		
275.0	-.5	-2.	-.6	-1.	-.4	-.7	.6	.6	1.4	-4.	0	1052.14	
287.5											0		
300.0	-.0	-2.	-.3	-.1	-.3	1.3	.91	.91	1.3	2.4	0	1059.4	
312.5											0		
325.0	-5.	-2.	-3.	-.1	-3.	.49	-2.	-2.	-2.	.49	0	1077.56	
337.5											0		
350.0	1.3	-2.	1.3	-1.	1.3	-.7	2.1	2.1	.74	-3.	0	1092.35	
375.0												1107.13	
400.0												1121.92	

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB-29 PROJECT> WADI BIDAH- LINE> 360N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-200.0											-105	1000	
-187.5											-104		
-175.0											-104	1001.97	
-162.5											-99		
-150.0	-.2	-.6	-.0	-.4	.47	-.4	1.6	1.6	.67	-7.	-99	1003.94	
-137.5											-79		
-125.0	-1.	-.5	-1.	0	-1.	-.1	-1.	-1.	-1.	-4.	-58	1005.9	
-112.5											-45		
-100.0	-.6	-.4	-.6	0	-.0	0	.77	.77	.47	-4.	-39	1007.87	
-87.5											-36		
-75.0	-.6	-1.	-.6	-.7	-1.	-2.	-1.	-1.	-6.	-10	-25	1010.23	
-62.5											-28		
-50.0	-.9	-1.	-.9	-1.	-1.	-3.	-2.	-2.	-8.	-15	-24	1011.81	
-37.5											-24		
-25.0	-1.	-1.	-.9	-1.	-1.	-4.	-4.	-4.	-9.	-15	-24	1013.38	
-12.5											-26		
0.0	-.8	-1.	-.8	-2.	-1.	-4.	-4.	-4.	-10	-17	-20	1014.56	
12.5											-21		
25.0	.47	-.7	.67	-1.	.77	-4.	-1.	-1.	-7.	-15	-35	1016.53	
37.5											-38		
50.0	-.6	-1.	-.4	-2.	-.4	-5.	-3.	-3.	-12	-17	-44	1018.89	
62.5											-53		
75.0	1.5	-1.	1.7	-2.	.43	-5.	-3.	-3.	-10	-16	-63	1021.65	
87.5											-66		
100.0	1.5	-.6	1.9	-1.	1.5	-4.	-.6	-.6	-6.	-11	-57	1024.41	
112.5											-29		
125.0	-1.	-1.	-1.	-1.	-2.	-2.	-4.	-4.	-7.	-7.	-16	1028.77	
137.5											-8		
150.0	-2.	-2.	-3.	-1.	-5.	-2.	-6.	-6.	-9.	-7.	-12	1035.61	
162.5											-6		
175.0	-1.	-3.	-1.	-3.	-4.	-4.	-8.	-8.	-15	-12	-44	1045.97	
187.5											-53		
200.0	6.1	-3.	5.0	-3.	.24	-5.	-7.	-7.	-14	-15	-63	1061.83	
212.5											-66		
225.0	5.2	-2.	5.9	-2.	-.4	-4.	-4.	-4.	-11	-11	-75	1081.22	
237.5											-78		
250.0	13.	-.9	9.0	-.1	3.4	-.6	.62	.62	-2.	-5.	-72	1106.22	
262.5											-64		
275.0											-63	1131.22	
300.0												1156.22	

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB-29 PROJECT> WADI BIDAH -LINE> 370N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-200.0											-74	1000	
-187.5											-89		
-175.0											-70	1000	
-162.5											-70		
-150.0	-.2	-1.	-.5	-.8	2.2	-2	3.3	3.3	-.7	-14	-71	1000	
-137.5											-70		
-125.0	2.2	-2.	3	-2.	3.3	-4.	2.9	2.9	-5	-19	-63	1000	
-112.5											-57		
-100.0	1.2	-3.	1	-4.	1.2	-8	-3	-3	-13	-23	-36	1000	
-87.5											-27		
-75.0	.3	-3.	.3	-5.	-1.	9.	-6	-6	-18	-25	-31	1000	
-62.5											-25		
-50.0	-1.	-3.	-1.	-4.	-2.	-8.	-5.	-5.	-17	-25	-47	1000	
-37.5											-21		
-25.0	-.6	-2.	-.2	-2.	.3	-5	-.8	-.8	-7.	-21	-19	1000	
-12.5											-12		
0.0	-.0	-1.	.84	-2.	2.3	-5.	-.0	-.0	-10	-23	-20	1001.57	
12.5											-23		
25.0	2.1	.50	3.8	.91	5.8	-1.	5.7	5.7	-2.	-16	-35	1005.94	
37.5											-47		
50.0	1.8	-1.	2.9	-1.	2.9	-5.	1.7	1.7	-8.	-18	-64	1013.2	
62.5											-100		
75.0	4.6	-1.	5.8	-1.	4.1	-4.	1.2	1.2	-5.	-14	-121	1025.94	
87.5											-130		
100.0	4.9	-.6	6.4	-.4	4.3	-3.	1.8	1.8	-7.	-12	-139	1044.1	
112.5											-129		
125.0	5.0	.12	5.0	.84	3.8	1.0	4.4	4.4	2.6	-5.	-102	1059.97	
137.5											-113		
150.0	-1.	-.2	-1.	2.2	.29	4.1	4.2	4.2	7.1	2.2	-145	1065.97	
162.5											-172		
175.0	.32	-2.	-.1	-1.	.02	-1.	.53	.53	-1.	-9.	-186	1070.74	
187.5											-279		
200.0	-7.	-2.	-8.	-1.	-10	-1.	-11	-11	-13	-4.	-277	1075.51	
212.5											-269		
225.0	-1.	-1.	-1.	-1.	-4.	-1.	-6.	-6.	-12	-4.	-258	1089.25	
237.5											-177		
250.0	2.6	-.6	4.2	0	-2.	-.3	-8.	-8.	-15	-6.	-134	1126.04	
262.5											-109		
275.0											-108	1162.82	
287.5											-94		
300.0											-95	1199.61	

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB-29 PROJECT> WADI BIDAH LINE> 380N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-200.0											-48	1000	
-187.5											-29		
-175.0											-21	1002.36	
-162.5											15		
-150.0	2.2	.50	3.5	2.4	5.0	3.0	9.5	9.5	10.	-8.	-4	1004.73	
-137.5											3		
-125.0	1.0	-1.	1.7	-.7	2.8	-1.	3.0	3.0	-.5	10.	18	1006.3	
-112.5											24		
-100.0	1.2	-4.	1.54	-5.	-1.	-9.	-5.	-5.	-16	-21	18	1007.87	
-87.5											21		
-75.0	-3.	-5.	-4.	-12	-7.	-13	-14	-14	-29	-23	19	1009.05	
-62.5											16		
-50.0	-2.	-5.	-3.	-7.	-6.	-12	-13	-13	-27	-25	10	1010.62	
-37.5											18		
-25.0	-2.	-2.	-1.	-4.	-1.	-8.	-5.	-5.	-19	-25	18	1007.86	
-12.5											9		
0.0	-.6	-1.	.96	-.9	3.3	-5.	1.2	1.2	-11	-23	-1	1011.02	
12.5											-21		
25.0	.94	-.6	3.1	-.3	4.6	-3.	4.0	4.0	-5.	-19	-50	1015.79	
37.5											-62		
50.0	1.7	-1.	2.8	-2.	3.2	-6.	-.3	-.3	-9.	-20	-73	1022.63	
62.5											-93		
75.0	2.7	-.8	3.3	-1.	4.4	-3.	3.3	3.3	-3.	-12	-96	1033.92	
87.5											-100		
100.0	1.4	0	2.6	1.2	4.4	-.2	5.1	5.1	1.4	-7.	-85	1051.49	
112.5											-78		
125.0	1.6	1.0	3.5	-3.	5.4	-4.	9.2	9.2	9.8	-.3	-90	1070.26	
137.5											-104		
150.0	.93	-.2	1.8	1.5	4.1	1.9	5.9	5.9	5.9	-4.	-125	1084	
162.5											-166		
175.0	.06	-3.	-.1	-2.	-.4	-3.	-1.	-1.	-4.	-9.	-210	1093.9	
187.5											-216		
200.0	-3.	-3.	-3.	-3.	-4.	-4.	-5.	-5.	-8.	-8.	-225	1103.8	
212.5											-219		
225.0											-221	1113.7	
237.5											-211		
250.0											-188	1123.6	
262.5											-135		
275.0											-135		
287.5											-118		
300.0											-101		
312.5											-72		
325.0											-35		

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB-29 PROJECT> WADI BIDAH LINE> 390N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-200.0											-8	1000	
-187.5											-3		
-175.0											2	1003.16	
-162.5											12		
-150.0	1.4	.50	3.1	3.5	6.0	5.5	11.	11.	15.	-.4	22	1006.32	
-137.5											27		
-125.0	-1.	-1	-.4	.30	.94	0	2.9	2.9	1.8	-7.	33	1007.89	
-112.5											22		
-100.0	-.4	-4	-1.	-4.	-2.	-8	-6	-6	-15	-19	12	1007.89	
-87.5											8		
-75.0	-2.	-6.	-4.	-7.	-7.	-12	-12	-12	-26	-22	4	1009.07	
-62.5											3		
-50.0	-.6	-6.	-2.	-9.	-6.	-13	-13	-13	-28	-25	2	1009.85	
-37.5											0		
-25.0	-1.	-4.	-1.	-4.	-1.	-8.	-4.	-4.	-16	-24	-1	1011.43	
-12.5											-1		
0.0	.96	-1.	2.2	-1.	3.5	-3.	3.0	3.0	-5.	-18	0	1014.59	
12.5											-25		
25.0	2.4	-1.	3.5	-1.	5.0	-4.	3.9	3.9	-4.	-19	-63	1019.76	
37.5											-87		
50.0	2.4	-.8	4.1	-1.	5.4	-4.	3.8	3.8	-5.	-17	-91	1013.34	
62.5											-86		
75.0	1.2	-.9	2.8	-.7	3.9	-3.	3.0	3.0	-4.	-14	-55	1021.47	
87.5											-49		
100.0	1.9	1.0	3.6	3.1	6.2	-3.	8.9	8.9	8.6	-.6	-49	1013.78	
112.5											-46		
125.0	3.1	2.3	7.0	6.0	7.5	9.1	13.	13.	18.	12.	-61	1017.74	
137.5											-63		
150.0	1.7	1.0	3.3	3.3	5.6	5.0	10.	10.	12.	-1.	-71	1018.91	
162.5											-86		
175.0	3.2	-2.	3.1	-2.	3.3	-3.	2.8	2.8	-2.	-12	-104	1017.74	
187.5											-131		
200.0	-3.	-5.	-5.	-7.	-7.	-11	-12	-12	-24	-20	-115	1014.97	
212.5											-117		
225.0											-128	1012.21	
237.5											-134		
250.0											-123	1009.45	
262.5											-162		
275.0											-182		
287.5											-86		
300.0											-71		

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB55 PROJECT> WADI BIDAH LINE> 550N UNITS> METERS

STATION	SLINGRAM								SP	TOPO	MAG
	Frq	111	222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-100.0										64	1000	
-87.5										73		
-75.0										82	1000.79	
-62.5										66		
-50.0	-3.	-7.	-5.	-10	-11	-16	-19	-19	-36	-26	50	1001.57	
-37.5											50		
-25.0	-1.	-5.	-3.	-7.	-7.	-10	-12	-12	-25	-17	50	1006.75	
-12.5											34		
0.0	-1.	2.9	-1.	-2.	-3.	-3.	-3.	-3.	-8.	-7.	17	1017.1	
12.5											30		
25.0	.74	2.3	3.1	2.8	4.8	5.6	9.3	9.3	10.	.94	44	1031.89	
37.5											41		
50.0	18.	13.	12.	13.	5.4	10.	4.0	4.0	1.6	2.9	39	1047.21	
62.5											31		
75.0	-2.	2.5	-1.	2.6	-1.	5.7	4.2	4.2	6.1	6.0	19	1058.03	
87.5											-2		
100.0	4.2	-.4	4.4	2.3	2.4	5.2	10.	10.	13.	6.2	-23	1065.29	
112.5											-48		
125.0	-1.	-.4	-1.	2.0	-.3	4.4	2.8	2.8	4.8	6.8	-73	1073.41	
137.5											-89		
150.0	-1.	-1.	-1.	-.2	-2.	1.0	-1.	-1.	-1.	2.0	-117	1080.68	
162.5											-168		
175.0	.75	-3.	-.3	-4.	-1.	-5.	-4.	-4.	-11	-12	-196	1088.8	
187.5											-241		
200.0	.59	-4.	.08	-5.	-2.	-10	-7.	-7.	-20	-21	-305	1093.98	
212.5											-306		
225.0	-.3	-4.	-.3	-4.	-1.	-7.	-4.	-4.	-13	-18	-268	1091.61	
237.5											-215		
250.0	-1.	-2.	-1.	-2.	-.9	-3.	-1.	-1.	-4.	-13	-158	1087.25	
262.5											-104		
275.0	1.8	-.9	2.9	.76	4.0	.98	6.7	6.7	9.0	-4.	-75	1076.9	
287.5											-63		
300.0	5.5	-.1	6.1	2.7	8.4	5 0	13.	13.	16.	2.4	-51	1065.61	
312.5											-40		
325.0	.28	1.2	1.8	4.8	4.9	7.4	10.	10.	15.	6.6	-30	1057.05	
337.5											-31		
350.0	.80	1.0	2.5	4.3	5.5	7.3	9.7	9.7	14.	7.3	-32	1051.87	
362.5											-30		
375.0	.24	-1.	.84	1.0	2.6	2.0	4.2	4.2	4.2	-3.	-28	1050.3	
387.5											-36		
400.0	-1.	4.0	-2.	-3.	-2.	-4.	-3.	-3.	-8.	-11	-44	1051.48	
412.5											-43		
425.0	-.8	-7.	-3.	-9.	-7.	-13	-13	-13	-26	-22	-43	1054.64	
437.5											-25		
450.0	-3.	-5.	-5.	-6.	-8.	-9.	-11	-11	-27	-18	-17	1058.59	
462.5											-11		
475.0											-6	1062.55	
487.5											-3		
500.0											0	1066.51	

Appendix 1.--*Profile data listing for Rabathan area* [continued]

FILE> RAB75 PROJECT> WADI BIDAH -LINE> 750N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.		im.	re.	im.	re.	im.	re.	im.				
400.0											0	1000	
412.5											2		
425.0											3	995.231	
437.5											0		
450.0	1.7	-2.	1.3	-.8	1.7	.30	.83	.83	3.2	-2.	-2	990.462	
462.5											-9		
475.0	-.1	-1.	.13	-.4	.83	.60	2.5	2.5	2.7	-3.	-14	991.641	
487.5											-27		
500.0	-2.	-1.	-2.	0	-1.	1.1	.81	.81	1.6	-3.	-41	995.199	
512.5											-58		
525.0	-1.	-.4	-.7	1.6	.48	3.7	2.9	2.9	5.3	4.5	-74	999.159	
537.5											-93		
550.0	-.5	.30	.39	2.5	2.3	5.1	5.6	5.6	7.6	6.1	-135	1004.34	
562.5											-229		
575.0	-1.	-.1	-.8	1.4	.70	1.7	3.2	3.2	3.0	4.8	-224	1008.7	
587.5											-239		
600.0	-.9	-1.	-.4	-1.	-.2	-3.	-.0	-.0	-5.	-8.	-266	1012.66	
612.5											-297		
625.0	-2.	3.6	-3.	-4.	-6.	-8.	-9.	-9.	-21	-19	-295	1017.43	
637.5											-300		
650.0	-2.	-4.	-3.	-6.	-7.	-10	-11	-11	-24	-22	-316	1022.6	
662.5											-291		
675.0	-2.	-2.	-2.	-2.	-3.	-3.	-4.	-4.	-9.	-10	-278	1029.44	
687.5											-257		
700.0	-2.	-2.	-2.	-2.	-3.	-4.	-4.	-4.	-11	-15	-257	1038.44	
712.5											-239		
725.0	-.9	-3.	-.7	-3.	-3.	-7.	-6.	-6.	-17	-15	-218	1051.18	
737.5											-210		
750.0	-1.	-2.	-1.	-4.	-4.	-7.	-9.	-9.	-17	-14	-210	1066.5	
762.5											-191		
775.0	-3.	-2.	-2.	-1.	-4.	-3.	-6.	-6.	-11	-12	-138	1084.07	
787.5											-113		
800.0	1.5	1.0	1.5	1.9	.87	2.6	.21	.21	-1.	-.1	-99	1105.43	
812.5											-85		
825.0	-2.	-.5	-1.	.78	-2.	1.3	-2.	-2.	-2.	1.6	-78	1126.11	
837.5											-72		
850.0	3.0	-.8	5.0	.40	3.0	.95	1.6	1.6	-.3	1.7	-62	1149.58	
862.5											-58		
875.0											-48	1173.06	
887.5											-40		
900.0											-35	1196.54	

Appendix 2.--*Profile data listing for Jabal Mohr area*

FILE> MOHR1S PROJECT> WADI BIDAH LINE> 100S UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-400.0												1051	
-375.0												1045.41	
-350.0	-1.	-2.	-1.	-1.	-1.	-.5	-1.	-1.	-2.	-1.	13	1039.82	
-337.5											9		
-325.0	-.5	-2.	-.6	-1.	-.6	-.6	-.0	-.0	-1.	-2.	14	1035.46	
-312.5											9		
-300.0	.71	-2.	.01	-1.	.01	-.7	.51	.51	-.3	-2.	8	1035.07	
-287.5											13		
-275.0	-5.	-2.	-5.	-1.	-5.	-.2	-4.	-4.	-6.	-1.	6	1035.46	
-262.5											4		
-250.0	-1.	-2.	-2.	-.8	-1.	.10	-1.	-1.	-1.	-.1	13	1039.02	
-237.5											9		
-225.0	-.8	-2.	-.8	-.7	-.8	.63	-.8	-.8	-.3	1.5	11	1046.71	
-212.5											5		
-200.0	-.8	-1.	-.8	-.1	-1.	1.5	-.3	-.3	.22	4.0	-3	1054.83	
-187.5											-3		
-175.0	1.4	-2.	1.0	-1.	1.0	.10	1.8	1.8	.81	.50	-13	1055.23	
-162.5											-22		
-150.0	1.9	-2.	1.3	-1.	1.1	-1.	1.5	1.5	-.0	-3.	-27	1053.65	
-137.5											-21		
-125.0	.03	-3.	-.6	-2.	-.8	-1.	-1.	-1.	-2.	-4.	-28	1050.89	
-112.5											-27		
-100.0	-3.	-3.	-3.	-2.	-4.	-2.	-4.	-4.	-6.	-6.	-30	1052.47	
-87.5											-51		
-75.0	-4.	-2.	-6.	-2.	-8.	-.3	-8.	-8.	-7.	-4.	-26	1070.04	
-62.5											-18		
-50.0	-4.	-1.	-3.	-.2	-7.	3.0	-6.	-6.	-4.	8.3	-21	1095.04	
-37.5											-9		
-25.0	-4.	-2.	-2.	-.8	-9.	.80	-8.	-8.	-8.	4.0	-10	1117.78	
-12.5											-7		
0.0	-4.	-2.	-4.	-1.	-5.	0	-3.	-3.	-3	-.5	-2	1129.55	
12.5											-13		
25.0	-3.	-2.	-3.	-1.	-3.	-1.	-2.	-2.	-2.	-8.	-8	1132.31	
37.5											-9		
50.0	-4.	-2.	-4.	-1.	-4.	-1.	-3.	-3.	-3.	-5.	0	1131.92	
62.5											-7		
75.0	-2.	-3.	-3.	-3.	-3.	-5.	-3.	-3.	-6.	-19	0	1130.34	
87.5											24		
100.0	-.9	-3.	-1.	2.6	-1.	-3.	-.9	-.9	-3.	-12	1	1133.1	
112.5											-11		
125.0	-2.	-2.	-3.	-1.	-3.	-2.	-2.	-2.	-3.	-7.	-7	1127.93	
137.5											-15		
150.0	.22	-2.	-.3	-1.	-1.	-.2	-.0	-.0	-.3	0	-9	1119.8	
162.5											-7		
175.0											-10	1111.68	
187.5											6		
200.0											0	1103.56	

Appendix 2.--*Profile data listing for Jabal Mohr area* [continued]

FILE> MOHR0 PROJECT> WADI BIDAH LINE> 00 UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-400.0													
-375.0													
-350.0	-3.	-2.	-4.	-1.	-4.	-1.	-4.	-4.	-6.	-3.	15	1062	
-325.0	-2.	-2.	-3.	-1.	-3.	-.9	-2.	-2.	-3.	-3.	7	1049.26	
-300.0	-6.	-2.	-6.	-1.	-6.	-1.	-7.	-7.	-7.	-4.	-2	1036.52	
-275.0	5.0	-2.	4.1	-1.	4.1	-1.	4.7	4.7	3.5	-4.	11	1032.16	
-250.0	.14	-2.	-.4	-1.	-.4	0	1.14	.14	1.14	-.9	-4	1037.75	
-225.0	-.1	-1.	-1.	-.1	-1.	1.1	-1.	-1.	-2.	2.3	-3	1049.51	
-200.0	3.0	-.8	3.6	1.2	3.6	3.3	5.4	5.4	7.8	7.6	-7	1062.25	
-175.0	.49	-1.	1.0	-.4	.49	.35	1.6	1.6	1.0	-.3	-11	1074.5	
-150.0	-3.	-3.	-4.	-2.	-6.	-2.	-7.	-7.	-8.	-1.	-23	1090.92	
-125.0	-4.	-4.	-6.	-4.	-7.	-4.	-7.	-7.	-9.	-9.	-6	1106.24	
-100.0	-6.	-7.	-8.	-8.	-10	-11	-11	-11	-24	-35	-14	1116.14	
-75.0	-2.	-5.	-3.	-6.	-4.	-11	-5.	-5.	-22	-42	-18	1124.26	
-50.0	-.5	-5.	-1.	-7.	-2.	-13	-7.	-7.	-28	-46	-19	1127.02	
-25.0	-2.	-4.	-3.	-6.	-3.	-11	-6.	-6.	-23	-42	-29	1129.38	
0.0	-1.	-4.	-2.	-4.	-2.	-7.	-3.	-3.	-10	-20	-10	1133.34	
25.0	-.2	-2.	.16	-1.	.56	0	2.7	2.7	4.5	-2.	-32	1136.5	
50.0	.01	-2.	-.2	-.7	.01	.70	1.8	1.8	4.0	.80	-2	1137.68	
75.0	.13	-3.	-.5	-2.	-.4	-3.	.34	.34	-1.	-12	-13	1138.47	
100.0	-1.	-3.	-2.	-2.	-1.	-3.	-1.	-1.	-4.	-12	-22	1138.07	
125.0	-3.	-3.	-3.	-2.	-3.	-2.	-3.	-3.	-5.	-10	-6	1136.5	
150.0	-2.	-2.	-3.	-.1	-3.	1.2	-2.	-2.	-1.	-4.	-7	1134.14	
175.0											-12	1130.18	
200.0											-5	1124.18	
												1118.17	
												1112.17	

Appendix 2.--*Profile data listing for Jabal Mohr area* [continued]

FILE> MOHR1N PROJECT> WADI BIDAH LINE> 100N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq		111		222		444		888		1777		mv.		nT
	re.		im.	re.	im.	re.	im.	re.	im.	re.	im.				
-400.0														1047	
-375.0														1039.74	
-350.0	2.8	-1.	3.1	-.8	2.5	-.4	2.3	2.3	1.1	-1.	-6			1032.47	
-337.5											-4				
-325.0	-.2	-.8	-.1	-.4	-.4	-.5	-.3	-.3	-1.	-2.	-3			1033.65	
-312.5											-6				
-300.0	2.1	-.8	2.3	-.5	2.4	-.4	2.4	2.4	1.9	-.2	-6			1038.83	
-287.5											0				
-275.0	8.1	-1.	7.0	-.4	6.2	-.2	5.3	5.3	2.5	-1.	-1			1049.65	
-262.5											-8				
-250.0	6.7	-1.	7.8	-.3	6.7	.11	6.1	6.1	4.8	.11	-9			1062.89	
-237.5											-26				
-225.0	2.5	-1.	2.5	-.3	1.2	.55	.93	.93	-.1	1.1	-21			1073.7	
-212.5											-23				
-200.0	3.8	-2.	3.8	-.5	2.9	.33	1.5	1.5	1.0	-2.	-36			1085.95	
-187.5											-20				
-175.0	.58	-1.	-.1	-1.	-.5	-1.	-.8	-.8	-1.	-2.	-22			1091.54	
-162.5											-23				
-150.0	3.9	-2.	3.3	-1.	3.3	-1.	3.7	3.7	2.0	-6.	-17			1089.18	
-137.5											-20				
-125.0	1.2	-2.	.91	-2.	.51	-3.	.51	.51	-2.	-14	-16			1088.78	
-112.5											-31				
-100.0	-1.	-2.	-1.	-1.	-2.	-1.	-.8	-.8	.07	-11	-33			1090.75	
-87.5											-29				
-75.0	1.6	-3.	1.1	-2.	1.1	-3.	1.1	1.1	-2.	-15	-22			1100.65	
-62.5											-23				
-50.0	6.9	-2.	1.0	-1.	-2.	-1.	-2.	-2.	-3.	-5.	-23			1121.33	
-37.5											-27				
-25.0	-14	1.0	-14	-.2	-14	1.0	-13	-13	-14	2.2	-18			1122.51	
-12.5											-16				
0.0	-2.	-2.	-3.	-1.	-3.	-1.	-3.	-3.	-3.	-5.	6			1128.93	
12.5											11				
25.0	-3.	-1.	-3.	.30	-2.	2.8	3.3	3.3	1.2	8.5	17			1132.09	
37.5											20				
50.0	-2.	-2.	-3.	-1.	-3.	-1.	-2.	-2.	-2.	-5.	11			1132.48	
62.5											19				
75.0	-3.	-2.	-3.	-2.	-4.	-3.	-2.	-2.	-4.	-11	14			1132.09	
87.5											6				
100.0	-2.	-2.	-2.	-2.	-3.	-2.	-2.	-2.	-3.	-9.	-6			1130.91	
112.5											-8				
125.0	-2.	-2.	-3.	-1.	-3.	-1.	-2.	-2.	-3.	-6.	-8			1128.54	
137.5											-2				
150.0	-1.	-1.	-2.	-.4	-1.	1.2	-.8	-.8	-.7	-4.	3			1124.16	
162.5											-11				
175.0											0			1119.82	
187.5											2				
200.0											0			1115.46	

Appendix 2.--*Profile data listing for Jabal Mohr area* [continued]

FILE> MOHR2N PROJECT> WADI BIDAH LINE> 200N UNITS> METERS

STATION	SLINGRAM								SP	TOPO	MAG
	Frq	111	222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-350.0										7	1060	
-337.5										8		
-325.0										6	1065.18	
-312.5										7		
-300.0	1.7	-2.	.90	-1.	.90	-1.	1.3	1.3	-.5	-4.	0	1070.35	
-287.5											0		
-275.0	-1.	-2.	-1.	-1.	-1.	-.7	-.3	-.3	-2.	-3.	3	1079.8	
-262.5											1		
-250.0	1.2	-2.	.75	-.5	-7.	-.1	1.2	1.2	.54	-.7	1	1087.92	
-237.5											-7		
-225.0	-2.	-2.	-2.	-.9	-2.	0	-1.	-1.	-2.	-.2	-10	1093.93	
-212.5											-14		
-200.0	-2.	-2.	-2.	-1.	-3.	-2.	-2.	-2.	-4.	-5.	-19	1103.37	
-187.5											-28		
-175.0	-8.	-3.	-9.	-3.	-12	-4.	-13	-13	-17	-14	-46	1114.19	
-162.5											-50		
-150.0	-5.	-3.	-7.	-3.	-8.	-4.	-9.	-9.	-12	-13	-51	1123.64	
-137.5											-40		
-125.0	-6.	-3.	-7.	-3.	-8.	-3.	-8.	-8.	-6.	-12	-31	1133.08	
-112.5											-47		
-100.0	-2.	-2.	-3.	-2.	-3.	-3.	-3.	-3.	-5.	-12	-25	1138.67	
-87.5											-29		
-75.0	-.8	-1.	-1.	-.3	-.8	1.1	.70	.70	2.5	.93	-21	1144.67	
-62.5											-12		
-50.0	-4.	-1.	-3.	0	-3.	1.4	-1.	-1.	-.3	2.9	-8	1154.12	
-37.5											-8		
-25.0	-1.	-2.	-1.	-.3	-1.	1.0	.54	.54	1.8	1.6	-17	1162.24	
-12.5											-4		
0.0	-2.	-1.	-2.	.41	-3.	2.3	-2.	-2.	-.0	6.8	-1	1167.83	
12.5											-9		
25.0	-2.	-2.	-3.	-.5	-3.	.60	-1.	-1.	-.5	.60	-3	1170.99	
37.5											-6		
50.0	-4.	-3.	-5.	-1.	-5.	-1.	-4.	-4.	-5.	-7.	-4	1172.56	
62.5											-12		
75.0	-4.	-3.	-4.	2.7	-4.	-3.	-4.	-4.	-6.	-12	-19	1172.56	
87.5											-15		
100.0	-3.	-3.	-3.	-2.	-3.	-3.	-3.	-3.	-5.	-11	2	1172.56	
112.5											-9		
125.0	-.8	-3.	-1.	1.9	-1.	-1.	-.4	-.4	-1.	-5.	-3	1170.6	
137.5											9		
150.0	-.6	-2.	-.9	-.6	-.8	1.0	-1.	-1.	1.39	3.8	5	1166.23	
162.5											5		
175.0											0	1161.87	
187.5											6		
200.0											7	1157.51	

Appendix 2.--*Profile data listing for Jabal Mohr area* [continued]

FILE> MOHR3N PROJECT> WADI BIDAH LINE> 300N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im	re.	im.	re.	im.	re.	im.			
-350.0											24	1039	
-337.5											13		
-325.0											11	1039	
-312.5											21		
-300.0	2.3	-2.	1.9	-.6	1.9	1.1	2.5	2.5	2.9	4.5	21	1039	
-287.5											22		
-275.0	-3.	-2.	-3.	.80	-4.	.50	-3.	-3.	-4.	2.1	21	1036.24	
-262.5											13		
-250.0	-7.	-1.	-7.	.1	-8.	3	-7.	-7.	-7.	7.5	15	1036.24	
-237.5											13		
-225.0	-.8	2.1	-1.	-.6	-1.	.80	-.7	-.7	-1.	2.9	14	1035.06	
-212.5											2		
-200.0	-4.	-2.	-4.	-1.	-5	-1.	-5	-5	-6.	-5	0	1035.06	
-187.5											-4		
-175.0	-2.	-2.	-1.	-2.	-2.	-2.	-2.	-2.	-6.	-8.	-12	1039.83	
-162.5											-5		
-150.0	.81	-3.	1.0	-2.	.81	-3.	.40	.40	-3.	-13	-7	1043.39	
-137.5											-27		
-125.0	1.6	-2.	1.3	-1.	.21	-2.	-.8	-.8	-4.	-11	-4	1053.74	
-112.5											0		
-100.0	2.4	-1.	1.6	-1.	-.5	-.5	-1.	-1.	-2.	-2.	-5	1065.51	
-87.5											-3		
-75.0	1.9	-1.	2.4	0	1.3	1.1	.78	.78	.78	5.0	0	1077.27	
-62.5											-7		
-50.0	-.7	-1.	-1.	-.2	-3.	.96	-3.	-3.	-3.	5.1	-5	1086.27	
-37.5											0		
-25.0	-.4	-1.	-.9	-4.	-1.	.61	-1.	-1.	-1.	2.0	-1	1091.86	
-12.5											-1		
0.0	-2.	-1.	-2.	-.8	-3.	-.2	-2.	-2.	-3.	-1.	0	1095.42	
12.5											-5		
25.0	-.9	-1.	-1.	-1.	-2.	-.5	-2.	-2.	-2.	-2.	10	1098.18	
37.5											8		
50.0	-1.	-1.	-1.	-.7	-1.	-.5	-1.	-1.	-2.	-3.	16	1099.75	
62.5											-20		
75.0	-1	-.9	-1.	-.7	-1.	-.9	-2	-2	-3	-4.	16	1099.75	
87.5											24		
100.0	-1.	-1	-1.	-.9	-1.	-1.	-1.	-1.	-3.	-5.	-7	1099.75	
112.5											-23		
125.0	-1.	-.6	-.8	-.8	-1.	-1.	-1.	-1.	-3.	-6.	-20	1099.75	
137.5											8		
150.0	-1	-1	-1	-.5	-1.	-.6	-1.	-1.	-2.	-3.	16	1099.75	
162.5											-13		
175.0											1	1099.75	
187.5											10		
200.0											18	1099.75	

Appendix 2.--*Profile data listing for Jabal Mohr area* [continued]

FILE> MOHR4N PROJECT> WADI BIDAH LINE> 400N UNITS> METERS

STATION	SLINGRAM										SP	TOPO	MAG
	Frq	111		222		444		888		1777	mv.		nT
	re.	im.	re.	im.	re.	im.	re.	im.	re.	im.			
-350.0											-7	1007	
-337.5											-13		
-325.0											-18	1006.21	
-312.5											-22		
-300.0	.05	.10	-.0	-.1	.36	-.7	-.4	-.4	-.5	-1.	-19	1005.43	
-287.5											-23		
-275.0	1.1	.10	1.2	0	.35	-1.	-.1	-.1	-.4	.40	-11	1008.59	
-262.5											-16		
-250.0	.05	0	.15	0	-.4	0	.15	.15	.05	2.9	-18	1007.8	
-237.5											-8		
-225.0	2.6	0	3.3	.10	3.9	1.8	.68	.68	.17	-.7	-22	1002.21	
-212.5											-12		
-200.0	1.9	0	2.0	0	1.3	-.7	1.0	1.0	.59	-1.	-39	1006.58	
-187.5											-27		
-175.0	9.6	.10	9.7	-.3	5.7	-2.	5.0	5.0	4.4	-1.	-33	996.678	
-162.5											-21		
-150.0	4.0	.10	4.4	.10	2.9	-.7	1.7	1.7	-.0	-3.	-30	990.259	
-137.5											-34		
-125.0	-.5	-.1	-.4	.20	-.0	-.4	.05	.05	-.5	-2.	-29	991.045	
-112.5											-28		
-100.0	.50	0	1.7	-.8	-.1	-.3	-.4	-.4	-1.	-2.	-36	994.603	
-87.5											-30		
-75.0	13.	-1.	11.	-3.	8.3	-.3	8.1	8.1	7.2	-1.	-29	1006.85	
-62.5											-26		
-50.0	19.	-3.	14.	-4.	11.	0	10.	10.	8.6	.23	-26	1021.64	
-37.5											-29		
-25.0	7.6	-2.	7.0	-2.	5.6	0	5.1	5.1	4.9	1.9	-24	1031.53	
-12.5											-18		
0.0	3.3	-1.	1.4	-.3	.80	.31	.70	.70	.49	1.8	-11	1037.54	
12.5											-31		
25.0	.10	-.7	2.8	0	-.0	.30	.10	.10	.50	2.0	-33	1041.09	
37.5											-34		
50.0	-1.	-.7	-1.	-.5	-2.	-.6	-2.	-2.	-2.	-3.	-27	1043.06	
62.5											-32		
75.0	-1.	-1.	-1.	.60	-1.	-1.	-1.	-1.	-3.	-6.	-26	1044.24	
87.5											-27		
100.0	-1.	-1.	-1.	-1.	-2.	-2.	-2.	-2.	-5.	-12	-34	1045.03	
112.5											-19		
125.0	-2.	-2.	-2.	-1.	-2.	-2.	-3.	-3.	-5.	-11	-7	1045.42	
137.5											-11		
150.0	-1.	-1.	-2.	-1.	-3.	-1.	-3.	-3.	-4.	-7.	-41	1045.81	
162.5											-3		
175.0											-23	1046.2	
187.5											13		
200.0											-8	1046.6	