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Tittel

EM survey in the Bidjovagge region in 1986.

Forfatter	Dato År	Bedrift
Lakanen, Ensio	6/6 1986	Outokumpu OY

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Kautokeino	Finnmark			

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Malm/metall	

Sammendrag / innholdsfortegnelse

Data acquisition by EM37 in Area 43 was successfully completed in April 1986. 3 km long zone was covered by 18.1 line km or 346 occupied stations measured. A skidoo was very useful and regardless of long distance from the road the survey was carried out quickly. No power lines or any other manmade sources existed here. Data processing and interpretations were straightforward using avaliable programs. There were many good conductive zones already known causing anomalies. The most interesting zone could be followed only partly, because of another close shallow parallell conductor masking its continuation to moderate depths.

EM31 measurement in Suovrarappat can be regarded successful, because a larger area with homogeneous conductivity could be delineated. Some magnetic data analyses and drilling are recommended followed by mise-á-la-masse measurements in the both areas. Spectral-IP would be interesting to test in Suovrarappat.

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Summary

Data acquisition by EM37 in Area 43 was successfully completed in April 1986. 3 km long zone was covered by 18.1 line-km or 346 occupied stations measured. A skidoo was very useful and regardless of long distance from the road the survey was carried out quickly. No power lines or any other man-made sources existed here. Data processing and interpretation were straightforward using available programs. There were many good conductive zones already known causing high anomalies. The most interesting zone could be followed only partly, because of another close shallow parallel conductor masking its continuation to moderate depths.

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Introduction

Transient or time domain EM (TDEM) method has been noticed suitable for fast deep reconnaissance sounding and profiling in prospecting of massive sulfide orebodies, which are good conductors. The depth penetration of the method depends on the resistivity of the ground, the size of the energizing loop and the current intensity flowing in the loop. In quite resistive ground (> 1000 ohmmeters) and with a reasonably large loop and portable power source, the depth range to detect middle sized orebodies is down to 500 m. The method is geometry dependent, which means that profitably situated bodies, i.e. as large projection as possible is parallel to the loop and below it, produce multifold anomaly intensities compared to perpendicular position. So the system is sensitive to horizontal bodies below the loop, and vertical ones outside the loop. Therefore quite resistive halfspace below the loop produces anomaly level that limits the detectability of a deep target. Also a suitably situated conductive host rock layer or dike with a large parallel projection causes a marked anomaly threshold. It is self-evident that power grid lines can also have harmful effects to this kind of sensitive system.

More detailed description of the method was included in the preliminary plan, report 13th of March, 1986, "Geophysical operations in the Bidjovagge region in spring 1986".

EM31 and Gefinex 200 devices are "one-man" slingrams, with rigid fixed coil systems 4 and 0.9 m long, 40 and 50 kHz operating frequencies respectively. EM31 is also made by Geonics Ltd in Canada and it is calibrated to indicate ground conductivity in units, mS/m by its measured out-of-phase component, which has a certain quite linear part from 1 to 1000 mS/m or 1000 to 1 ohmmeters. Its depth penetration is limited by the high frequency to an average of 5 m, but it may be even 15 - 20 m in a highly resistive environment. 4 m long coil separation makes it insensitive to conductive boulders except very large ones.

Gefinex 200 is a modern version of Proxan made by Outokumpu Oy. It is mainly aimed to boulder hunting, to trace conductive boulders 0.5 to 1 m in diameter. Its coils are in a maximum coupled position and it measures both in-phase and out-of-phase components. Its depth penetration is normally less than 5 m, but a larger good conductor can be observed at a depth of even 10 m. When the overburden is thin it can also be used to bedrock conductivity mapping indicating all the minor changes.

Broadside configuration of slingram means that the coils are parallel to geological strike and cross over the petrological frontiers at the same time. This system is effective to delineate elongated parallel narrow conductors. Every crossover causes an anomaly turnover, besides when the conductor is too thin, too deep or diagonal so that the both coils are not above it just at the same time. The negative values are obtained only when the both coils are inside the same conductor. So the edges of the conductors are mapped accurately. This configuration is not popular, because it needs an open space to be as fast as normal slingram, when the reference cable in between gets stuck to trees and bushes. The overburden must be quite thin before negative anomalies can be obtained above conductors underneath it.

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Survey details

Equipments were transported from Espoo Finland to Kautokeino by the Finnish technician, Jouko Longi, who was the operator of EM37. Survey initiated on the 2nd of April and was finished till the 18th of

April, a total of 13 working days. Geophysicist Ensio Lakanen attended from 14th to 17th of April and carried out EM31 and Gefinex 200 surveys.

EM37 Equipment

The ground transient EM device EM37-3 is manufactured by Geonics Ltd., Canada. This instrument was first introduced in 1980, but has been updated so that this unit is the latest No. 3 version delivered in 1984.

Transmitter consists of a console weighing 20 kg and power unit with 5 HP Honda gasoline engine coupled to 120 V, 3-phase, 400 Hz alternator weighing 60 kg. Output power is 2.8 kW, maximum current 30 A and voltage 150 V. The transmitter loop was built up with 4 mm^2 isolated copper wire; 9 reels with 400 m, 20 kg each were available. The current waveform in the transmitter consists of alternating bipolar current pulses with a slow exponential turn-on and a rapid linear shut-off (turn-off) time depending on the loop size and current, normally less than 0.5 ms. The repetition rate can be set at 2.5 or low, 6.25 or medium, and 25 Hz or high.

Receiver consists of a console weighing 22 kg and air-cored 100 cm dia. coil weighing 8 kg. A coil holder is supplied to facilitate measurement along three axes. The measured quantity is the time rate of decay of magnetic flux at 20 logarithmically spaced time channels covering range from 0.08 at high to 80 ms at low repetition rate. 4 digits plus sign LED display is used and integration time can be selected from 2^n (n = 4, 6, 8, 10, 12, 14) cycles at 25 Hz. The effective area of the coil is about 100 m^2. Synchronization of receiver to transmitter can be maintained with oven controlled high stability quartz crystals. Receiver energy is taken from 12 V rechargeable NiCd batteries of 20 Ah.

At the receiver the induced voltage in the coil is measured in millivolts. The reading is normalized by dividing with the effective area of the coil and the current in the transmitter loop and is written in nanovolts per A x $meter^2$ (nV/Am^2).

KTP-84 is a data logger or digitizer and recorder, also called a field computer manufactured by Rautaruukki Oy, Finland. EM37 interface KTP-EMI and software were made during 1985 and was introduced in January 1986. The interface is built in EM37

receiver unit, but the data logger is a separate box weighing about 1 kg. It is plugged into EM37 via the interface and records all the readings and parameters after every measurement when pushing a button. It has 120 kb RAM and 40 kb ROM memory, one station having two components by two measurements each (offset compensation) takes about 1 kb. It is almost impossible to fill the memory in one day. The memory contents can be transferred into a KTPCU or cassette unit or right away to a micro. We have made the reading program for HP 9845, for which we have also processing and interpretation programs. It could be any other micro, which has RS232 port. It is good to have this micro in the field camp, but if processing is not necessary during the survey, a cassette unit and a printer is enough to restore the data. This data logger saves time in the field about one minute per measurement, and it is convenient when windy, cold or rainy weather prevails. It saves again one minute per measurement when manual writing into a computer can be skipped.

Surveys

Area 43, appendices 1/1 was surveyed by time domain EM (TDEM) method. EM37 equipment was used in a normal fixed loop mode meaning that the transmitter is located in a fixed position feeding a large loop, here 300 x 500 m^2, and the receiver with the coil moves from station to station along survey line. Here 4 - 5 lines or profiles were measured with one transmitter position, and they cross the loop continuing outside of it. Then one loop is finished it is moved to the next location. Here all the known conductors were vertical or nearly vertical, and there were at least three parallel long conductors only few hundred meters separated from each others, the most interesting zone in the middle dipping little to west. It was concluded that the transmitter loop must be outside the interesting zone in the western side, and to eliminate the response of the western conductor as much as possible the loop was laid down above it, the centre little to east of its middle point. The moment of the loop will in that case be parallel to the western vertical conductor and excite it only little, but the middle conductor will be intersected perpendicularly with strong excitation. The most eastern conductor will also be intersected by the moment, but with weakened energy. The measured profiles are mainly located in the eastern side of the loop.

Six transmitter locations were needed to cover the three kilometer long area each with five profiles spacing 100 m, except the most northern loop having

four profiles and two 200 m spacings, appendix 1/2. Spacing between stations was 50 m. The length of the lines varied from 350 to 900 m totalling 18.1 km, 29 lines, 346 stations. At the end one smaller loop 200 x 200 m^2 was laid down to a closer position of the interesting zone and five more lines with 50 m spacings were measured. This gave 1.75 more linekilometers and 40 stations. Two components along Z (vertical) and X (parallel to lines) axes were recorded. Repetition rate of 6.25 Hz or medium, integration time n = 10 and gain N = 7 were used.

Two men crew with a motor sledge (skidoo) could work very fast in this open hill area. Long distance from the road consumed time, but the average of 30 stations per working day can be regarded to be a fine figure. Variable weather caused some trouble with snow storm or fog threatening to mislead the surveyors. The long distance assured that there was no trouble with civilization, power lines etc. The instrument worked well all the time even when the temperature was less than -20 °C.

The profiles are divided according to the loop number from south to north, the smaller loop being the last one, appendices 2 - 8. Each profile's Z and X components are plotted, all the 20 channels logarithmically in scale 1 : 5000. Thin plate models interpreted are included for Z component anomalies where appropriate. Depth inversion or DIT-plots have been processed and plotted, too, though their value is not indisputable for vertically dipping conductors. Contoured maps of the channels nos. 5 and 15 for both components are drawn, appendices 9/1 - 9/4, the last one bearing the projections of interpreted conductors.

Data processing and interpretations have been carried out by HP9845 micro having 512 kb memory and programs made by Outokumpu Oy, Exploration. There was one micro already in Kautokeino so that processing could be started on the spot, and so the data was evaluated all the time during the survey. There was a trouble with one micro, which had to be exchanged in our Rovaniemi office. Interpretation of TDEM data is mainly qualitative. The fixed loop mode is good at locating conductive bodies, but does not indicate accurately their geometric or physical parameters. Particularly when there are two or more conductors close together as it was the case in Area 43, we have no way to calculate mutual inductances and handle complex situations.

Slingram (MaxMin II) and magnetic profiles were also measured in the area and the broadside configuration tested in three profiles. Their data are not depicted in this report. The used coordinate system in Area 43 is local and can be traced in appendix 1/2.

Suovrarappat, appendix 1/3, is a known small, but rich Cu-mineralization in the middle of graphite schists. Only airborne and old Turam data were available here. Now magnetic and Slingram (also broadside) profiles were measured, and a detailed survey with EM31 and Gefinex 200. Only 10 m line spacing and five meter point spacing were used with the last mentioned. Actually these devices were measuring continuously so that no big changes could have missed between points. Contoured maps of the results have been drawn after correcting the location errors, appendices 11/1 and 11/2. This survey took about two hours per instrument by one man.

Results

Anomalies in the Area 43 are strong and expected, no remarkably new information was obtained by TDEM survey. The known mineralization zone (abbreviated here as MZ) in the profile O, app. 5/1, is clearly indicated, but the more eastern conductor (abb. EC) is only about 150 m apart. Turnovers in Z-component and maxima in X-component are distinct and sound. The mineralized zone is somewhat less conductive, because the later channels do not indicate it as clearly. The western conductor (WC) is about 400 m apart and only half-shown.

In the next profile (P) 100 N, app. 5/2, the continuation of MZ is weak but visible. EC is very strong again, but the profile is too short to show WC. When looking at the X-component and DIT-plot, app. 5/7, it seems like MZ anomaly would be caused by a deeper source and there is a gradual moving of the maximum towards east in the later channels. This can be interpreted by three ways: 1. There are two weak parallel vertical conductors very close together, 2. one weak conductor is dipping east and 3. one medium conductor is at the depth of about 50 m. I favor the last one, but it could also be an edge effect with no conductor just below.

P 200 N, app. 5/3, contains still continuations of MZ and EC. Now MZ anomaly is without doubt caused by a shallow weak conductor with little depth extension. EC is the same as before.

In P 300 N, app. 5/4, there is only EC anomaly visible and it is somewhat weaker. The same continues in P 400 N, app. 5/5. There are some minor changes in X-component, which cannot be explained.

Profiles 500 - 900 N, app. 6, follow up the marked EC anomaly, which gets stronger towards north. X-component is widest in P 600 N narrowing again to north. DIT-plots indicate that EC-anomaly dominates here meaning that WC is weakened, missing or farther away.

1000 N, app. 7/1 gives a slight anomaly telling that EC has finished and this is the response of its edge between 900 and 1000 N. This is longer line to west and shows WC again. Next two profiles are practically empty, but the last one 1500 N, app. 7/4, shows EC anew, probably starting little more to north.

When going to south in P 100 S, app. 4/5, MZ anomaly is very strong, now almost all the channels turn over. X-component gets broader. P 200 S, app. 4/4, has a weaker MZ and still broader X-component. The upper surface of MZ is plausibly plunging deeper towards south. DIT-plot, app. 4/9, indicates only slight increase of depth.

P 300 S, app. 4/3, means more radical change of MZ. Either it is markedly deeper or has ended, and the anomaly, which is closer to EC is caused by the edge. DIT-plot, app. 4/8 is as if MZ-effect were missing. P 400 S, app. 4/2, has only minor indication of MZ in X-component. DIT-plot, app. 4/7, is, however, rather tight, like in a good gently dipping conductor. This may not be important, I do not know the behavior of DIT so well.

P 500 S, app. 4/1, sees no MZ at all, except in a DIT-plot, app. 4/6. WC is again clearly shown, as the line goes long enough to west. Small changes at point 150 W are just where the cable of the transmitter loop is located, and it is propably an effect of measuring first inside when outside the loop.

P 600 S, app. 3/5, is different in nature, as the earlier channels of Z-component are negative in a wide zone from 50 to 250 W. DIT-plot, app. 3/10, has long tails now, and there are like three vertical conductors. Explanation to this odd behavior is observed when looking at the contoured map, app. 9/1.

The same kind of responses are still stronger in P 700 S, app. 3/4. The anomaly of EC has a change of turnover from higher to lower channels, probably caused by two intermingled anomaly sources. P 800 S, app. 3/3, has even three-fold anomaly of EC in X-component, and two-fold of WC. EC-anomaly has moved 100 m to west, and this bending explains at least part of the multifold anomaly pattern. WC is either thicker here or has two parallel zones. DIT-plot, app. 3/8, has got some near-surface tails, 200 - 350 W, which often mean more conductive overburden.

P 900 S, app. 3/2, is somewhat more peaceful, no further movement of EC, but it is little stronger indicated. DIT-plot, app. 3/7, has still the near-surface tails, but the indications of the conductors are clearly deeper. This is caused by overall change to more negative values in Z-component, and this is probably caused by the edge current. This is a proven fact when looking at P 1000 S, app. 3/1, where EC has almost died off. WC is still two-fold. In the DIT-plot, app. 3/6, the thickening of WC is quite visible, EC is only weakly and deeply indicated.

In the profile 1100 S, app. 2/5, EC is totally missing. Some small indication of X-component starts to develop at 150 W. This is more pronounced in 1200 S, app. 2/4. It is like plunging deeper to south, as in P 1300 S, app. 2/3, it is seen at lower channels (100 W). DIT-plots are just rising gradually towards WC. A new small indication starts in P 1400 S, app. 2/2, at 150 W, and it is more marked in P 1500 S, possibly causing two-fold pattern in Z-component, too. In the DIT-plot, app. 2/6, some more near to surface tails are formed at 150 W and eastward.

All these TDEM behaviors caused by three-dimensional bodies are not easy to interpret even qualitatively, but they must be studied against other information. They do give a hint of something, but to explain what, that is a problem.

When looking at the contoured maps of app. 9, one must recall that the Z-component of vertical thin plate has a turnover just above the plate, and X-component has a maxima. If the plate is thick or more horizontally dipping Z gets the maximum in the middle of plate and X has a turnover. This can become effective also when two parallel close together thin plates exist.

X-component, channel No. 15, app. 9/4, seems to give the best overall picture of the surveyed area. The projections of the interpreted conductors are included in this appendix. Here is also something new, almost perpendicular, negative anomaly zone cuts both WC and EC in profiles 900 and 1000 S respectively. EC is totally finished here. This may be caused by a magnetized dike, and not just a fracture zone, because it is so clear in the later channels. This feature is also seen in the Z-component, app. 9/3.

To investigate more thoroughly the southern plunge of MZ a small 200 x 200 m^2 transmitter loop was laid down, the centre at 275 S, 125 E, and five profiles from 200 S to 400 S with 50 m spacing were occupied, app. 8. P 200 S, app. 8/5, is clearly caused by two good conductors as with the larger loop. Well separated two anomalies are still visible in P 250 S, app. 8/4. In the P 300 S the earlier channels indicate one thick plate while the later channels separate the two plates, and so does DIT-plot, app. 8/8 (note that the appendix numbers are mixed here and getting smaller to north). The same widening of the anomaly is seen in P 350 S, app. 8/2, but only one in P 400 S, app. 8/1, can be observed. DIT-plot, app. 8/10, however, has a conductor indication at point O.

When compared to slingram results measured from 500 S to 200 N over MZ and partly EC are in good correlation with EM 37 results just discussed. The most intense anomaly is in P 50 N (not measured by EM 37), and broadside configuration delineates the conductor accurately to 60 W and is about 15 m thick. Anomaly continues to south getting smaller and wider. The zero level is so much on positive side that the minimum does not go to negative after 250 S, but can be interpreted as well after normalizing the readings. Even P 500 S can be interpreted with a conductive plate at a depth more than 60 m (not accurate due to lack of model results with a ratio more than 0.6 - depth to coil separation). In P 350 S plate is at a depth of 60 m. EM37 would give a distinct anomaly from that depth, if there would not be other conductors so close. A large loop TDEM has a poor resolution when there are more than one parallel conductor in question.

There are also three slingram profiles in the south, 1400, 1500 and 1600 S indicating many parallel conductors, just as EM37, but better.

Magnetic high correlates with diabase and MZ and EC are on its flanks. Diabase ends in the north in

P 150 N. More exact comparison is best to be made after having magnetic data processed.

Airborne data by Dighem correlate well regarding the accuracy of locating the anomalies. Magnetic high seems to be broken where TDEM anomalies were cut, too, c. P 1000 S.

Transient curves and time constants, app. 10/1, indicate relatively high values, even 12 ms at 600 N, 100 W, for instance. Unfortunately they are mainly due to graphite. App. 10/2 is to show one normal interpretation, P 500 S channel no. 10, as an example.

In Suovrarappat EM31 result was a nice surprise. It was hoped for that this instrument would give homogeneous conductivity readings above the known mineralization. The wish seems to be fulfilled, when looking at the data, app. 11/1. The intersection of the mineralization is in the western side of the space having very homogeneous conductivity of 7.4 to 7.7 mS/m. It is about 100 m long in E-W direction and 30 m in S-N direction. This is two or three times the area estimated for the outcrop earlier. The conductivity increases to three different directions to south, north and northeast getting the highest value 22 in north, where the zone is also narrowing. This is very probably caused by graphite, but where it changes from sulfides to graphite is impossible to say. A test was made in Bidjovagge mine on an open pit of the orebody B. The conductivity above the known ore was from 7 to 9 mS/m and graphite gave even 40.

Gefinex 200, still smaller EM instrument were also used, but the overburden thickness must be too much for it in order to behave as homogeneously as EM31, app. 11/2. What seems to be seen from the data are a zone with thinner overburden probably and a couple of outcrops or large boulders causing the highest readings. Interpreted overburden thicknesses vary from 0.5 to 5 m.

These data show no marks of really good conductors, (as in Area 43), and therefore the slingram anomalies are only moderate. Profiles with 50 m spacing is not enough to produce discriminating information. The width of the anomalies are the same as with EM31, when the coil separation is not subtracted. It is possible that the conductive zone has very little depth extension and even less on the outskirts of the zone.

Conclusions and recommendations

In Area 43 it is clearly evidenced that MZ is a good conductor for at least 300 m long. It seems to plunge toward south and it may also be possible that there are more than one conductive body in succession underneath as might be the case with a weak indication in P 200 N. Quite likely the conductor continues at least to 500 S the upper surface less than 100 m deep. Because of so close other shallow parallel conductor, EC, the anomaly of MZ is masked and cannot be better followed by TDEM. EC continues to 900 S bending rather sharply toward west in 600 - 700 S, and to 1000 N, starting again in about 1500 N. WC is quite continuous, only broken by the negative almost perpendicular zone in 900 S. WC is getting wider toward south or having a parallel conductor.

Magnetic data of a larger area should be interpreted for structural information and mise-à-la-masse method used to follow the intersected mineralized conductors in more detailed fashion. That is all geophysics can offer for this case; more knowledge must be gained from drilling.

Suovrarappat gave more than a hoped for result. EM31 delineated an extraordinarily homogeneous conductive area. It will be highly recommended to expose the bedrock to see, what it means. Magnetic data will be analyzed later. This might be a good test ground for spectral-IP.

Outokumpu Oy
Exploration

Ensio Lakanen
Research geophysicist

Jakelu : Kalle
3 Marjan
OKME

Abbreviations

TDEM	=	time domain electromagnetic method
	=	transient electromagnetic method
EM 37	=	Geonics Ltd.'s transient electromagnetic equipment
HI	=	High frequency = 25 Hz pulse frequency
MD	=	Medium frequency = 6.25 Hz pulse frequency
Z	=	Z- or vertical component of electromagnetic field (time derivative)
X	=	X horizontal " "
Y	=	Y " " "

(X is the direction of survey line, Y is perpendicular to it, note that X and Y are used as coordinate axes as well)

nV/Am^2	=	unit of the time derivative of the electromagnetic field normalized by the transmitter loop current (nanovolts per Ampermeter squared)
TR = Tx	=	transmitter
ch.	=	channel
DIT	=	depth inversion techniques = apparent resistivity versus depth inversion
Ra	=	apparent resistivity
mean	=	mean of apparent resistivity at one station
$\pm$ dec.	=	one order of magnitude more or less than mean
Rx	=	receiver

APPENDICES

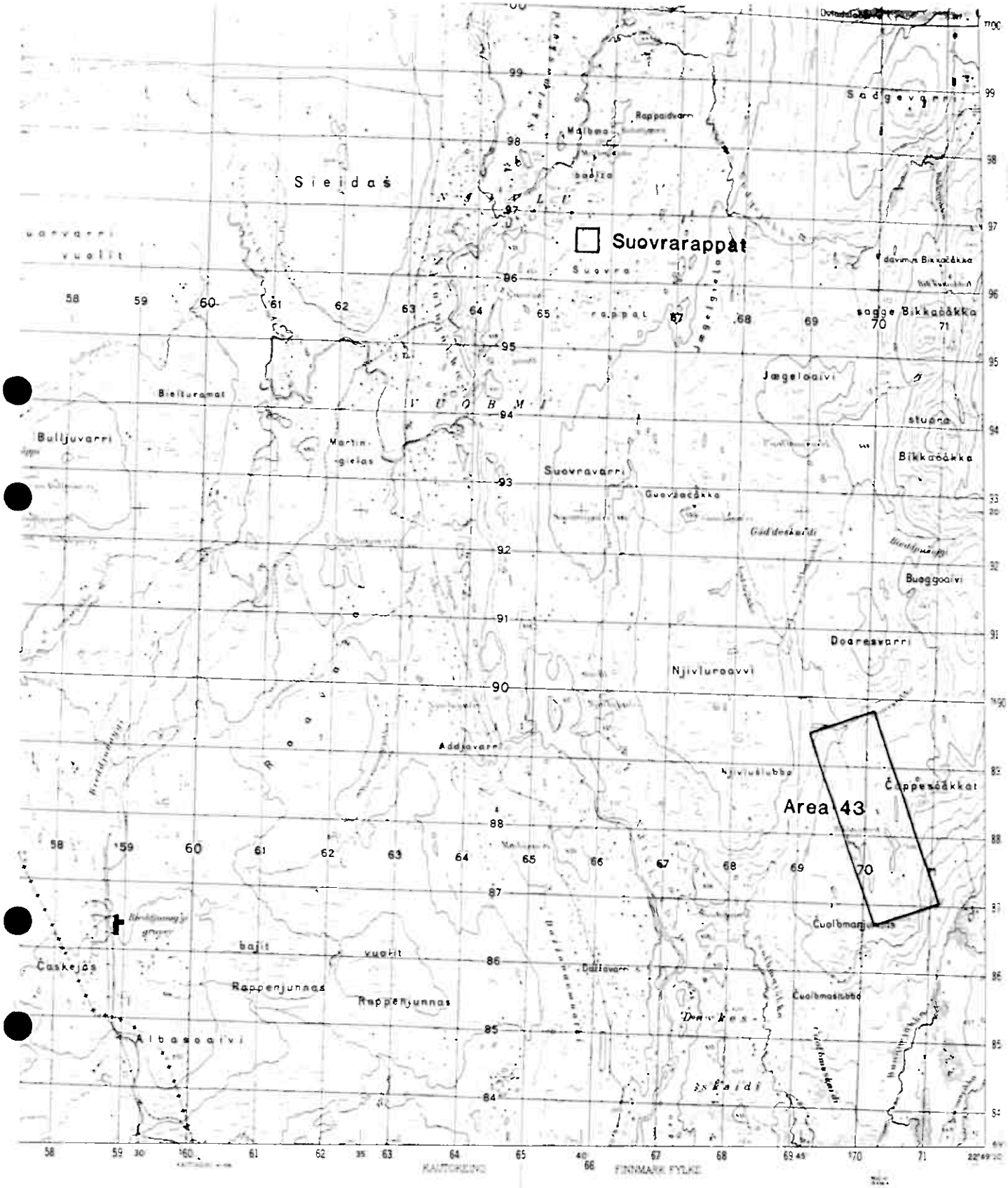
1/1	Overall survey layout c. 1:80000	
1/2	Area 43 TDEM survey layout 1:20000	
1/3	Suovrarappat EM31 survey area 1:20000	
2/1	Area 43, TDEM-profile 1500 S, Z- and X-components	1:5000
2/2	" " 1400 S "	"
2/3	" " 1300 S "	"
2/4	" " 1200 S "	"
2/5	" " 1100 S "	"
2/6	" DIT-plot 1500 S	1:5000
2/7	" " 1400 S "	
2/8	" " 1300 S "	
2/9	" " 1200 S "	
2/10	" " 1100 S "	
3/1	Area 43, TDEM-profile 1000 S, Z- and X-components	1:5000
3/2	" " 900 S "	"
	and interpreted plate model	
3/3	" " 800 S "	"
	and interpreted plate model	
3/4	" " 700 S "	"
	and interpreted plate model	
3/5	" " 600 S "	"
	and interpreted plate model	
3/6	" DIT-plot 1000 S	1:5000
3/7	" " 900 S "	
3/8	" " 800 S "	
3/9	" " 700 S "	
3/10	" " 600 S "	
4/1	Area 43, TDEM-profile 500 S, Z- and X-components	1:5000
	and interpreted plate model	
4/2	" " 400 S, "	"
	and interpreted plate model	
4/3	" " 300 S "	"
	and interpreted plate model	
4/4	" " 200 S, "	"
	and interpreted plate models	
4/5	" " 100 S "	"
	and interpreted plate models	
4/6	" DIT-plot 500 S	1:5000
4/7	" " 400 S "	
4/8	" " 300 S "	
4/9	" " 200 S "	
4/10	" " 100 S "	

5/1	Area 43, TDEM-profile		0, Z- and X-components		1:5000
		and interpreted plate models			
5/2	"	"	100 N,	"	"
		and interpreted plate model			
5/3	"	"	200 N,	"	"
		and interpreted plate model			
5/4	"	"	300 N,	"	"
		and interpreted plate model			
5/5	"	"	400 N,	"	"
		and interpreted plate model			
5/6		DIT-plot	0	1:5000	
5/7	"	"	100 N	"	
5/8	"	"	200 N	"	
5/9	"	"	300 N	"	
5/10	"	"	400 N	"	
6/1	Area 43, TDEM-profile		500 N, Z- and X-components		1:5000
		and interpreted plate model			
6/2	"	"	600 N	"	"
		and interpreted plate model			
6/3	"	"	700 N	"	"
		and interpreted plate model			
6/4	"	"	800 N	"	"
		and interpreted plate model			
6/5	"	"	900 N	"	"
		and interpreted plate model			
6/6	"	DIT-plot	500 N	1:5000	
6/7	"	"	600 N	"	
6/8	"	"	700 N	"	
6/9	"	"	800 N	"	
6/10	"	"	900 N	"	
7/1	Area 43, TDEM-profile		1000 N, Z- and X-components		1:5000
7/2	"	"	1100 N	"	"
7/3	"	"	1300 N	"	"
7/4	"	"	1500 N	"	"
7/5	"	DIT-plot	1000 N	1:5000	
7/6	"	"	1100 N	"	
7/7	"	"	1300 N	"	
7/8	"	"	1500 N	"	

200 x 200 m^2 transmitter loop:

8/1	Area 43, TDEM-profile		400 S, Z- and X-components		1:5000
		and interpreted plate model			
8/2	"	"	350 S	"	"
		and interpreted plate model			
8/3	"	"	300 S	"	"
		and interpreted plate model			
8/4	"	"	250 S	"	"
		and interpreted plate models			
8/5	"	"	200 S	"	"
		and interpreted plate models			
8/6	"	DIT-plot	200 S	1:5000	
8/7	"	"	250 S	"	
8/8	"	"	300 S	"	
8/9	"	"	350 S	"	
8/10	"	"	400 S	"	

9/1	Area 43, TDEM contoured map 1:5000, channel No. 5, Z-comp.
9/2	" " " " " 5, X- "
9/3	" " " " " 15, Z- "
9/4	" " " " " 15, X- "
	and projections of interpreted plate models
10/1	TDEM transient decay curves, 12 stations
10/2	An example of plate modeling, profile 500 S channel No. 10, 1:5000
11/1	Suovrarappat EM31 contoured map 1:1000 in mS/m
11/2	" Gefinex 200 contoured map 1:1000 in-phase in percents



5 Kilometers
5000 Yards
3 Statute Mi

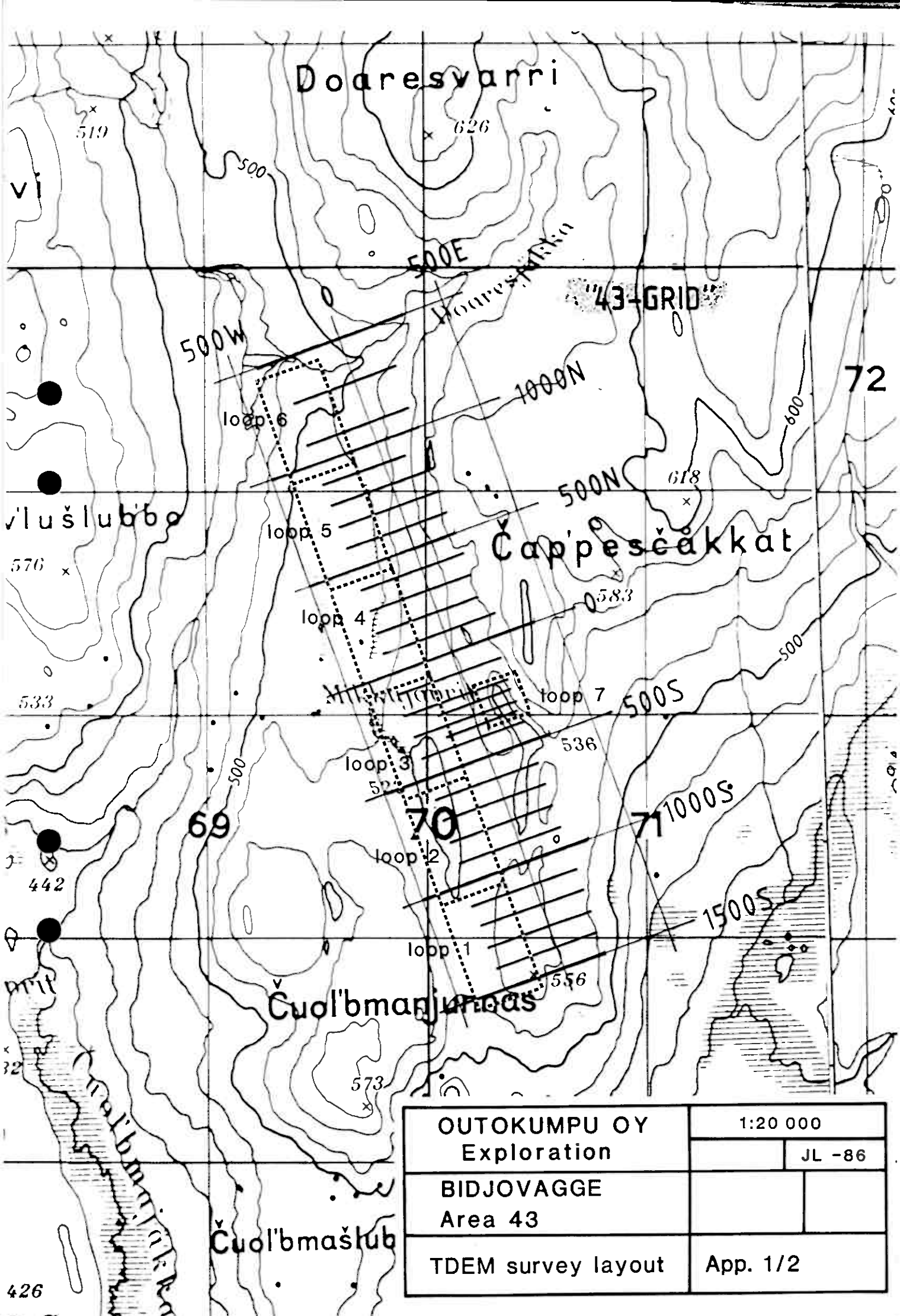
EKVIDISTANSE 20 METER

CONTOUR INTERVAL 20 METERS

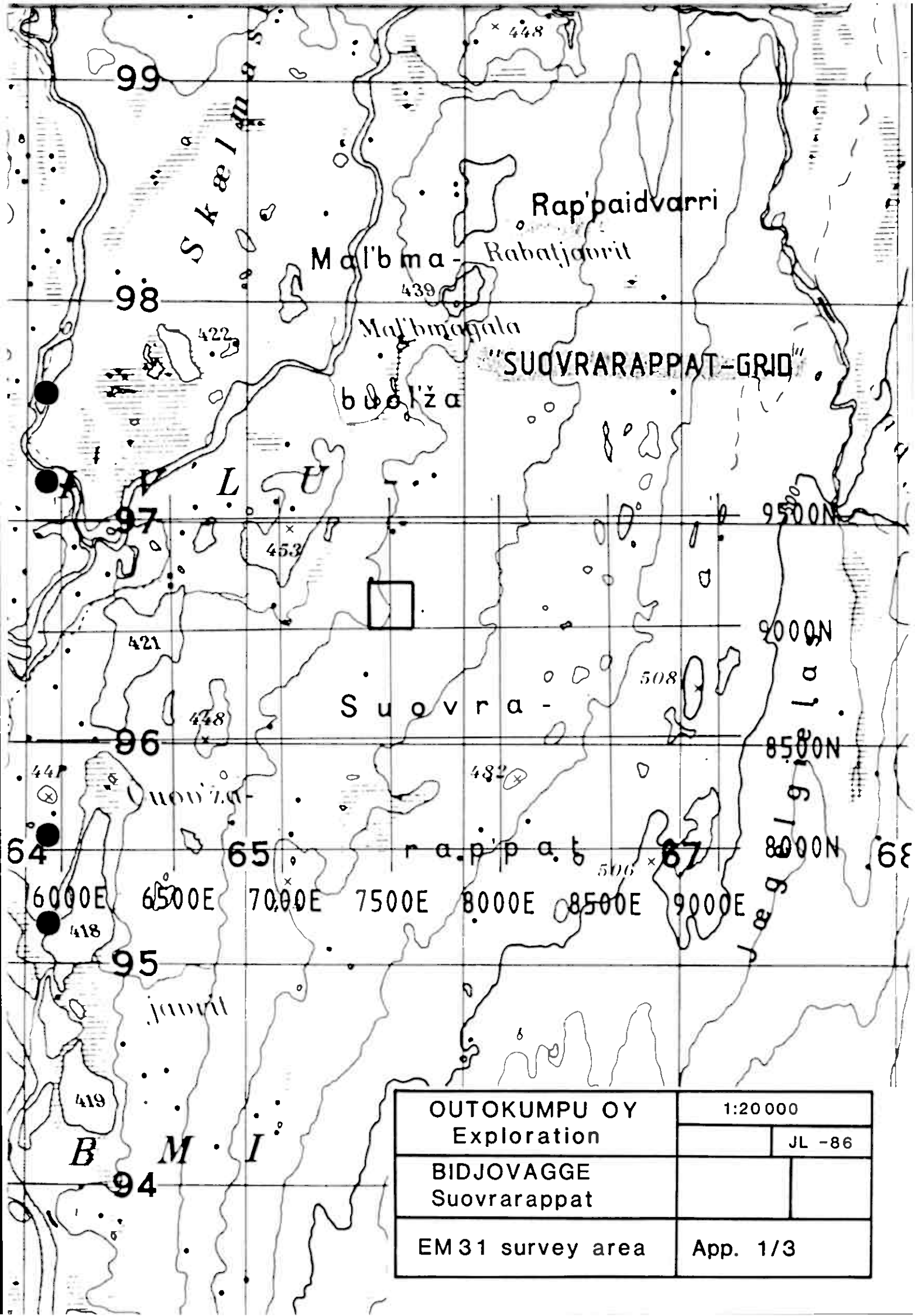
EUROPEAN DATUM

TRANSVERSE MERCATOR PROJECTION

OUTOKUMPU OY Exploration	
BIDJOVAGGE	
survey areas	App. 1/1



OUTOKUMPU OY Exploration	1:20 000	
		JL -86
BIDJOVAGGE Area 43		
TDEM survey layout	App. 1/2	



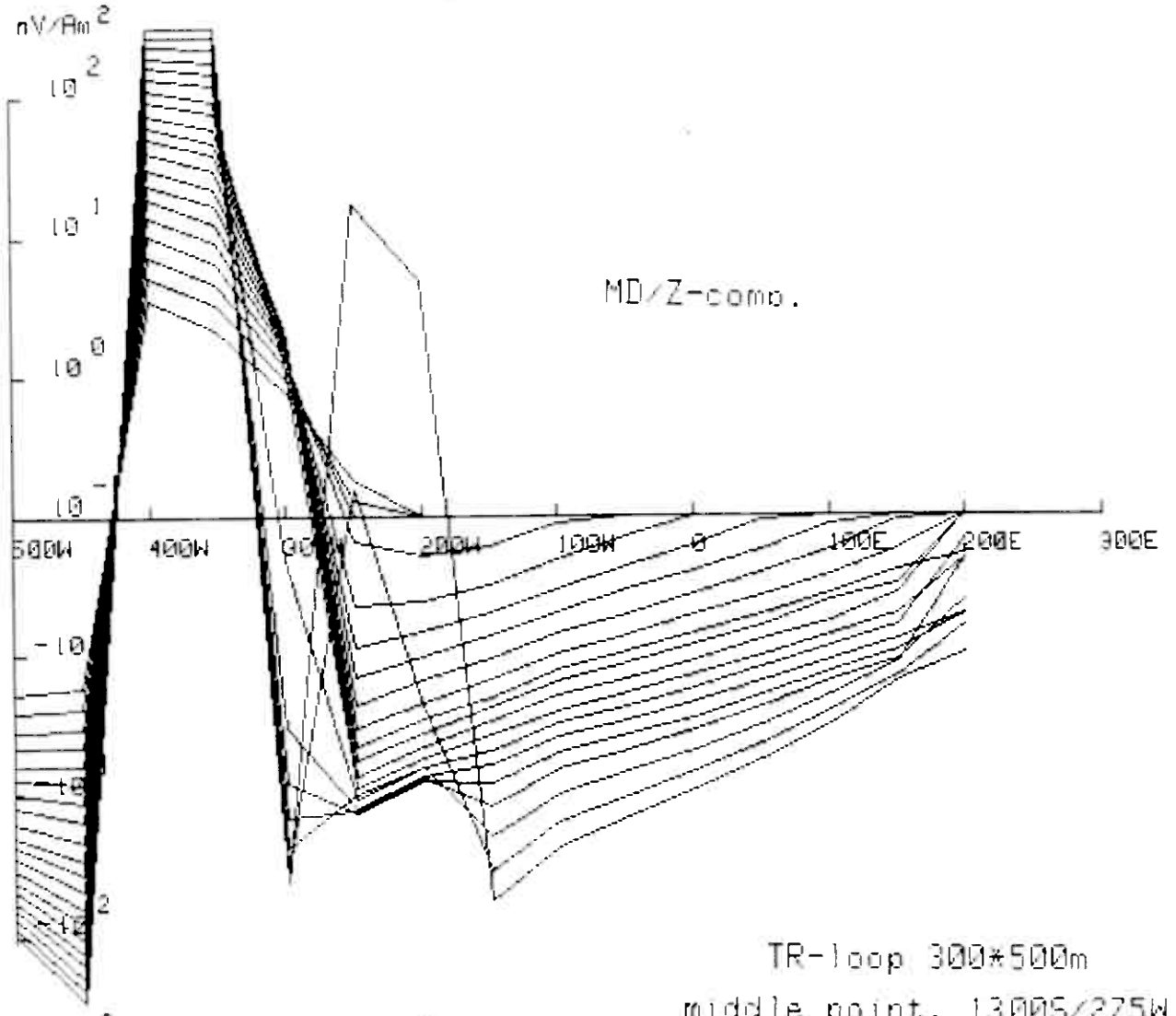
OUTOKUMPU OY Exploration	1:20000
	JL -86
BIDJOVAGGE Suovrarappat	
EM 31 survey area	App. 1/3

Appx. 2.

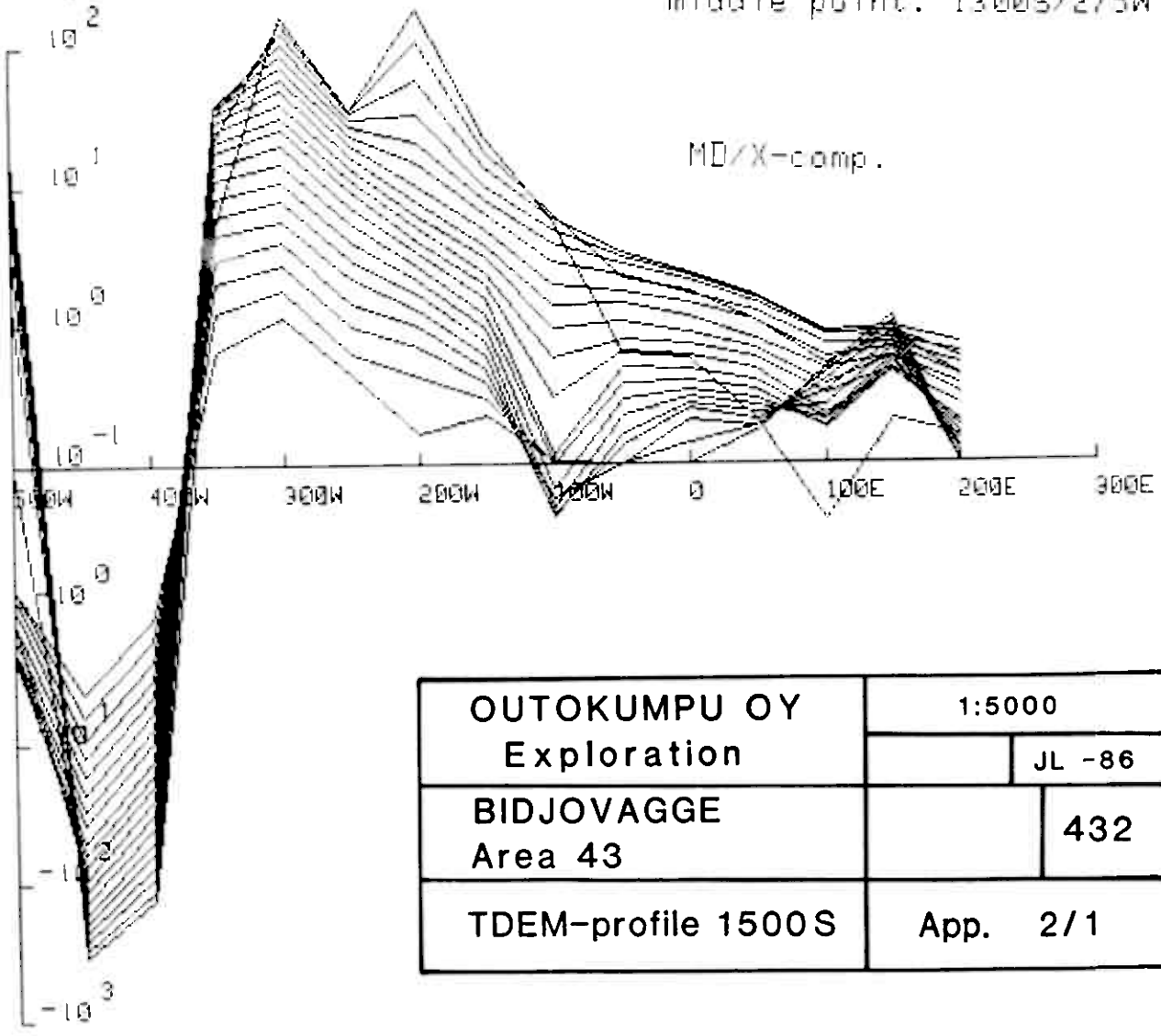
DIAMOND DRILLING PROGRAM AREA 43, 1986.

Drill hole	Profile	Coord.	Dip	Direction	Length
43- 8	100 N	100 W	45	Grid E	60 m
- 9	"	120 W	65	"	130 m
-10	200 N	125 W	50	"	65 m
-11	150 S	60 W	50	"	75 m
-12	300 S	50 W	50	"	130 m
-13	600 S	80 E	45	"	55 m
-14	900 S	50 W	40	"	50 m
-15	1500 S	225 W	40	"	60 m
-16	50 N	180 W	60	"	180 m
-17	0 N	190 W	65	"	260 m
-18	50 S	170 W	70	"	270 m
-19#	75 N	105 W	40	"	65 m
-20#	"	130 W	57	"	125 m
-21#	125 N	115 W	45	"	65 m
-22#	"	128 W	50	"	120 m

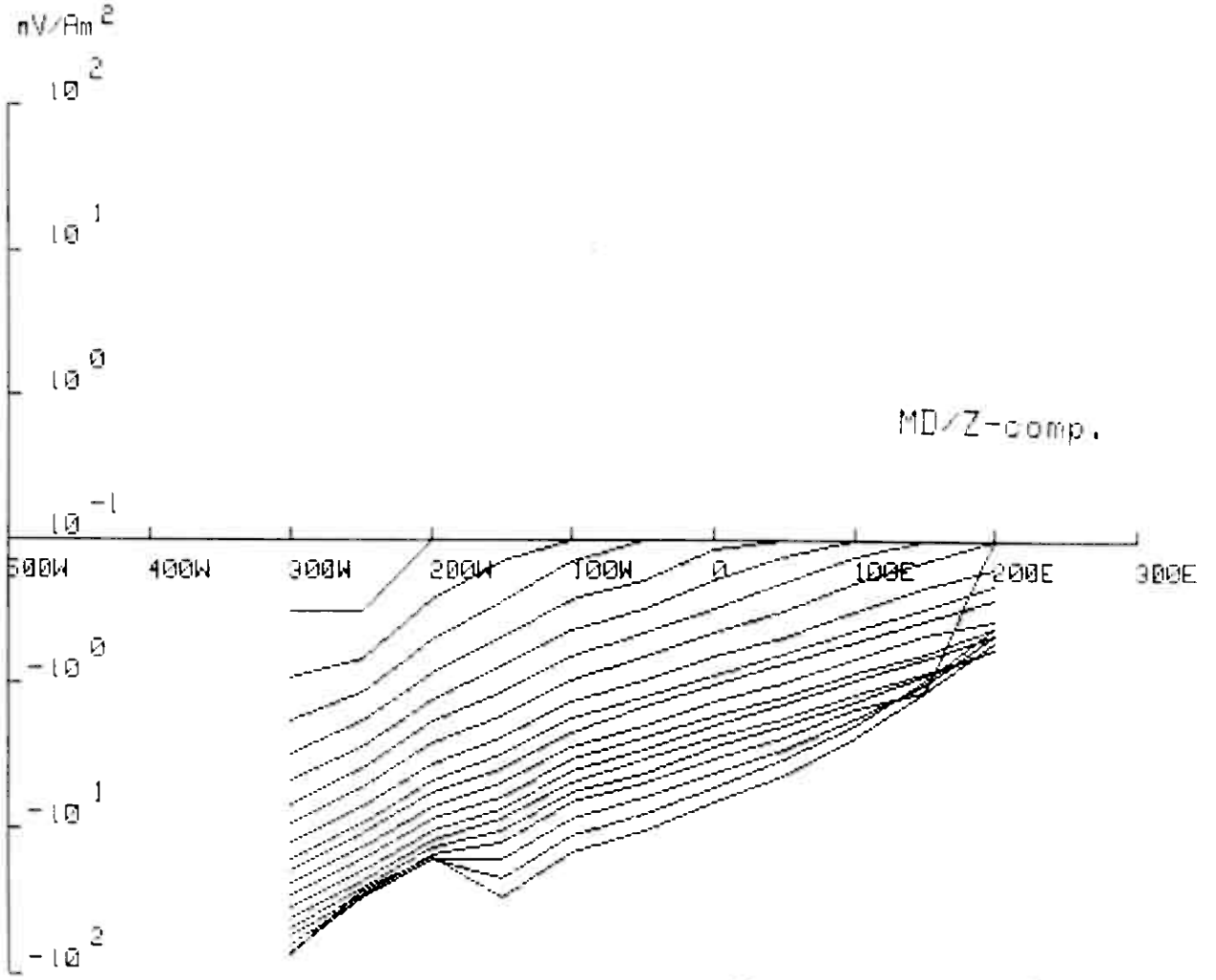
-To be drilled only in case of very positive results in holes 43-8 and 43-9. If not, one or two deep holes will be drilled as an alternative. Position of alternative holes will be decided after reviwing results from holes 8 to 18.



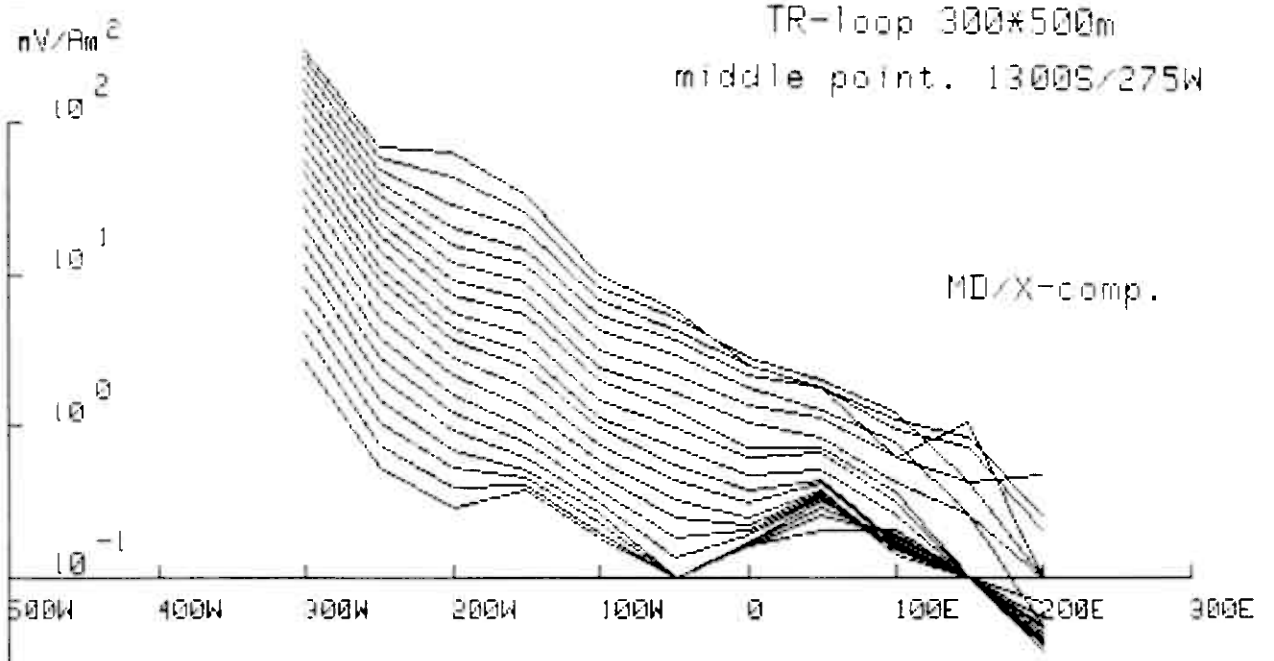
TR-loop 300*500m
middle point. 13005/275W



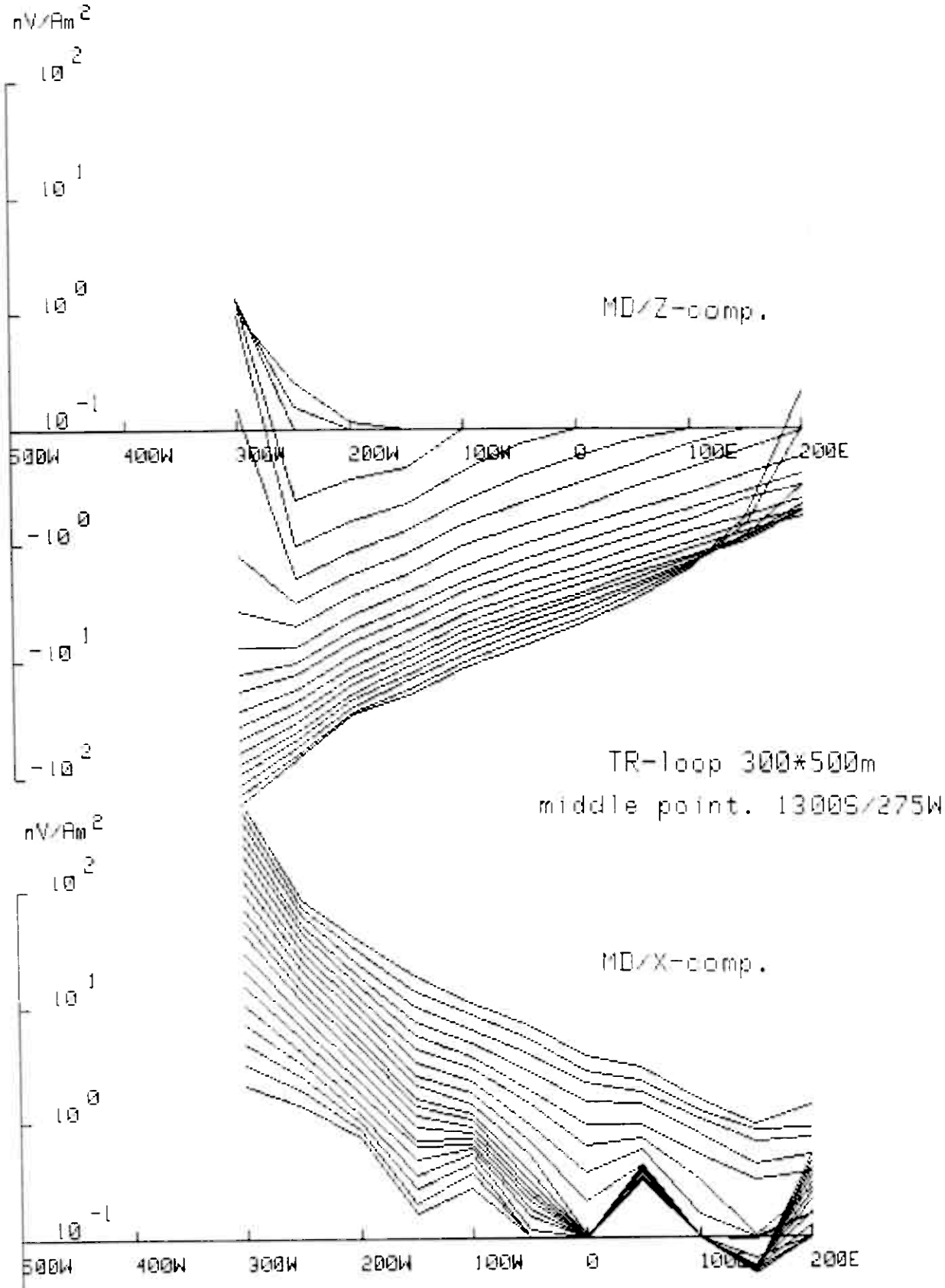
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 1500S	App. 2/1



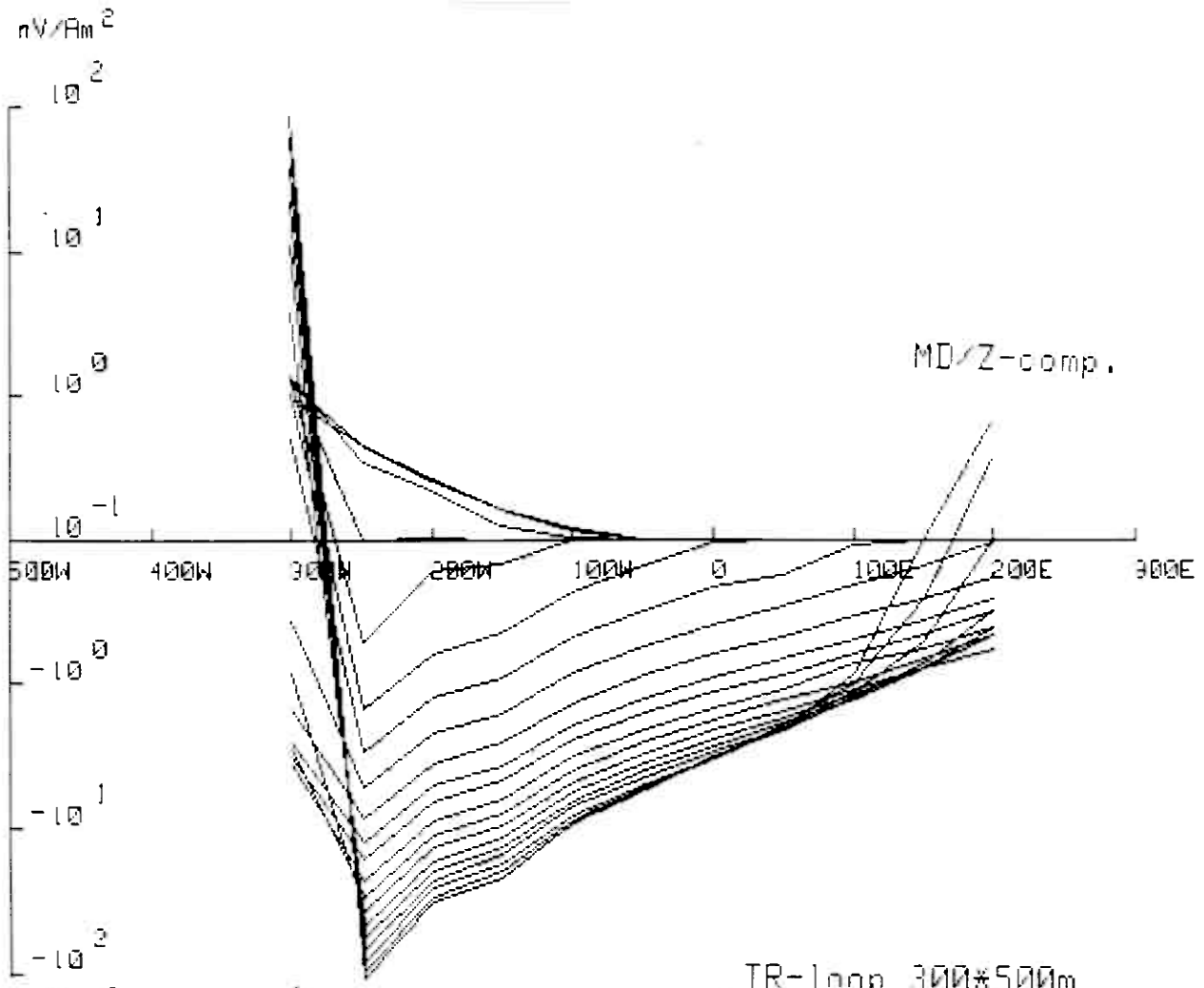
TR-loop 300*500m
middle point. 1300S/275W



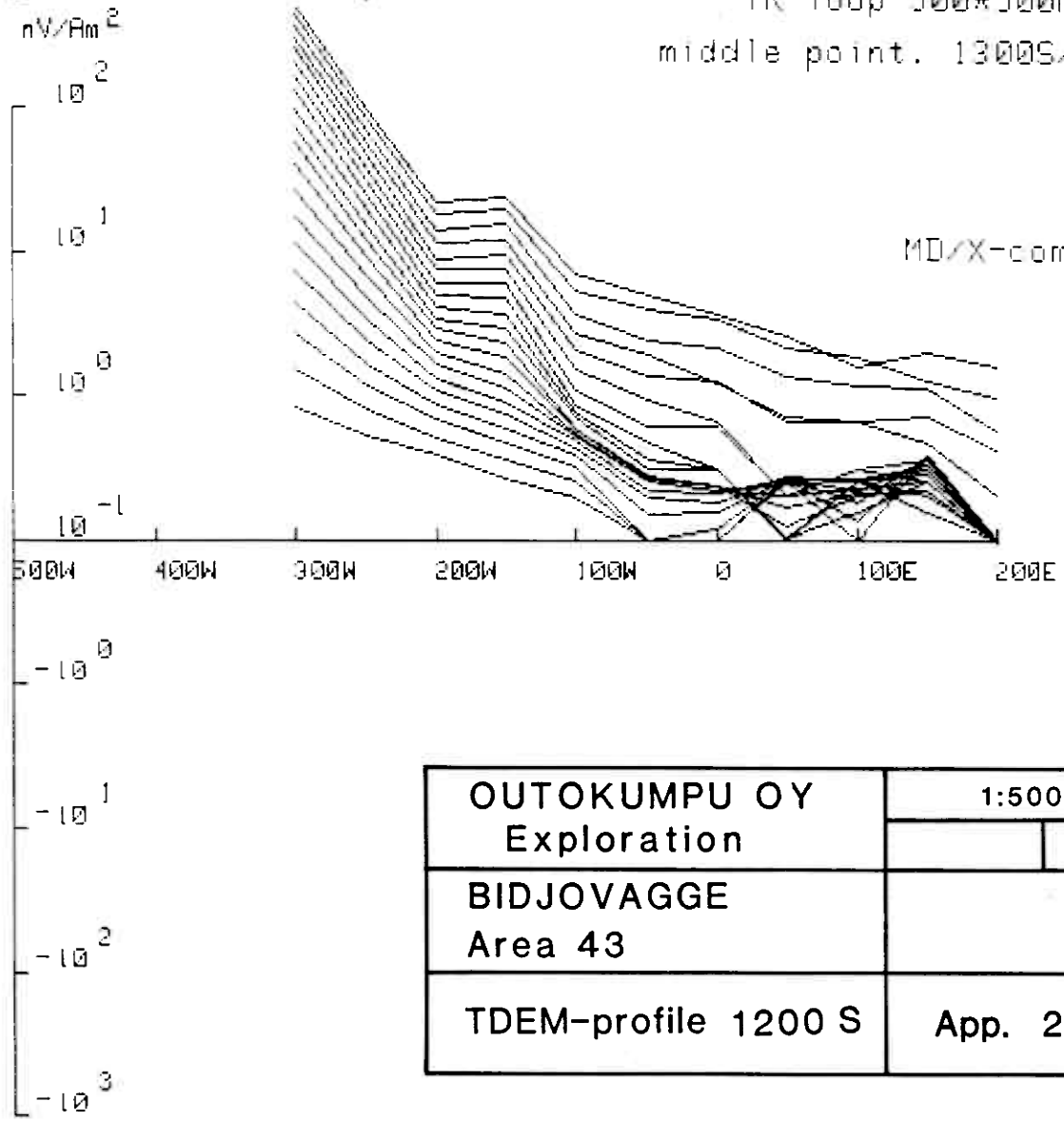
OUTOKUMPU OY Exploration	1:5000	JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1400 S	App. 2/2	



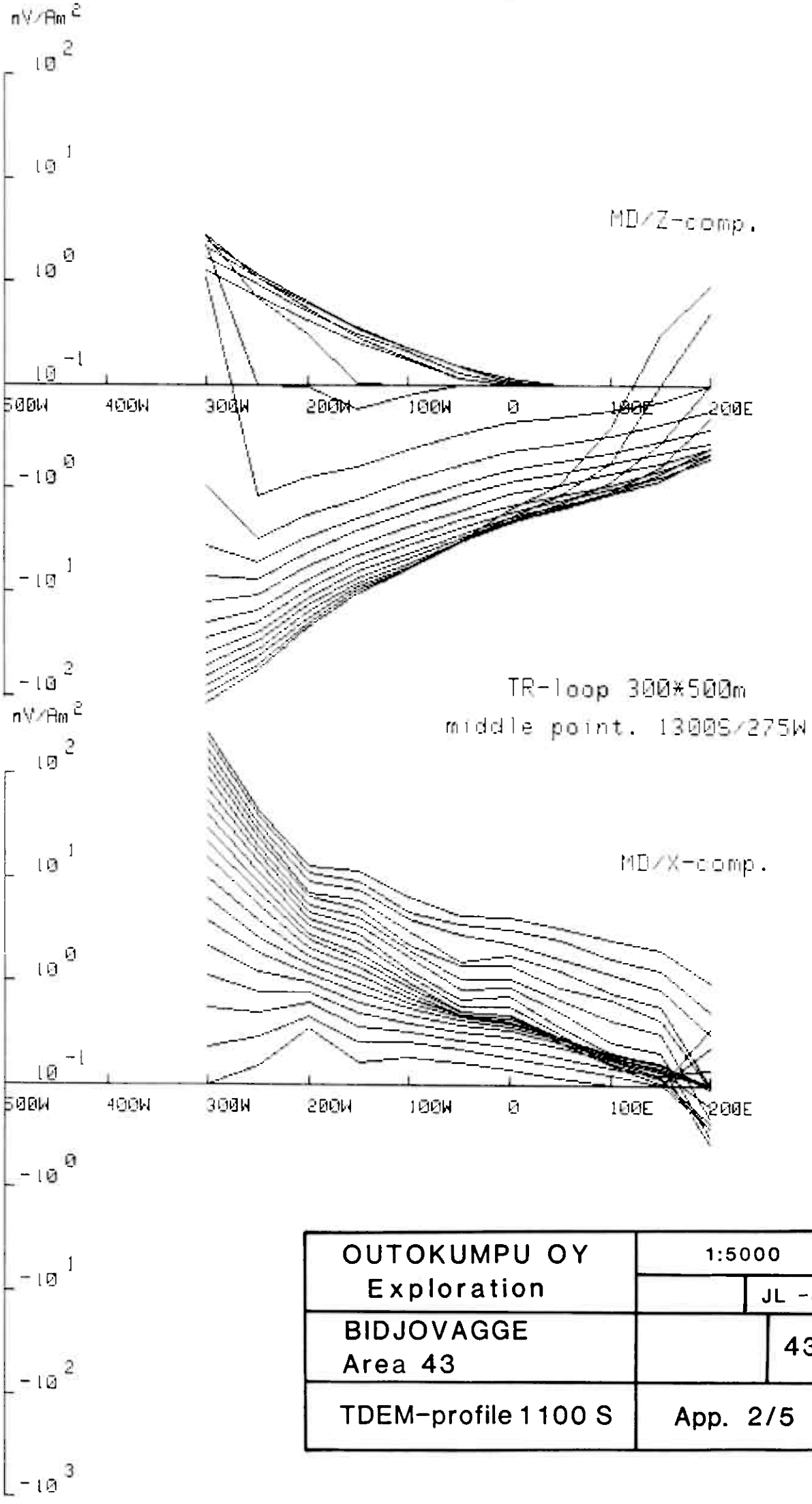
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1300 S	App. 2/3	



TR-loop 300*500m
middle point. 1300S/275W



OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 1200 S	App. 2/4



OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 1100 S	App. 2/5

Area 43 MIKKUJAURE 1 Prof.1500S

433 EM37 MD/Z 300m * 500m

1:5000

-dec. mean +dec.

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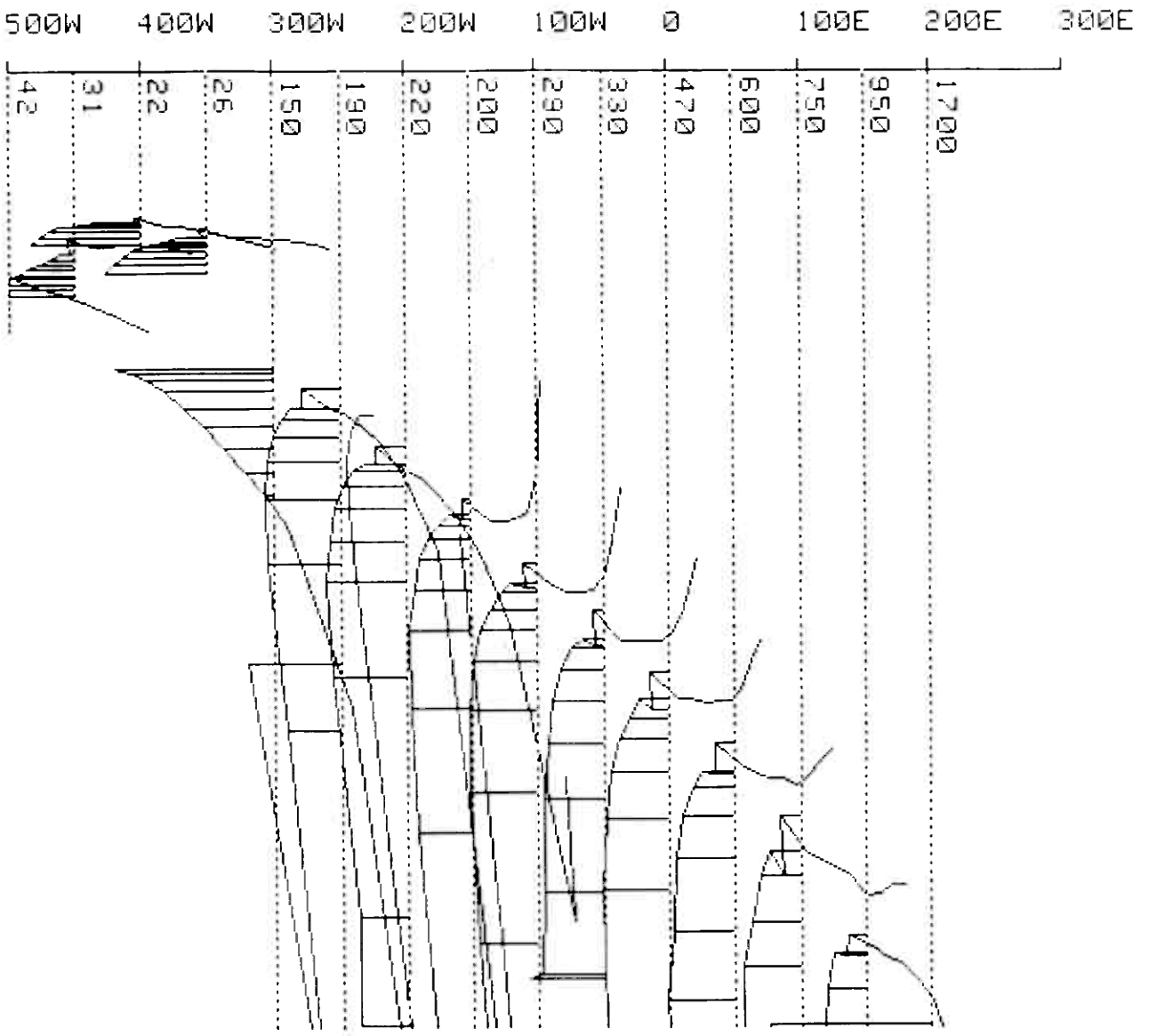
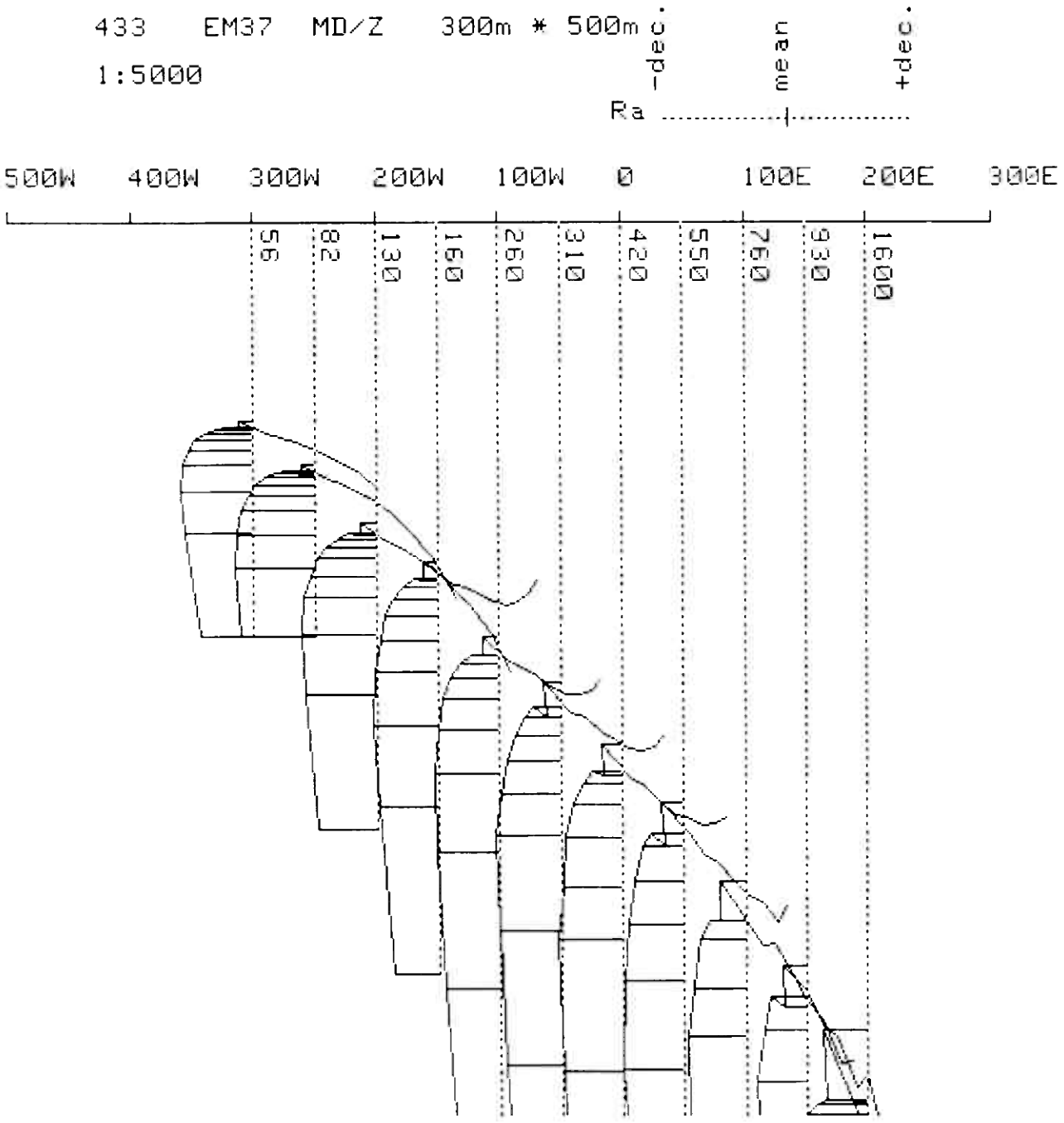


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 2/6	

Area 43 MIKKUJAURE 1 Prof.1400S

433 EM37 MD/Z 300m * 500m

1:5000

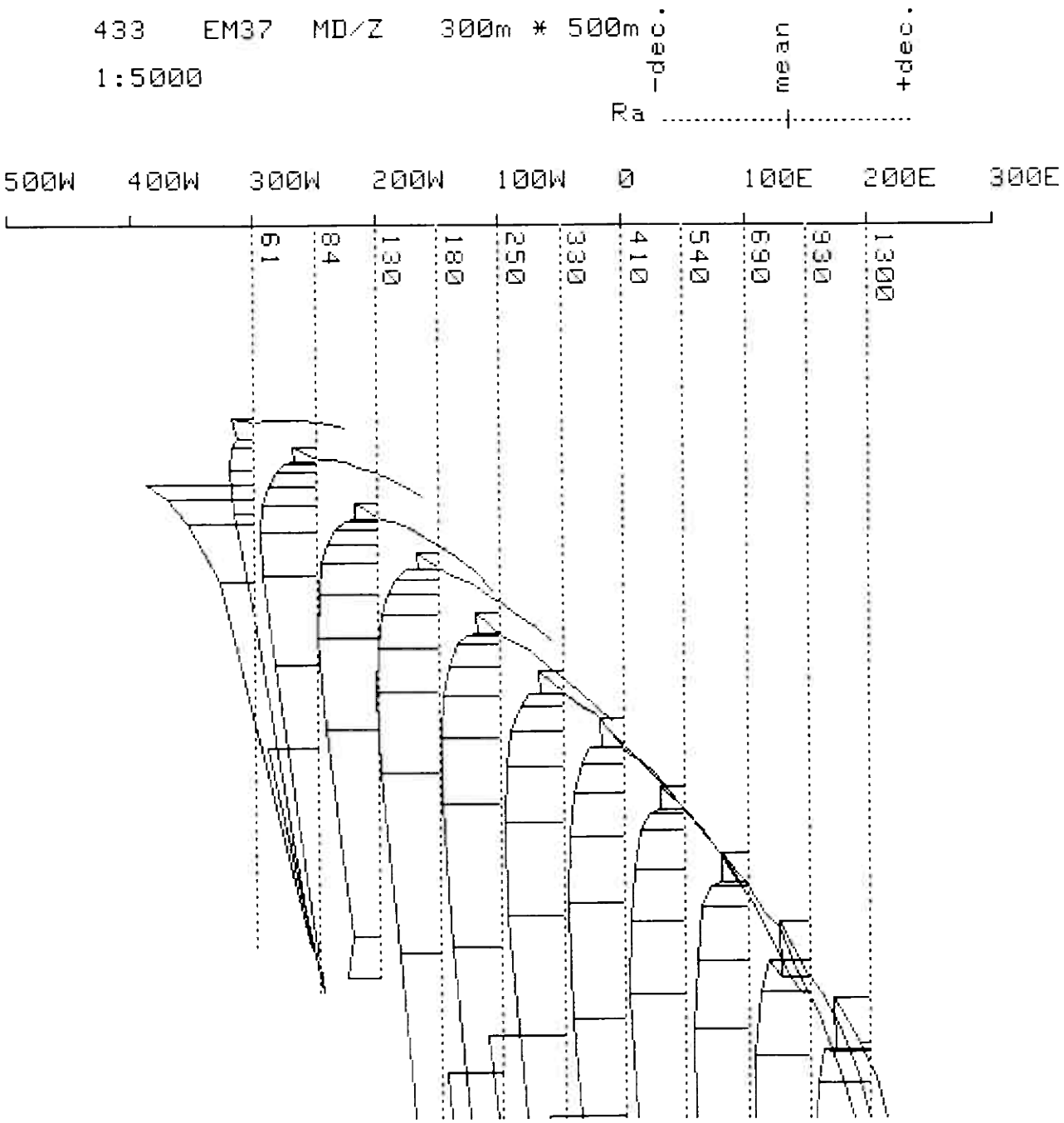


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 2/7	

Area 43 MIKKUJAURE 1 Prof.1300S

433 EM37 MD/Z 300m * 500m

1:5000

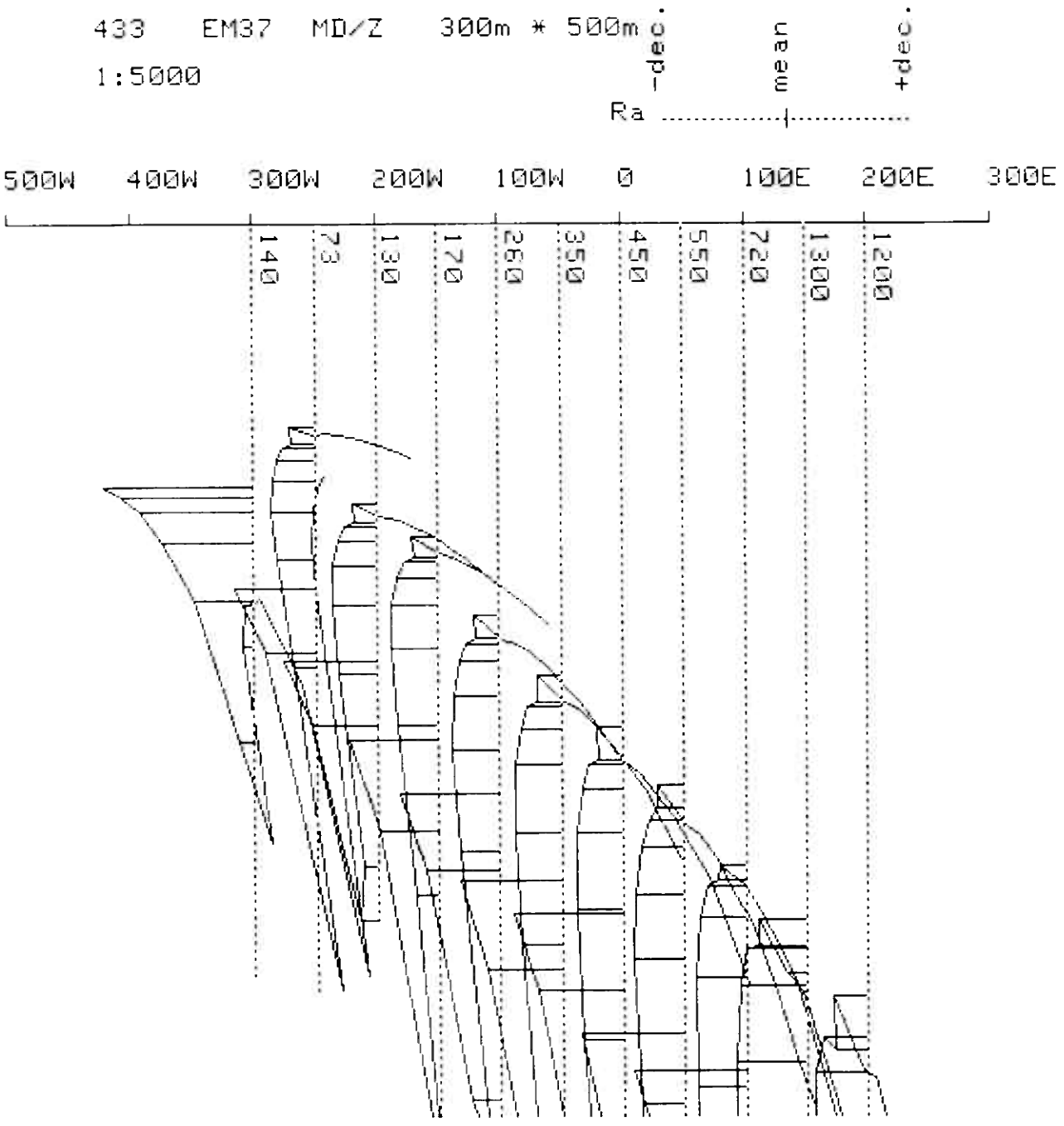


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 2/8	

Area 43 MIKKUJAURE 1 Prof.12005

433 EM37 MD/Z 300m * 500m

1:5000

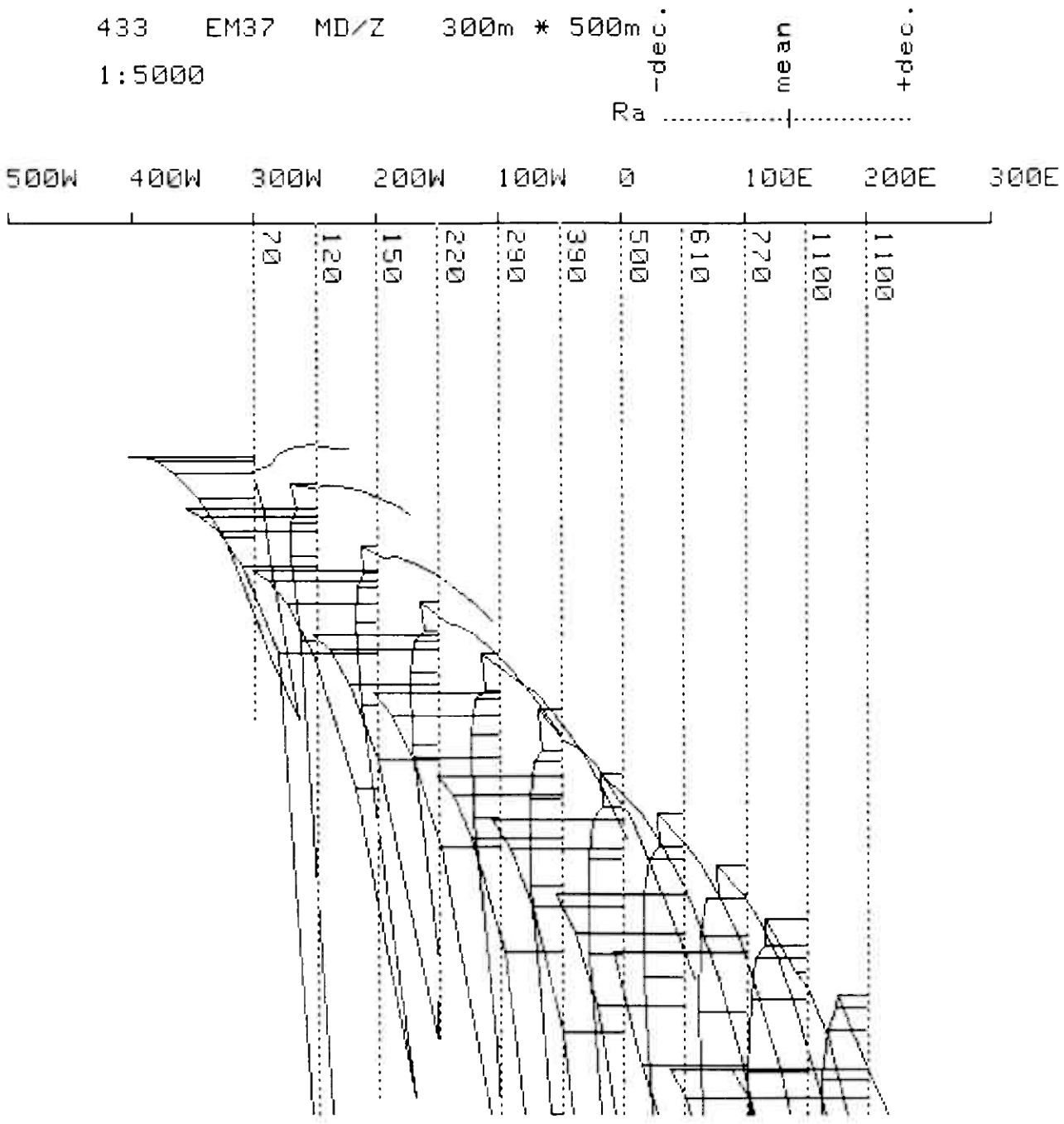


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 2/9	

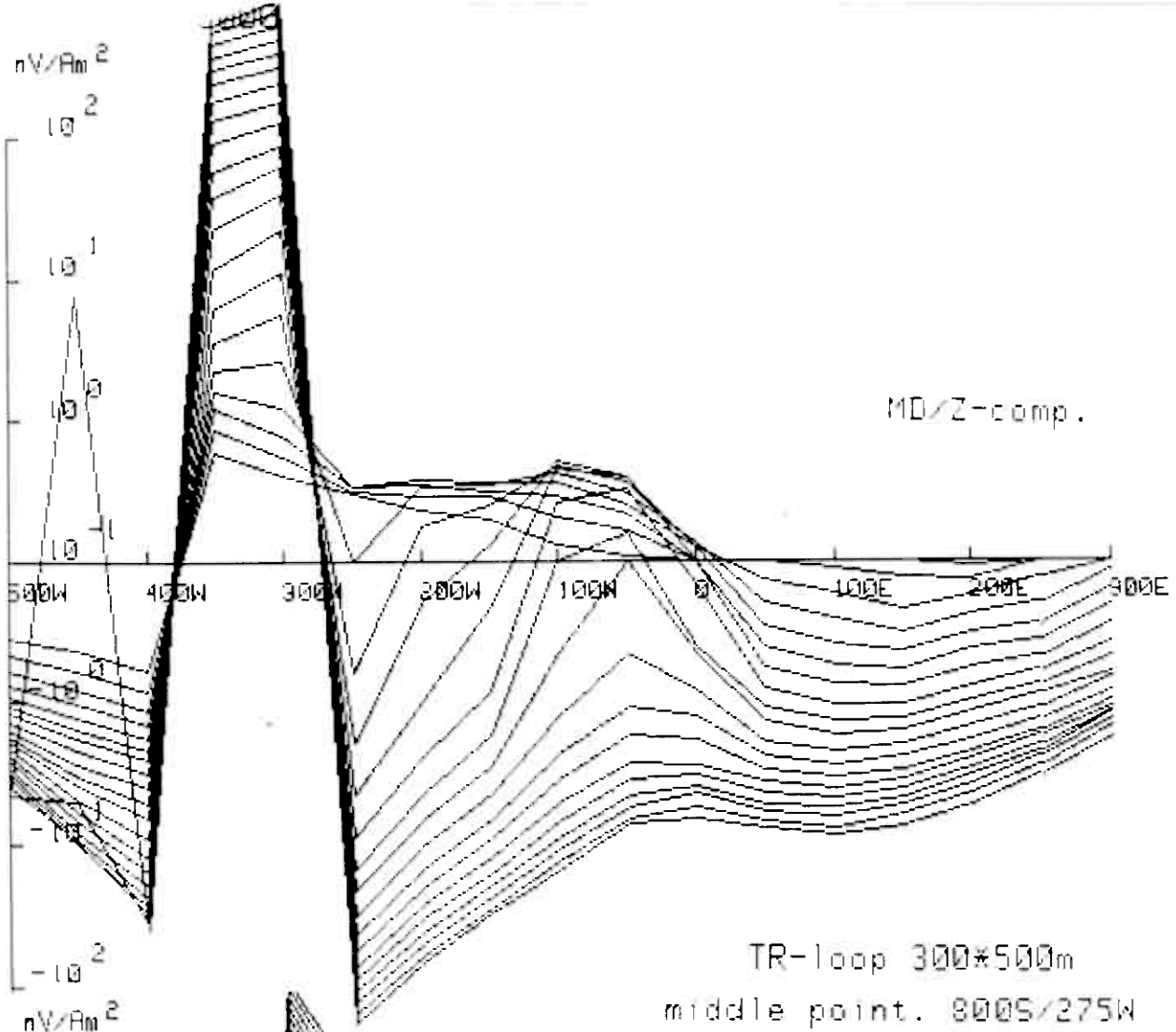
Area 43 MIKKUJAURE 1 Prof.1100S

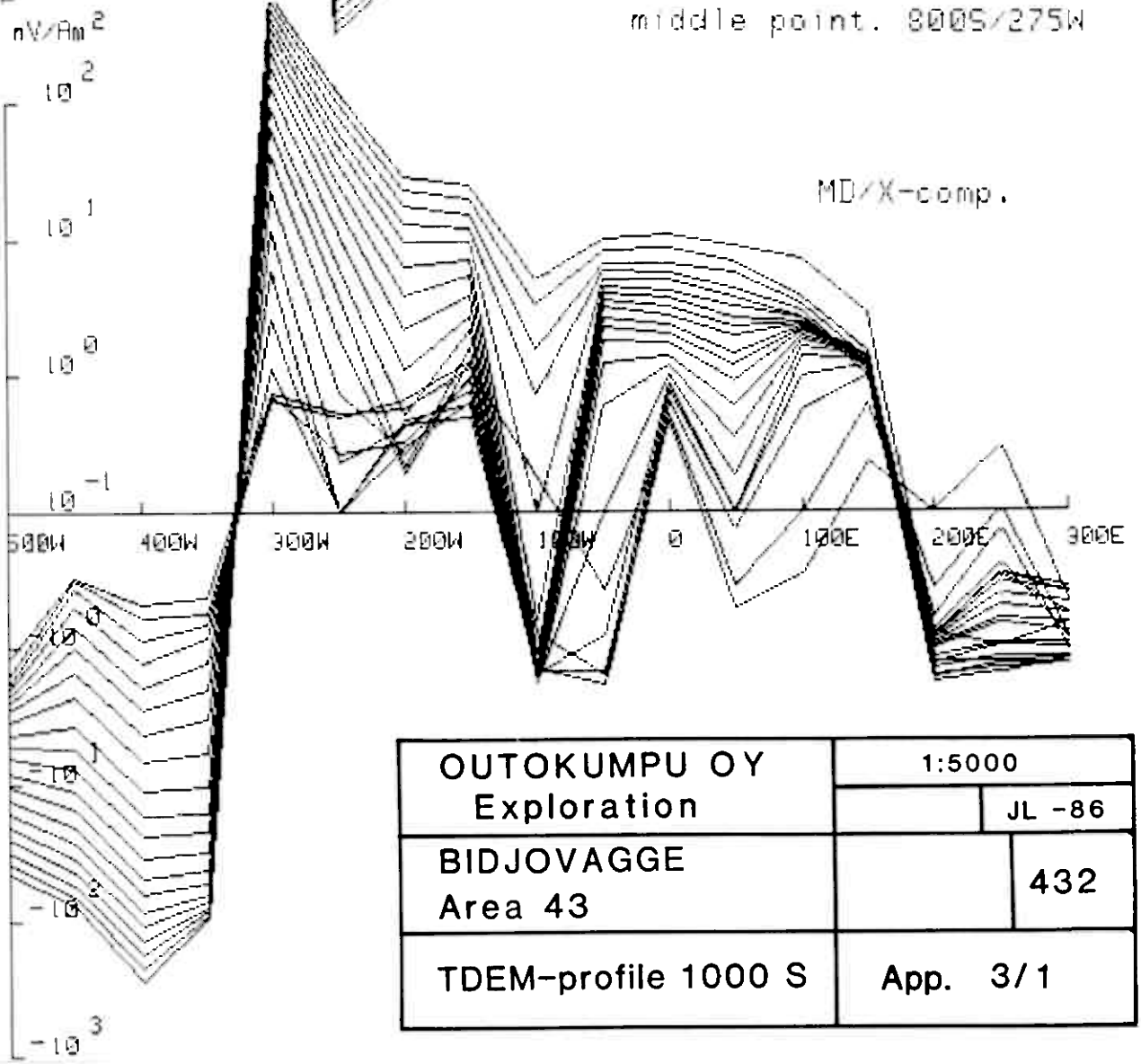
433 EM37 MD/Z 300m * 500m

1:5000

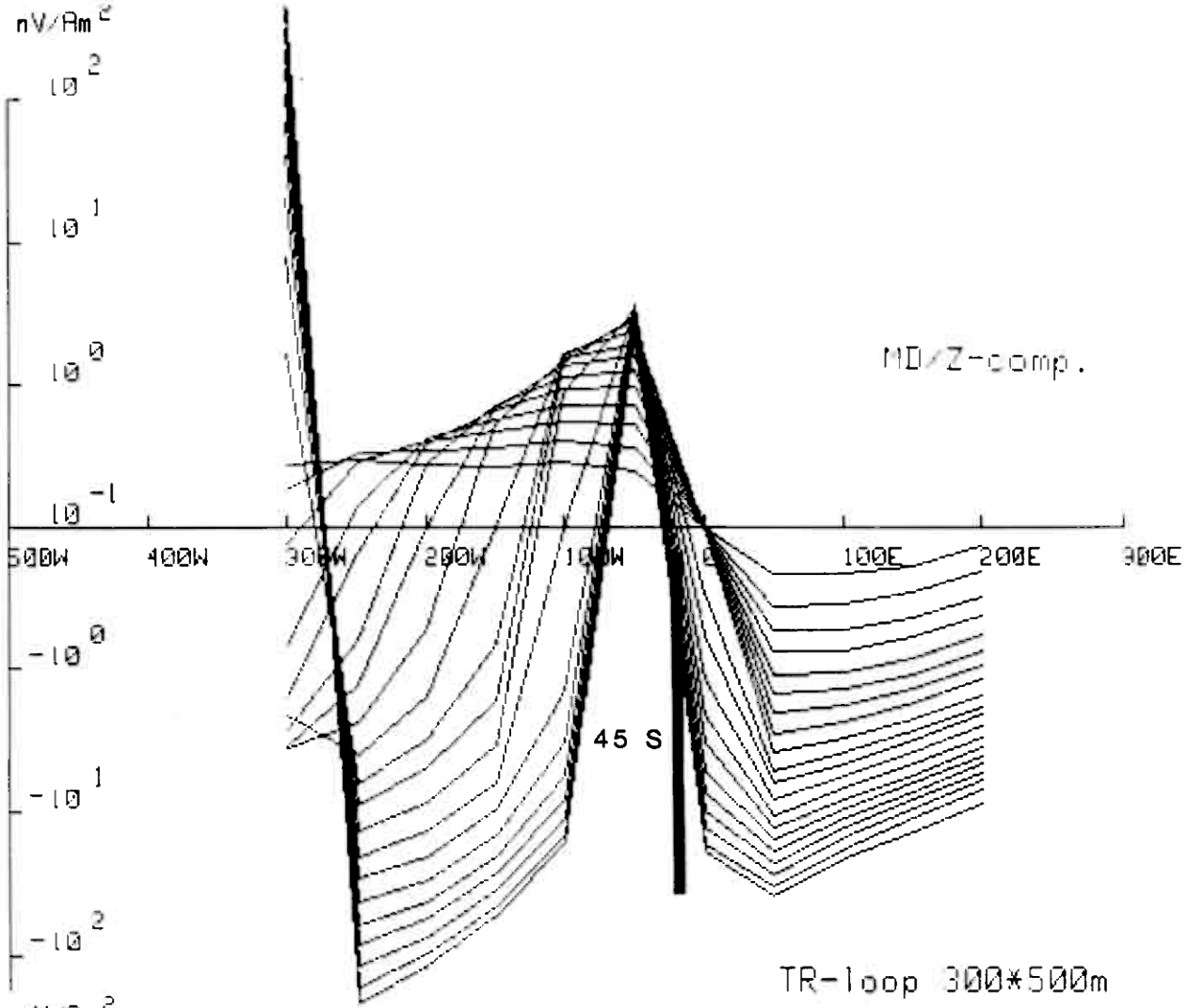


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 2/10	

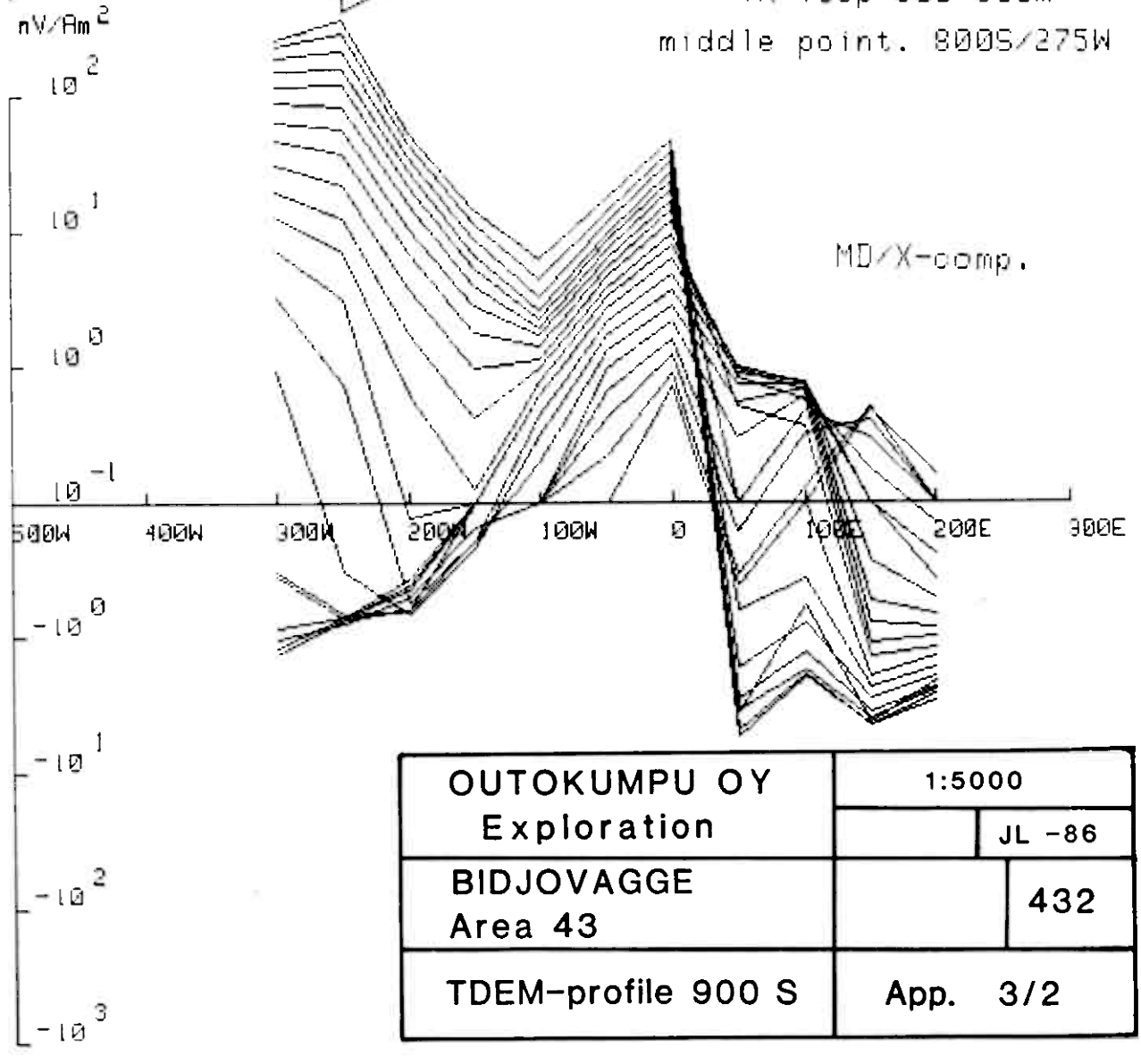




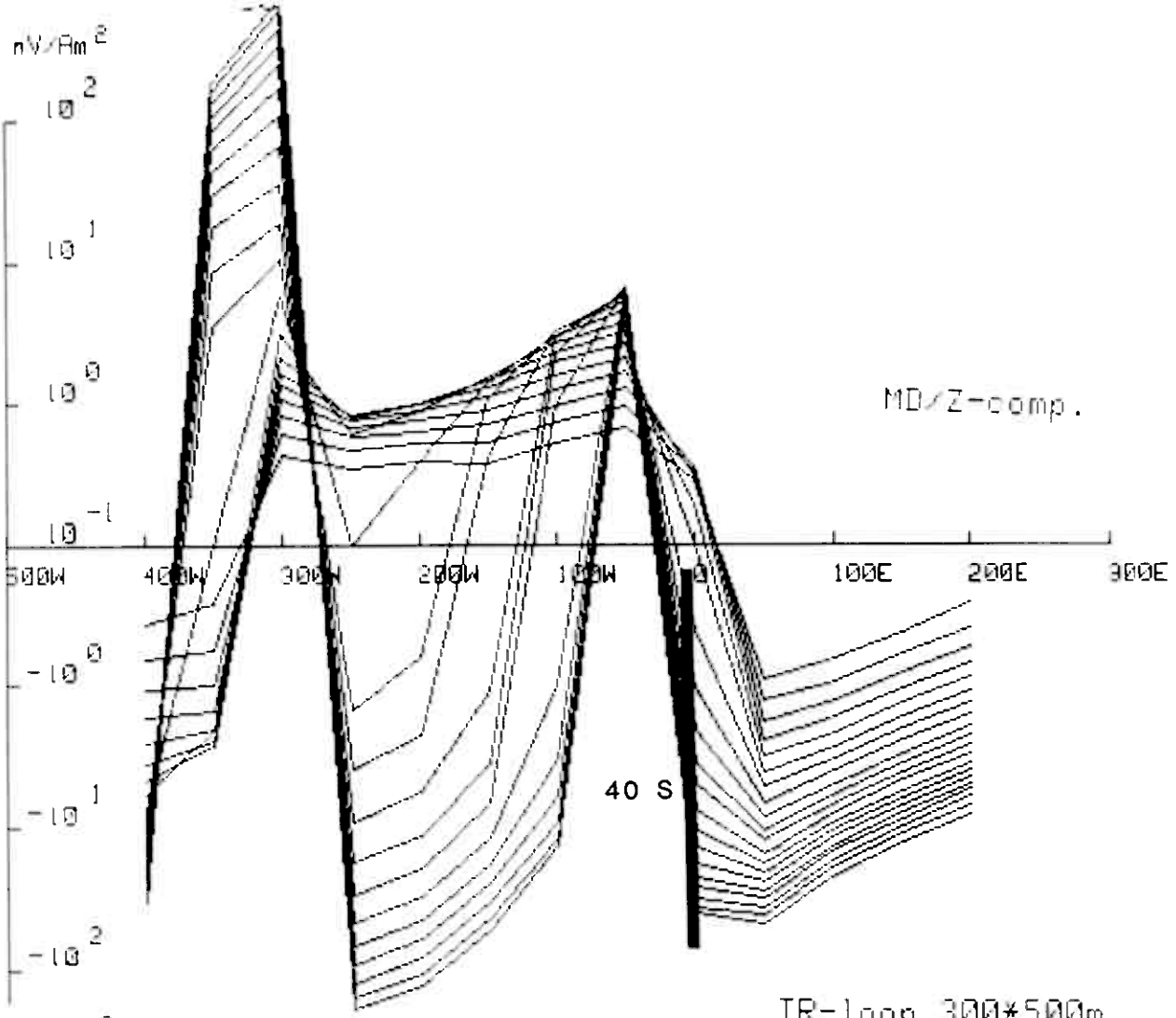
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1000 S	App. 3/1	



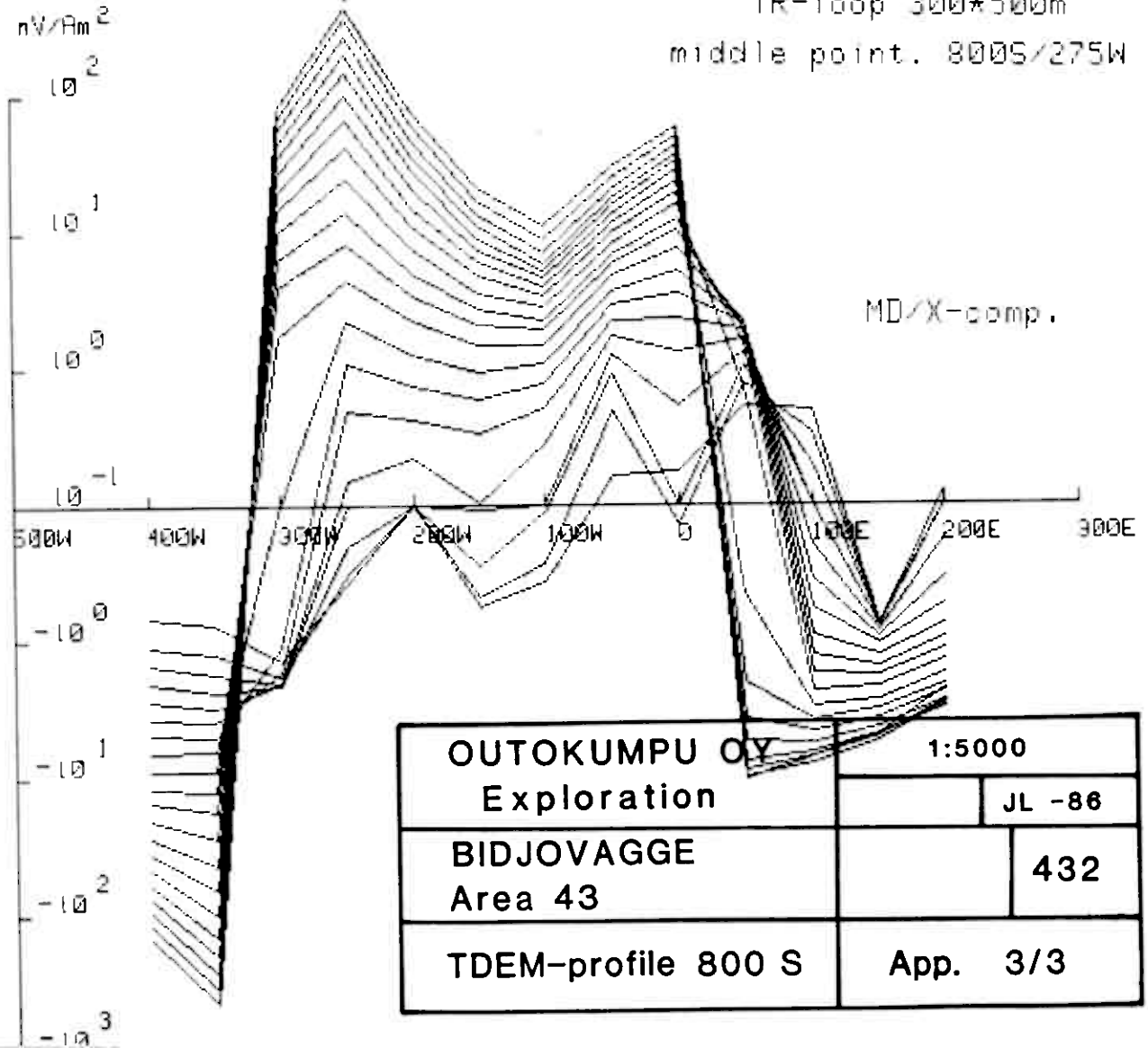
TR-loop 300*500m
middle point. 800S/275W



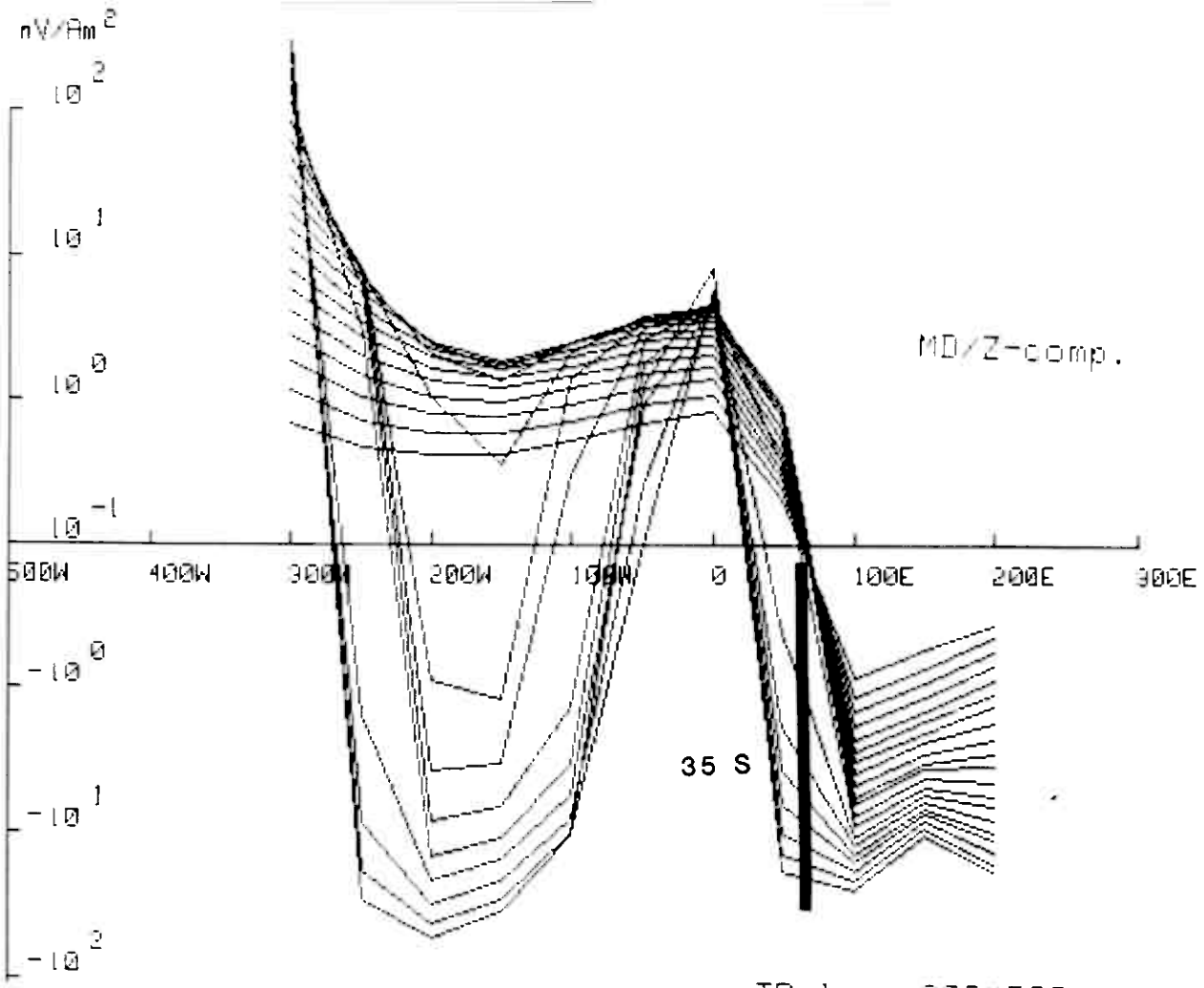
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 900 S	App. 3/2	



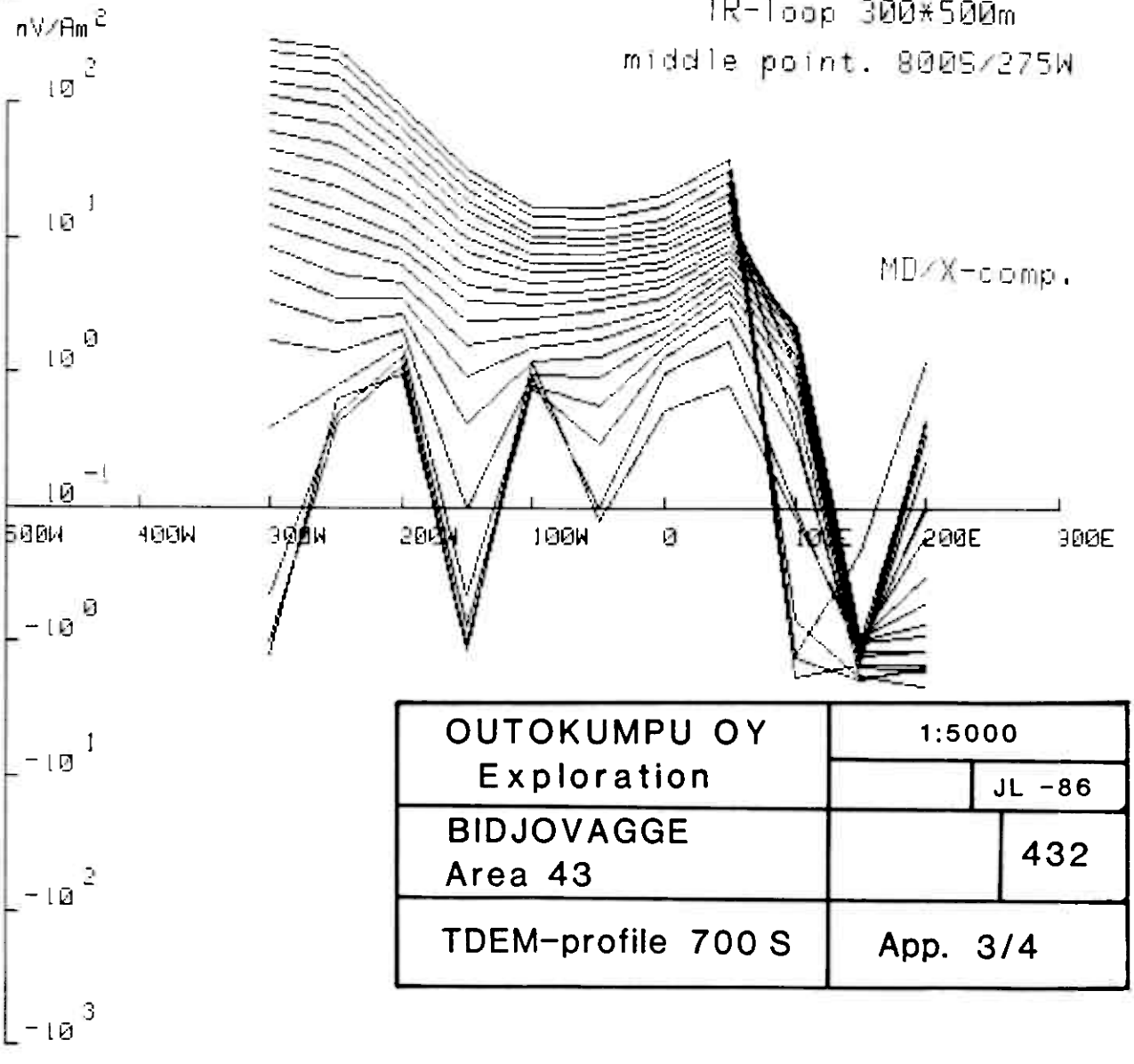
TR-loop 300*500m
middle point. 800S/275W



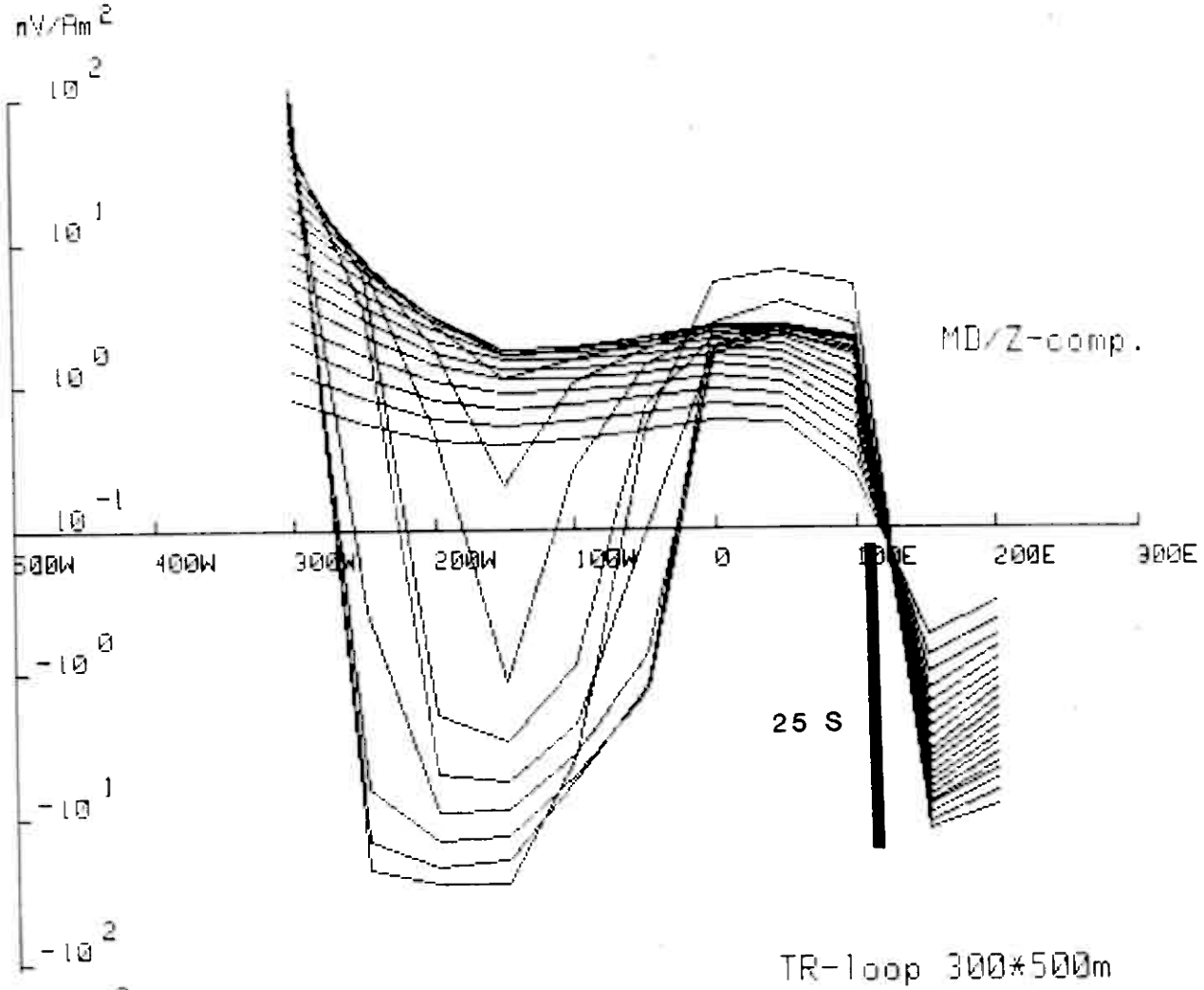
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 800 S	App. 3/3	



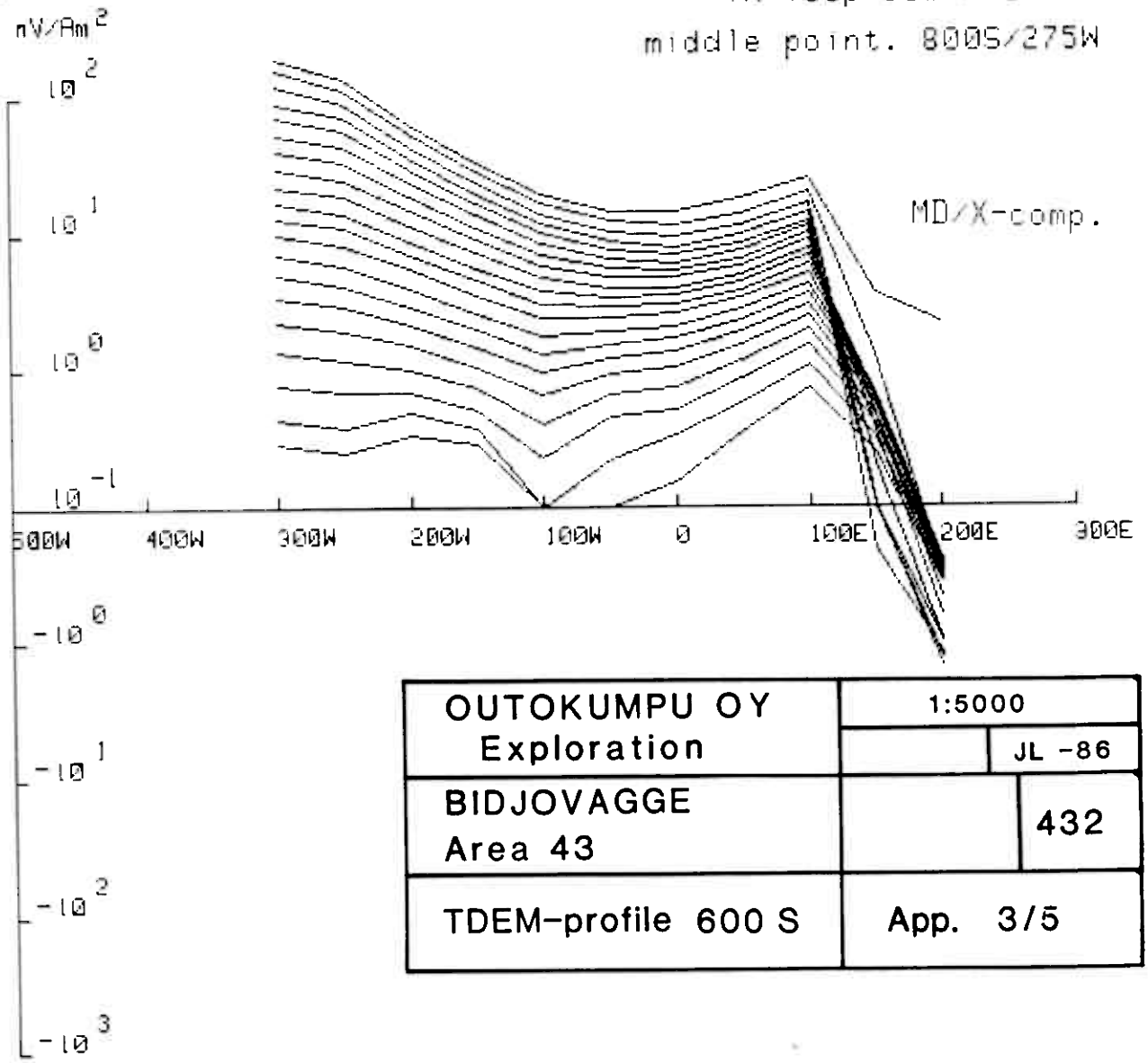
TR-loop 300*500m
middle point. 8005/275W



OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 700 S	App. 3/4	



TR-loop 300*500m
middle point. 8005/275W

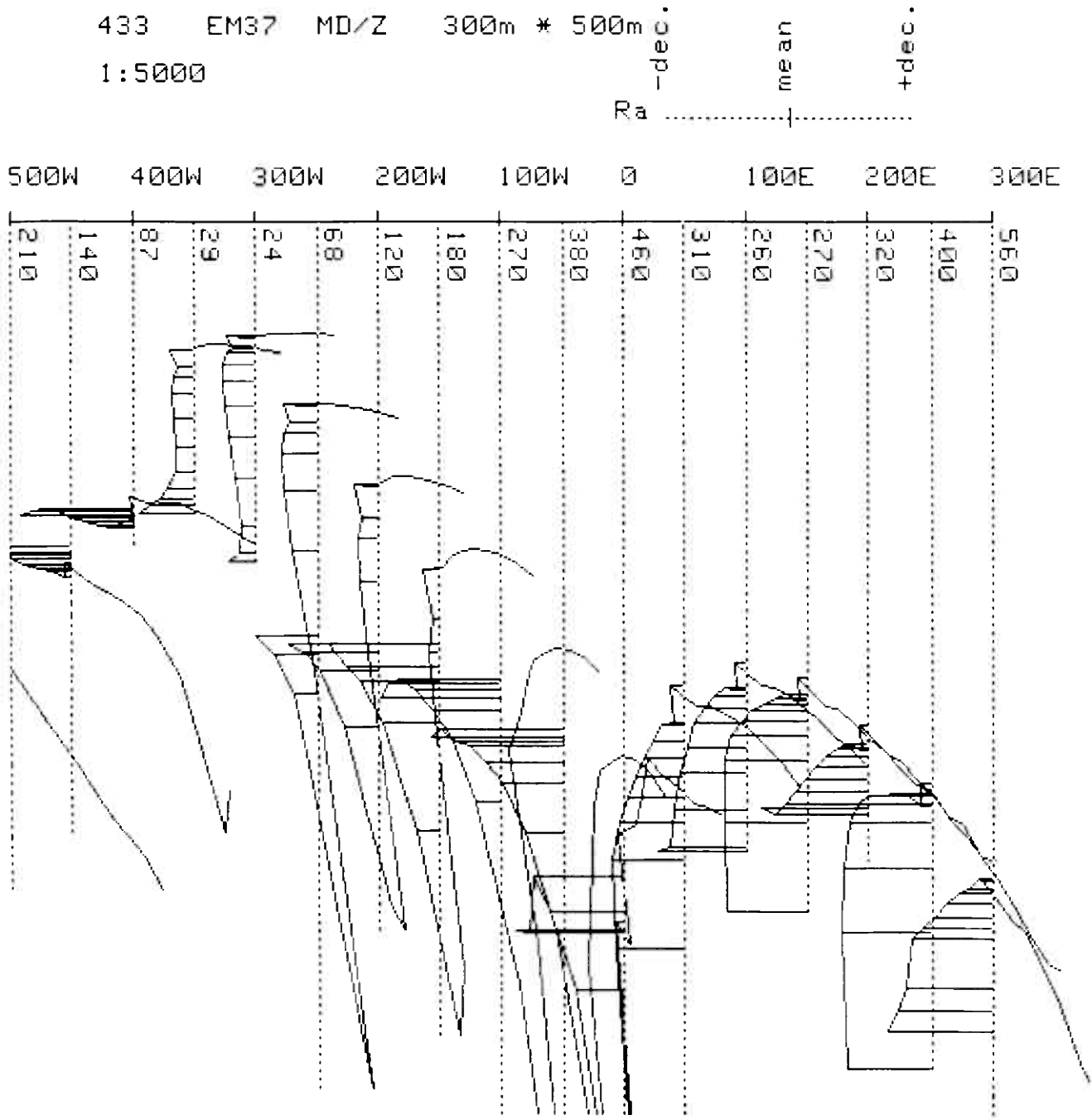


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 600 S	App. 3/5	

Area 43 MIKKUJAURE 2 Prof.1000S

433 EM37 MD/Z 300m * 500m

1:5000

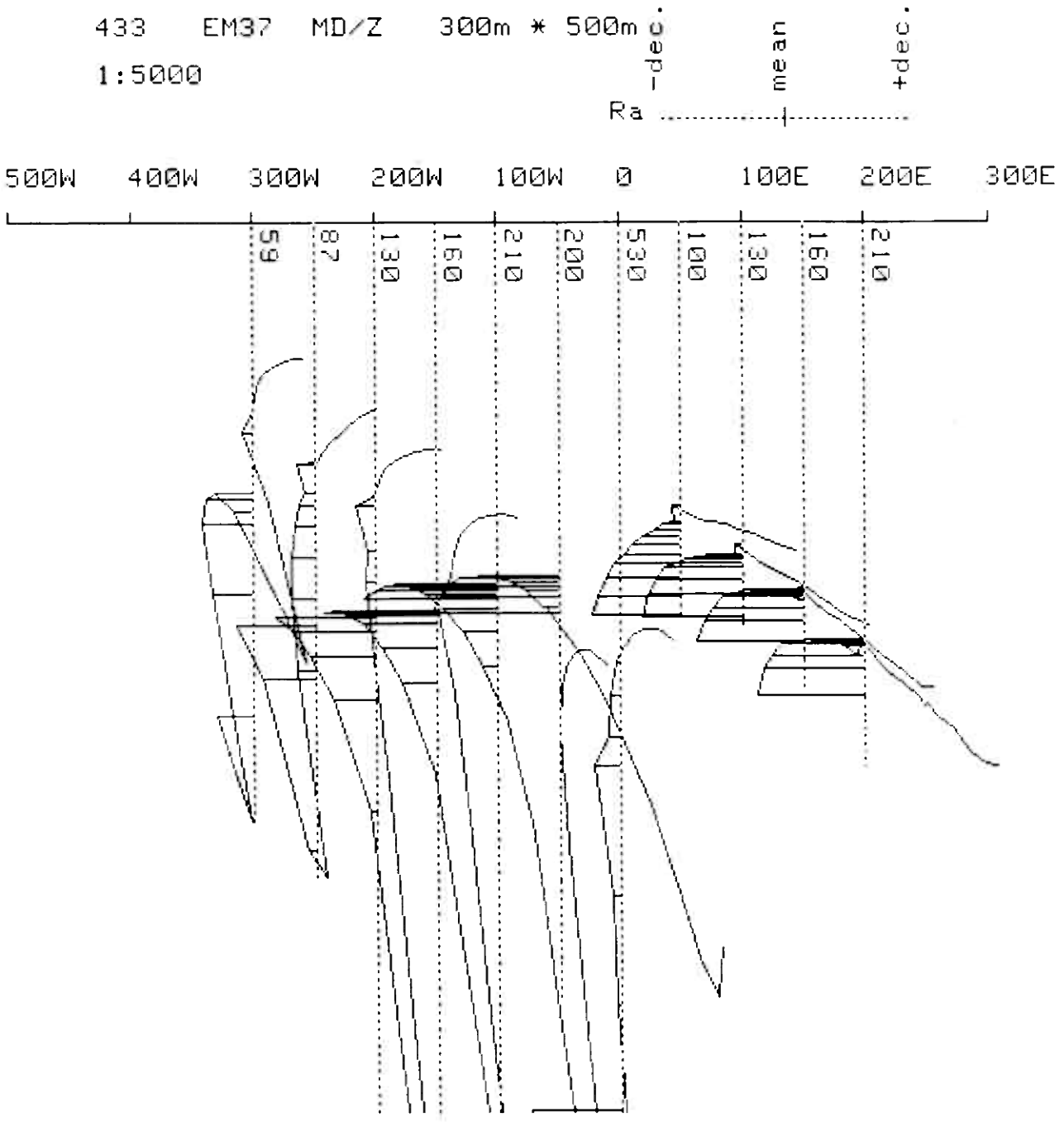


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 3/6	

Area 43 MIKKUJAURE 2 Prof.900S

433 EM37 MD/Z 300m * 500m

1:5000

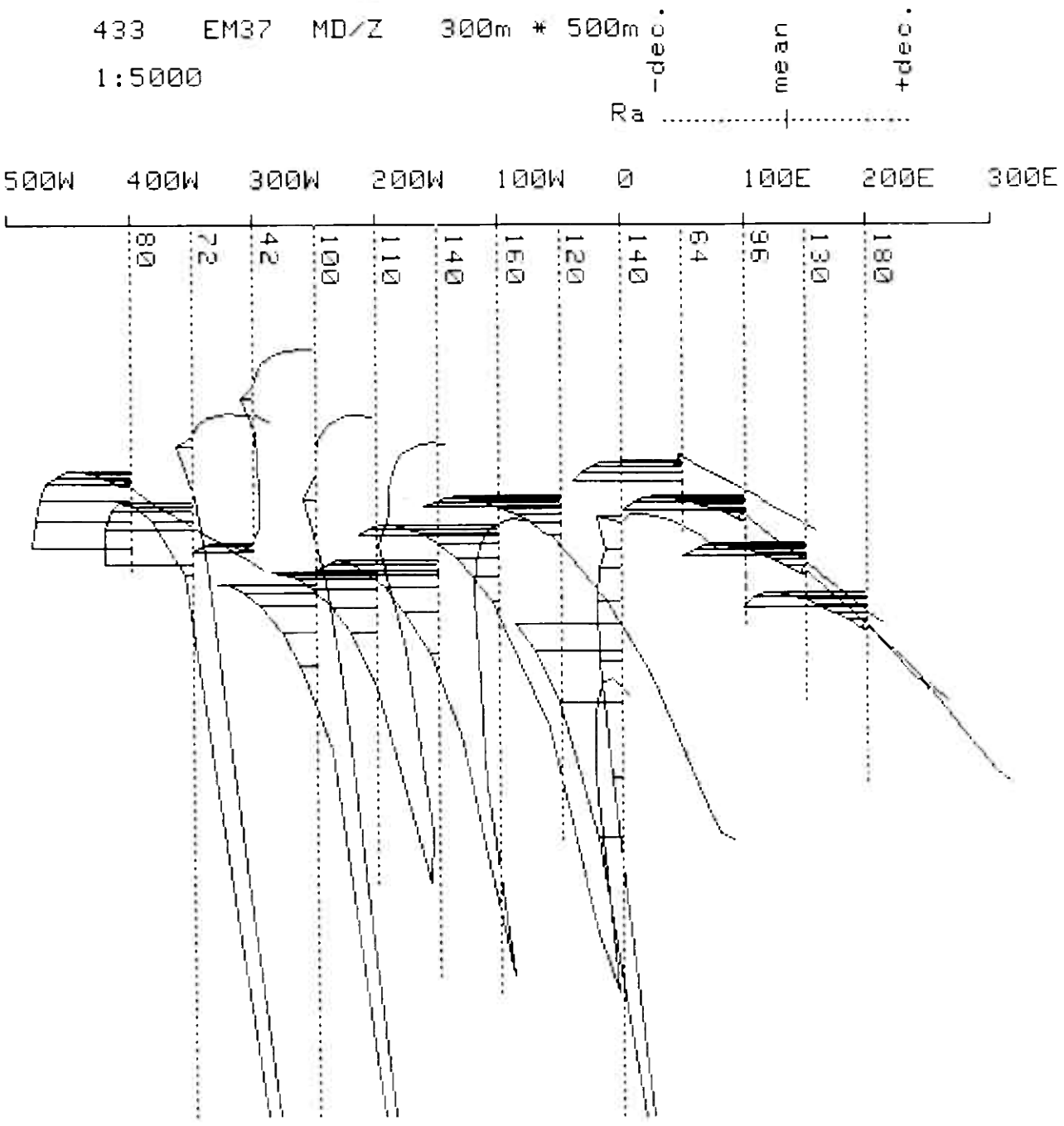


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 3/7	

Area 43 MIKKUJAURE 2 Prof.800S

433 EM37 MD/Z 300m * 500m

1:5000

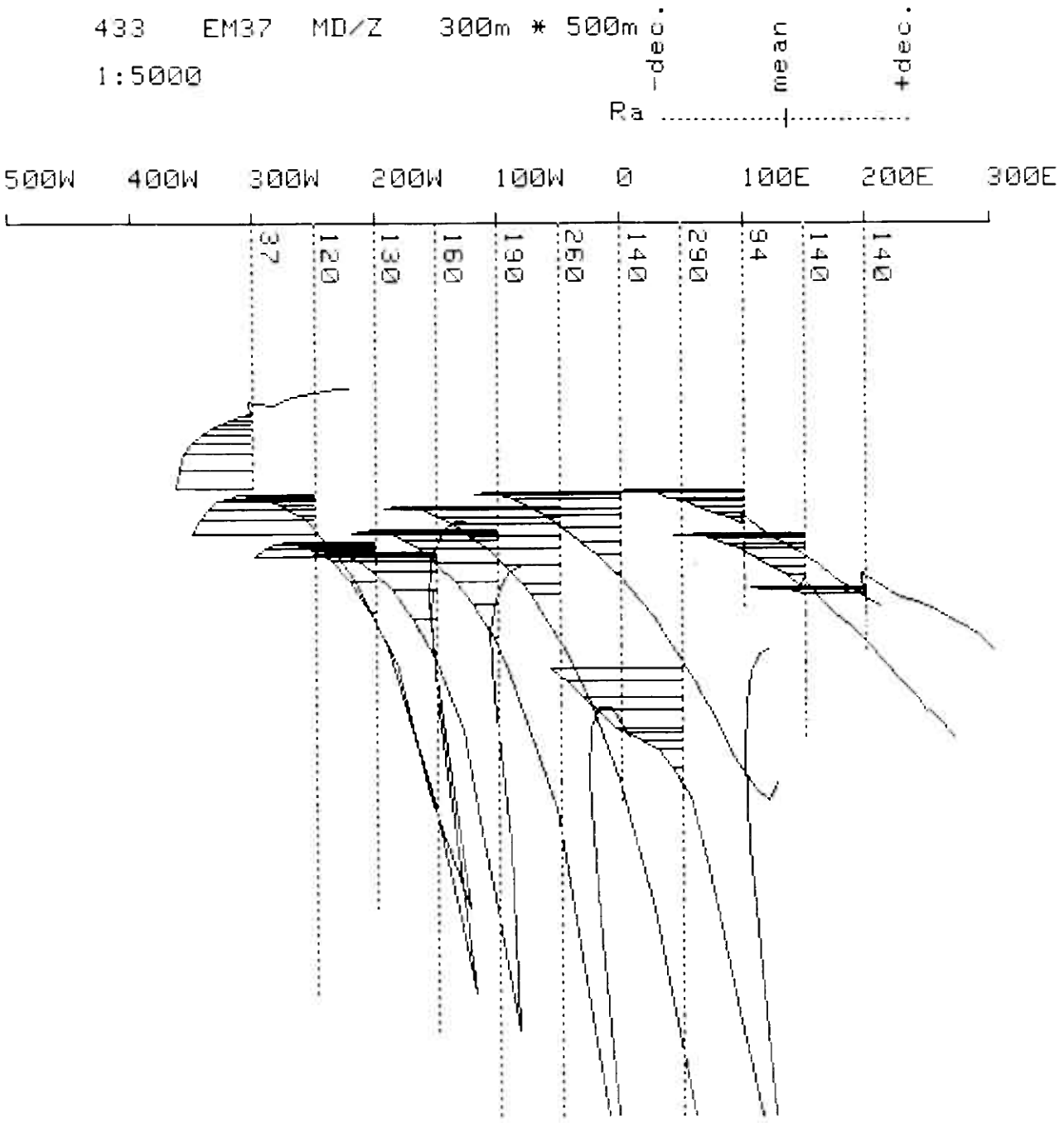


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 3/8	

Area 43 MIKKUJAURE 2 Prof.700S

433 EM37 MD/Z 300m * 500m

1:5000

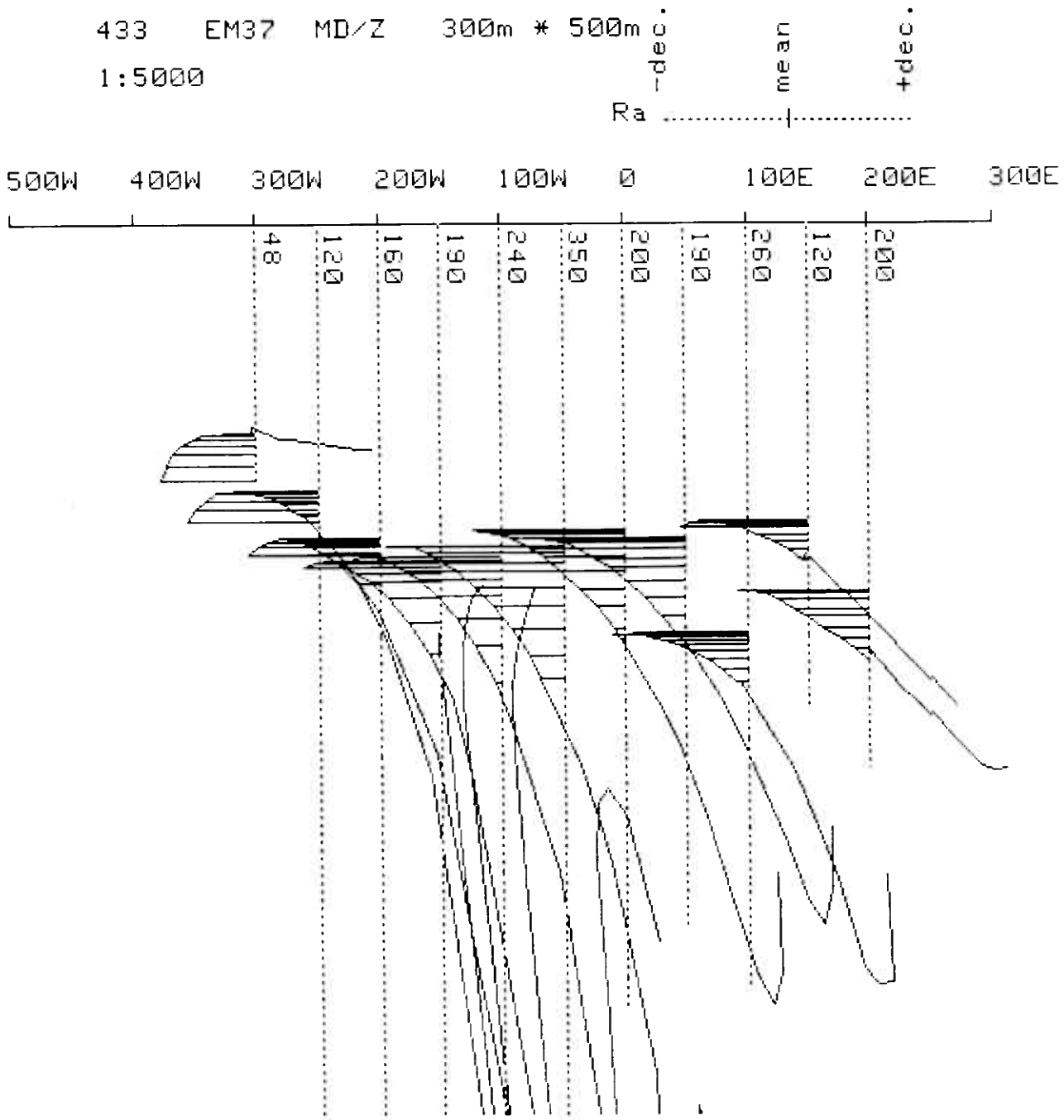


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 3/9	

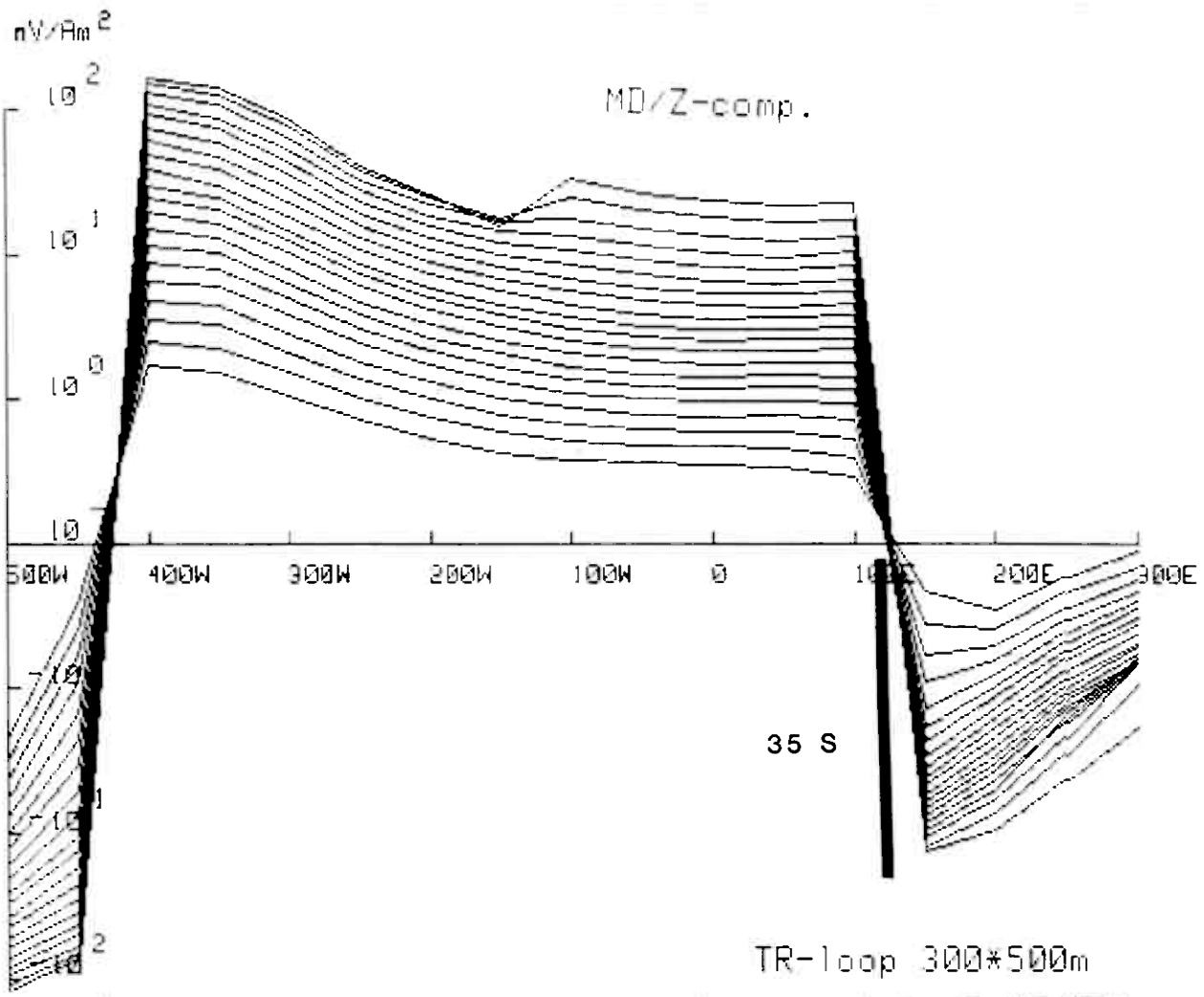
Area 43 MIKKUJAURE 2 Prof.600S

433 EM37 MD/Z 300m * 500m

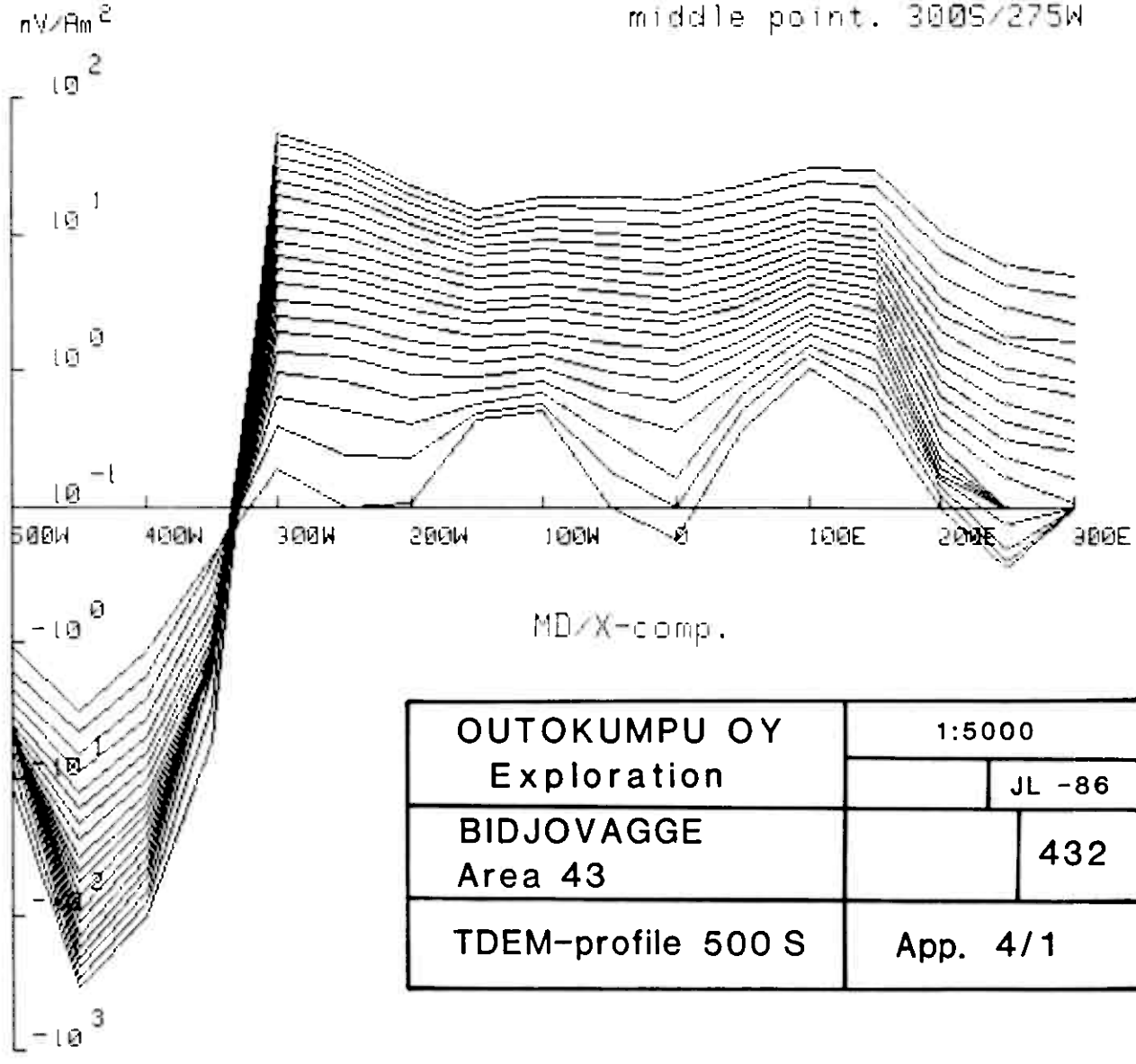
1:5000



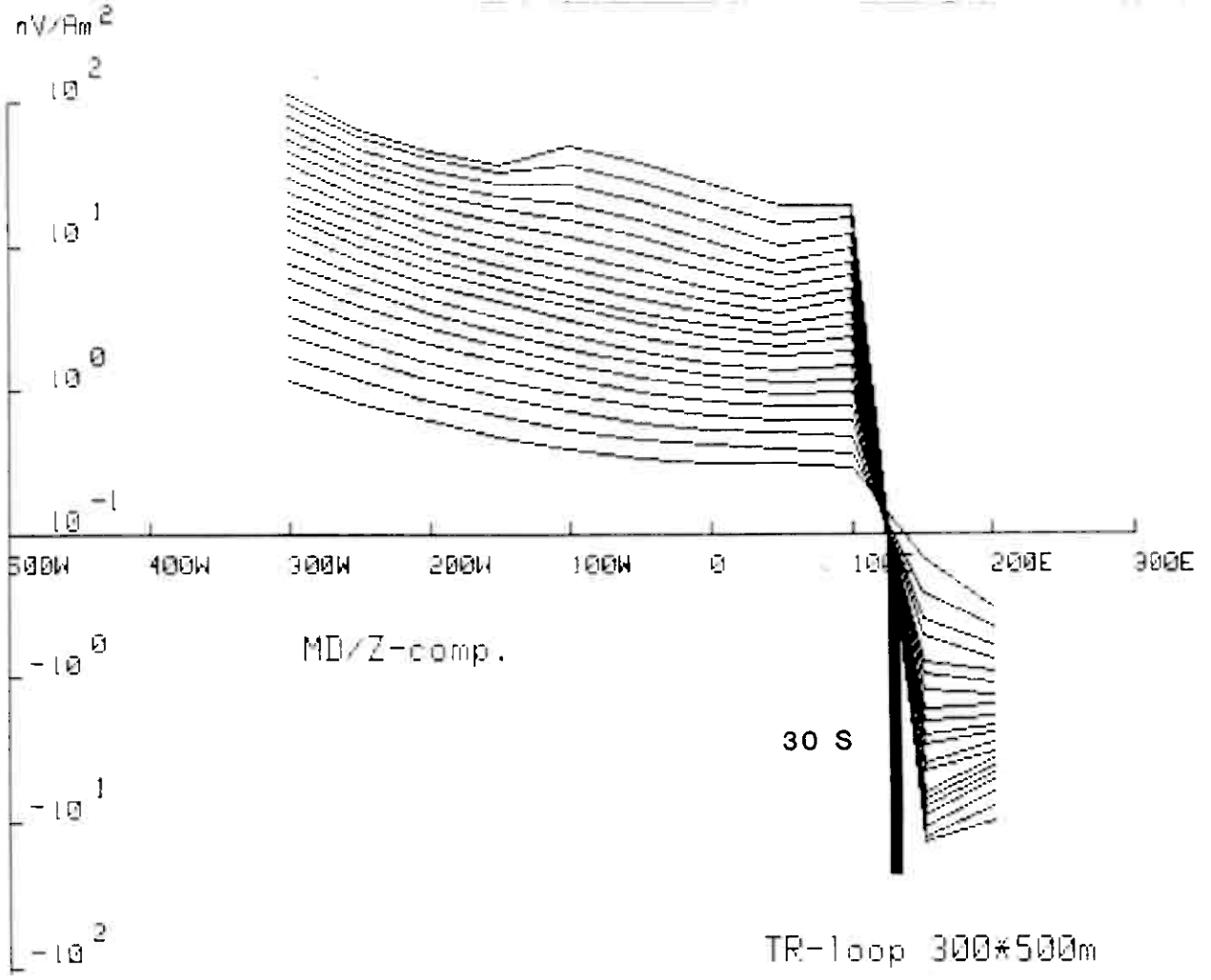
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 3/10	



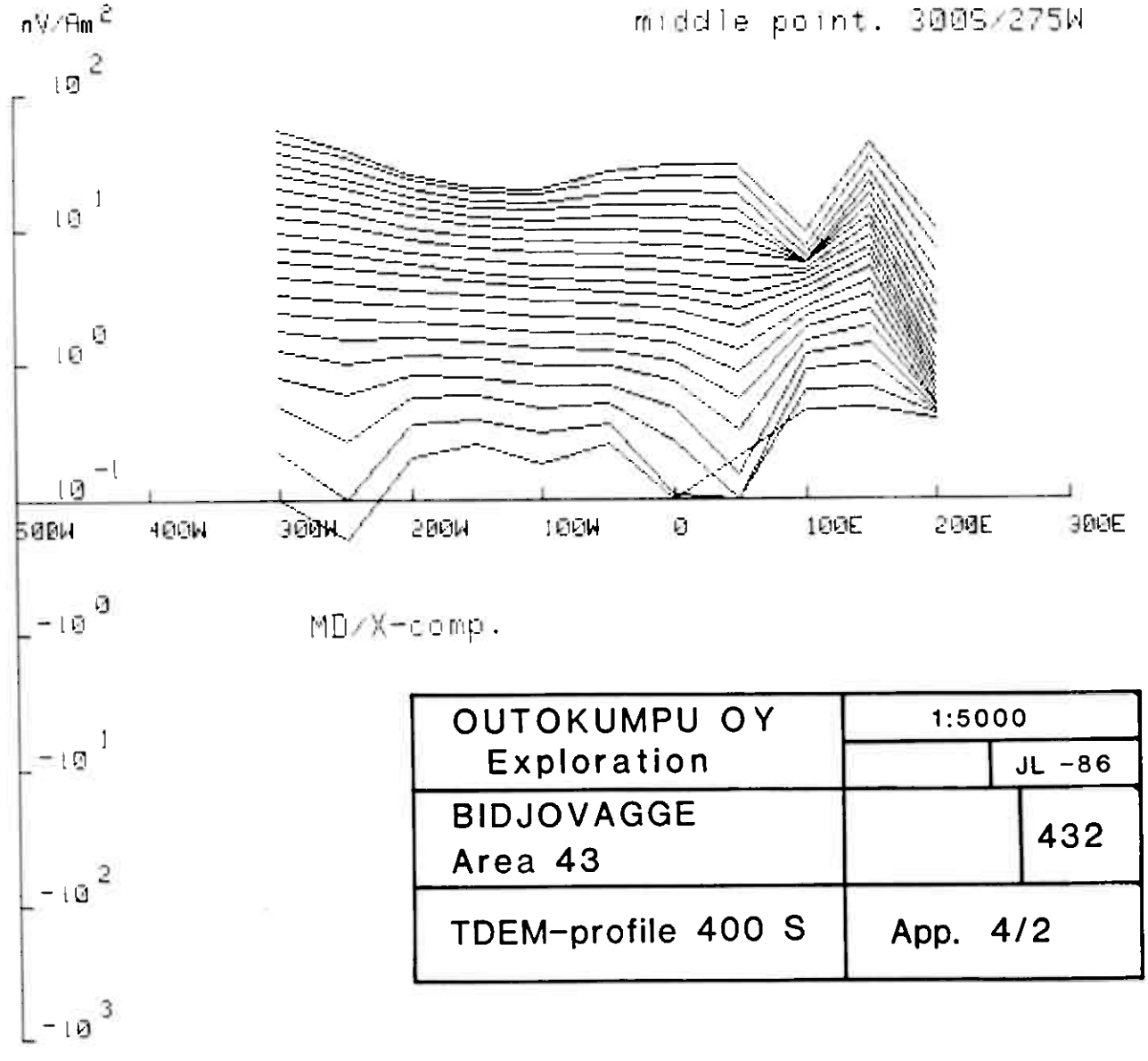
TR-loop 300*500m
middle point. 300S/275W



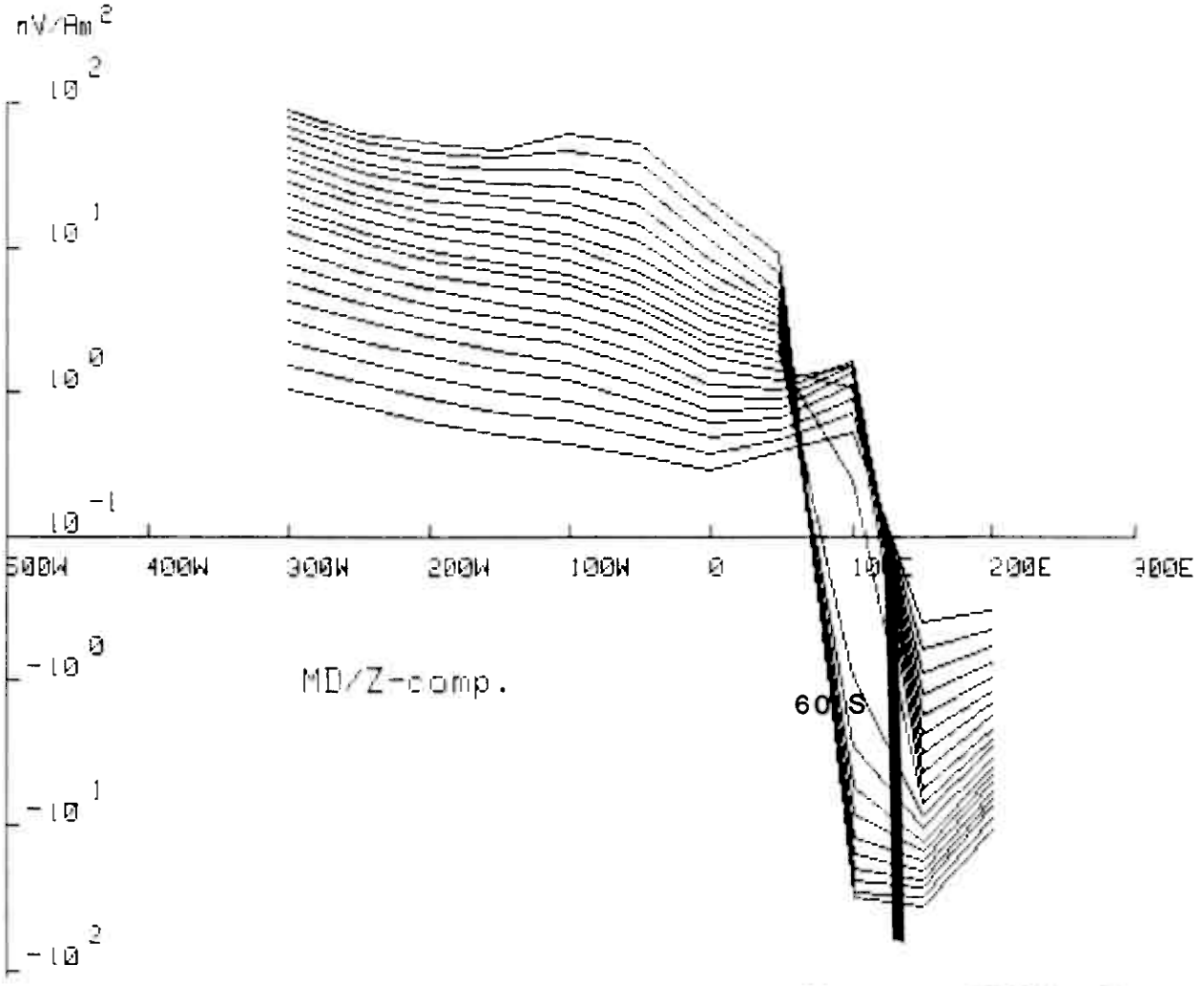
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 500 S	App. 4/1



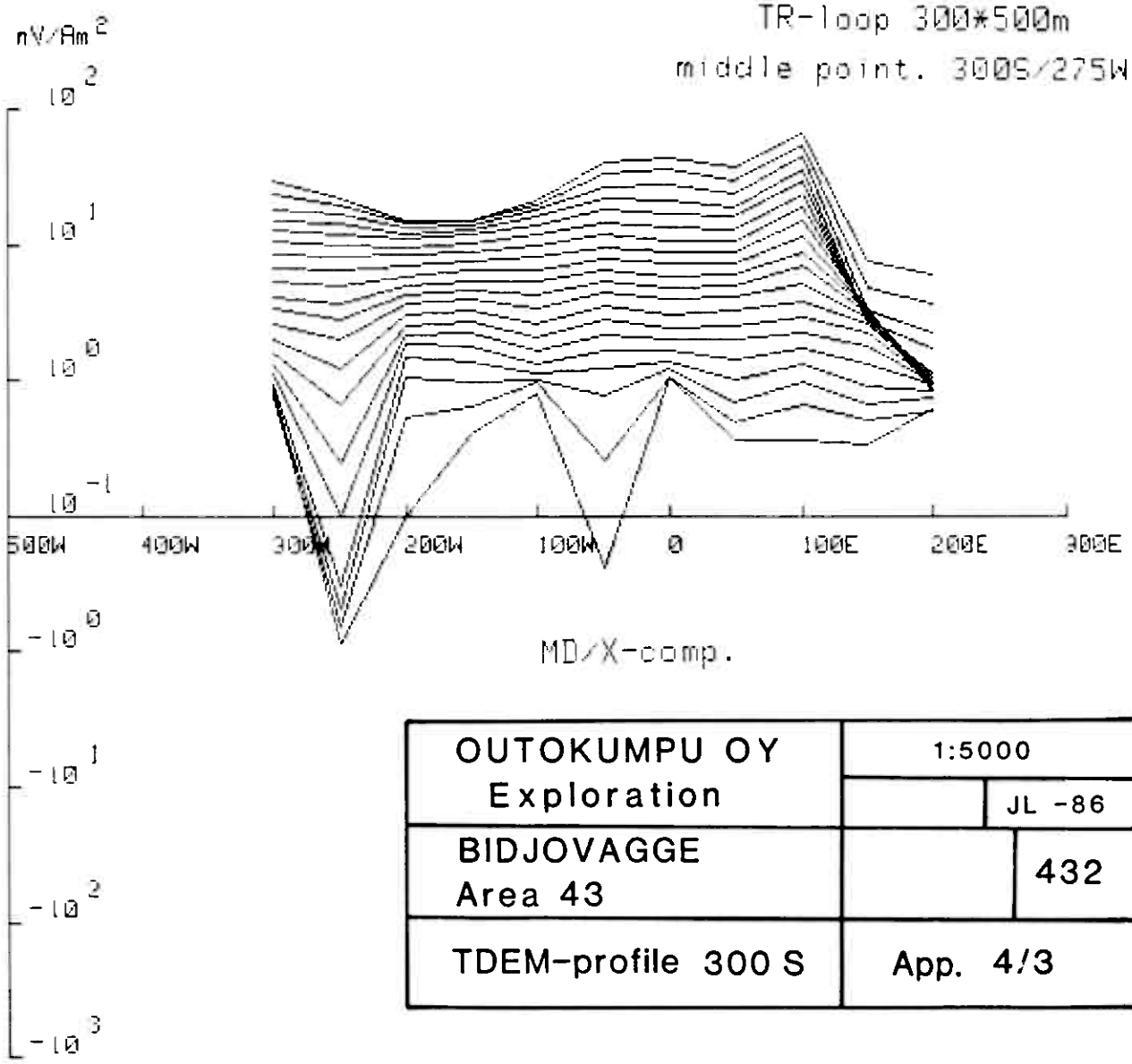
TR-loop 300*500m
middle point. 300S/275W



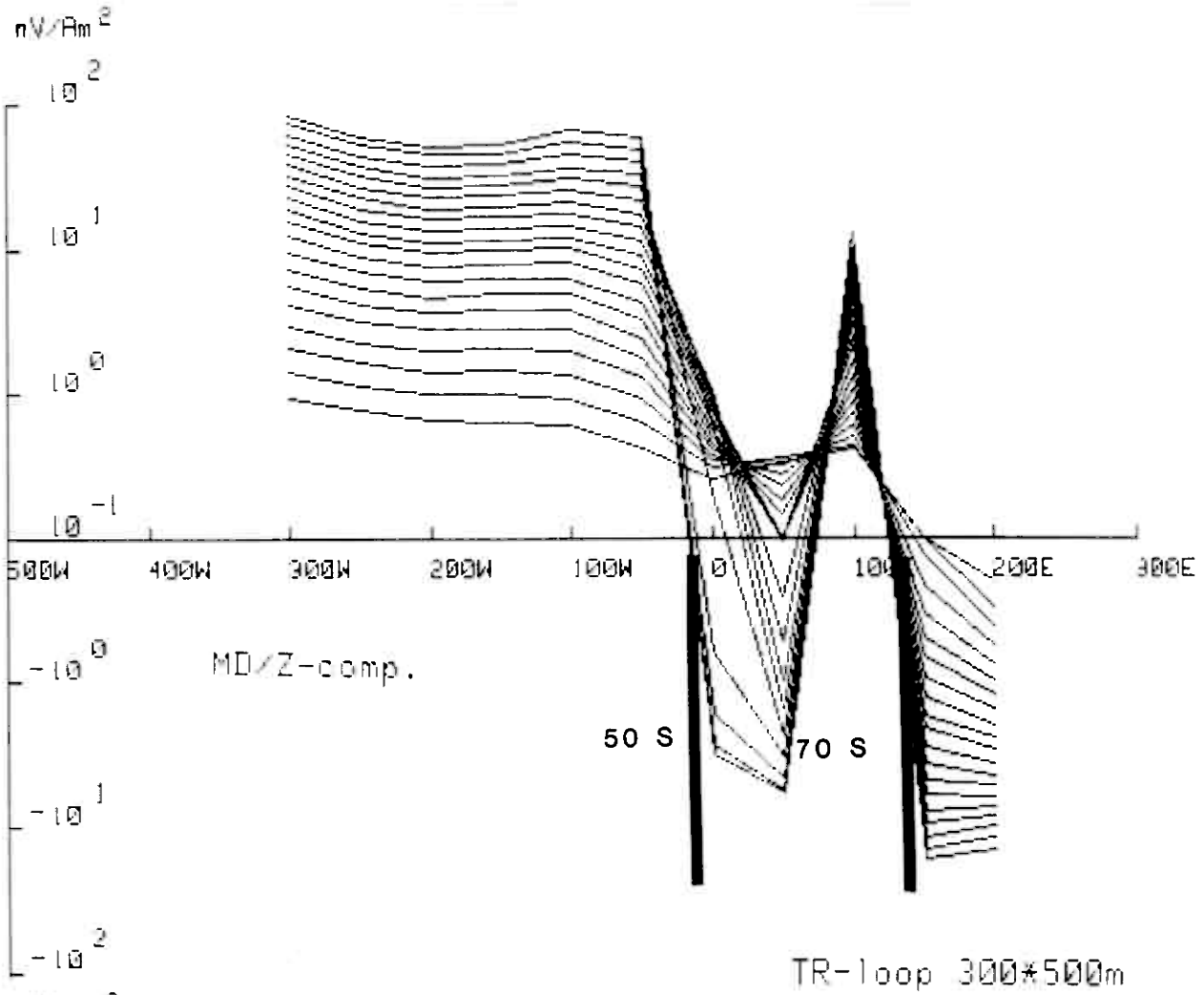
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 400 S	App. 4/2



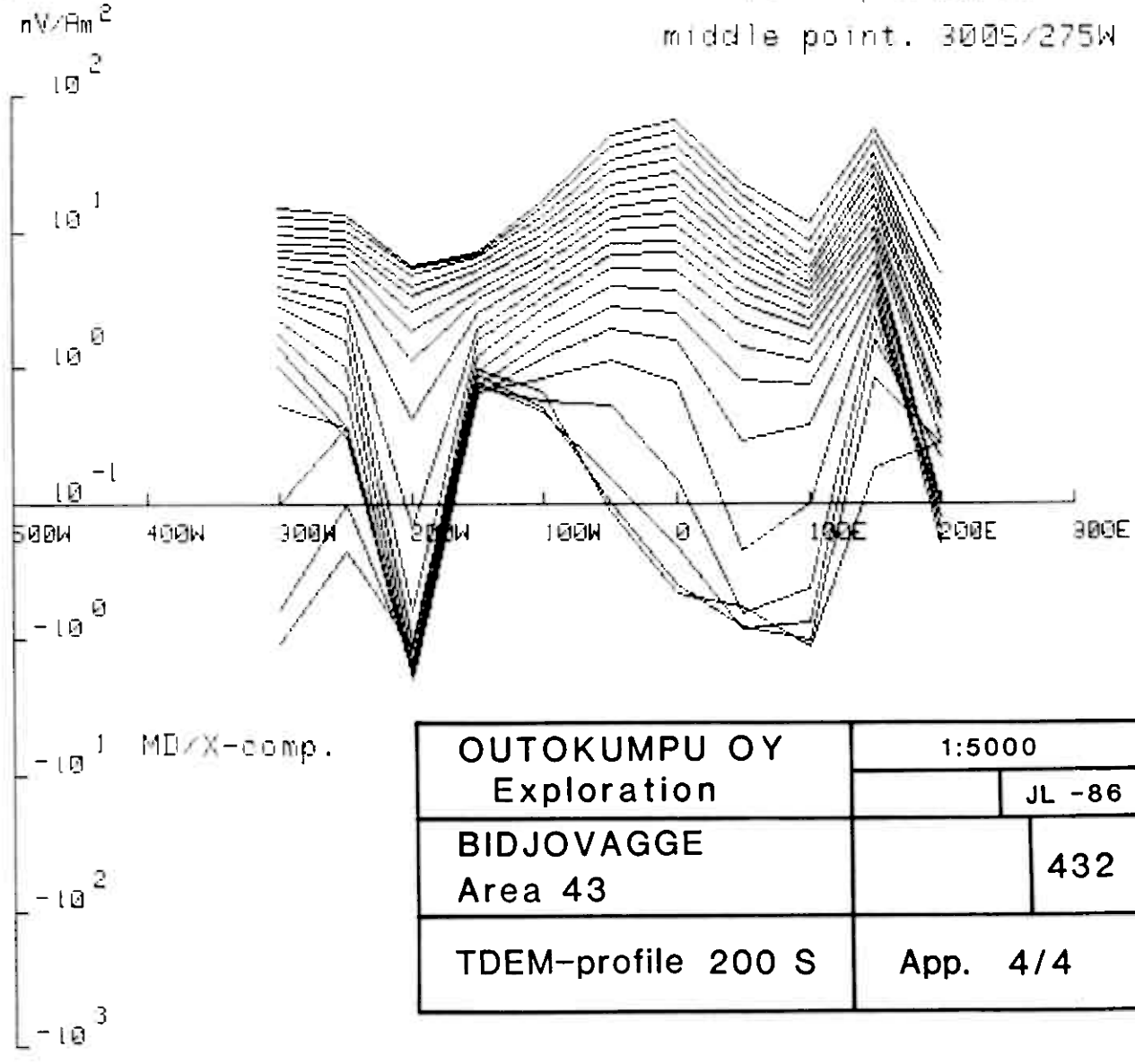
TR-loop 300*500m
middle point. 300S/275W



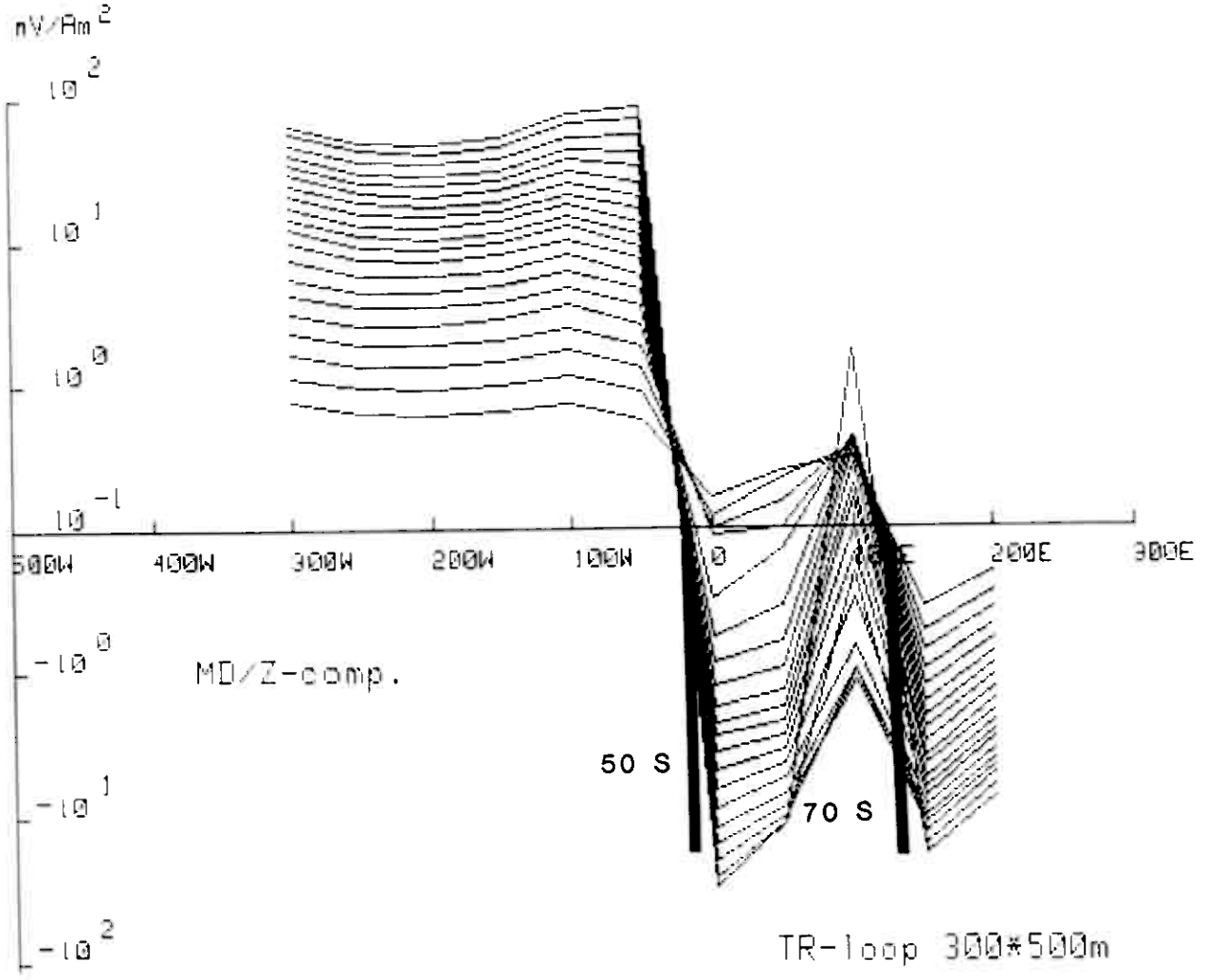
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 300 S	App. 4/3	



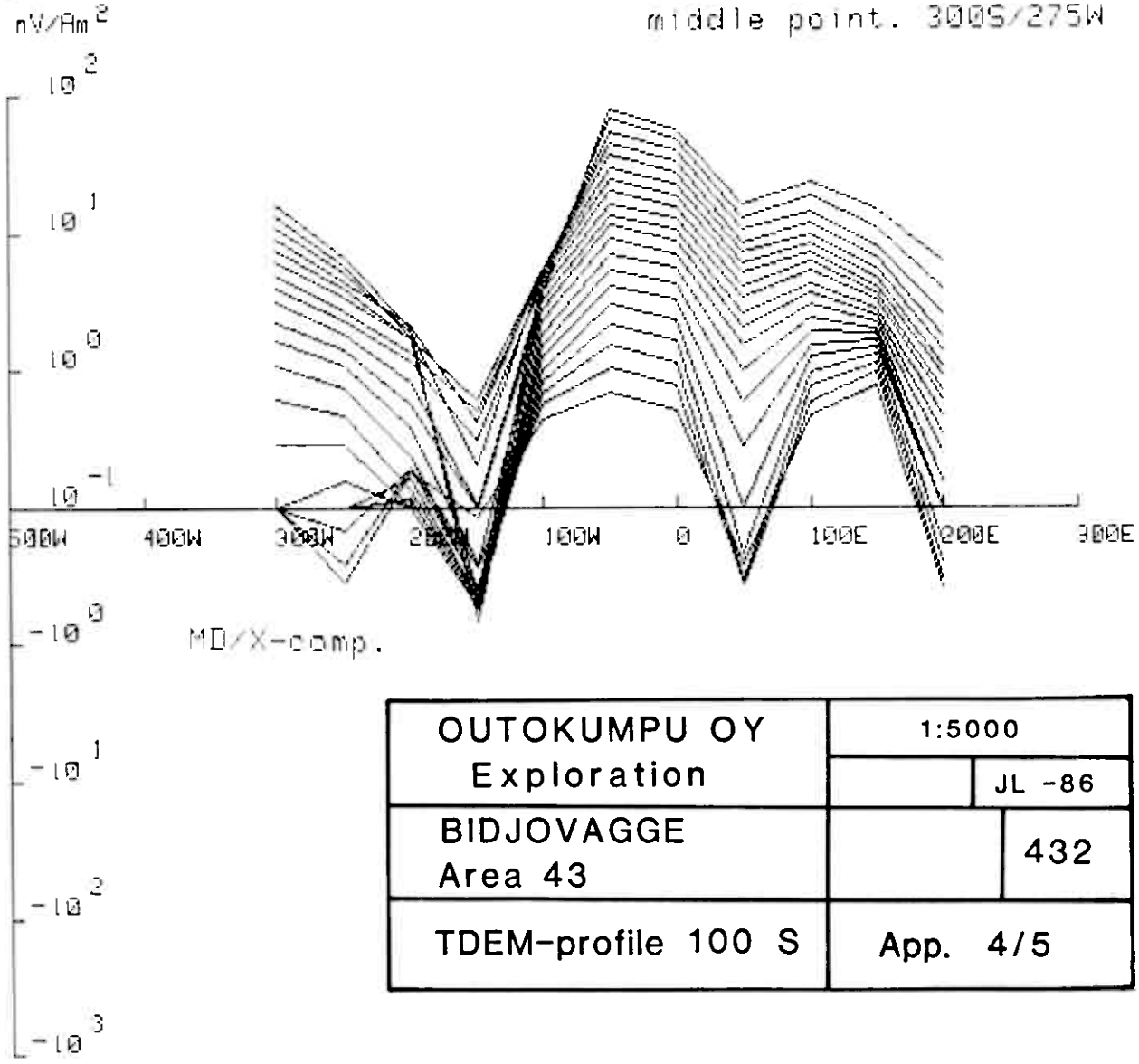
TR-loop 300*500m
middle point. 3005/275W



OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 200 S	App. 4/4	



TR-loop 300*500m
middle point. 300S/275W

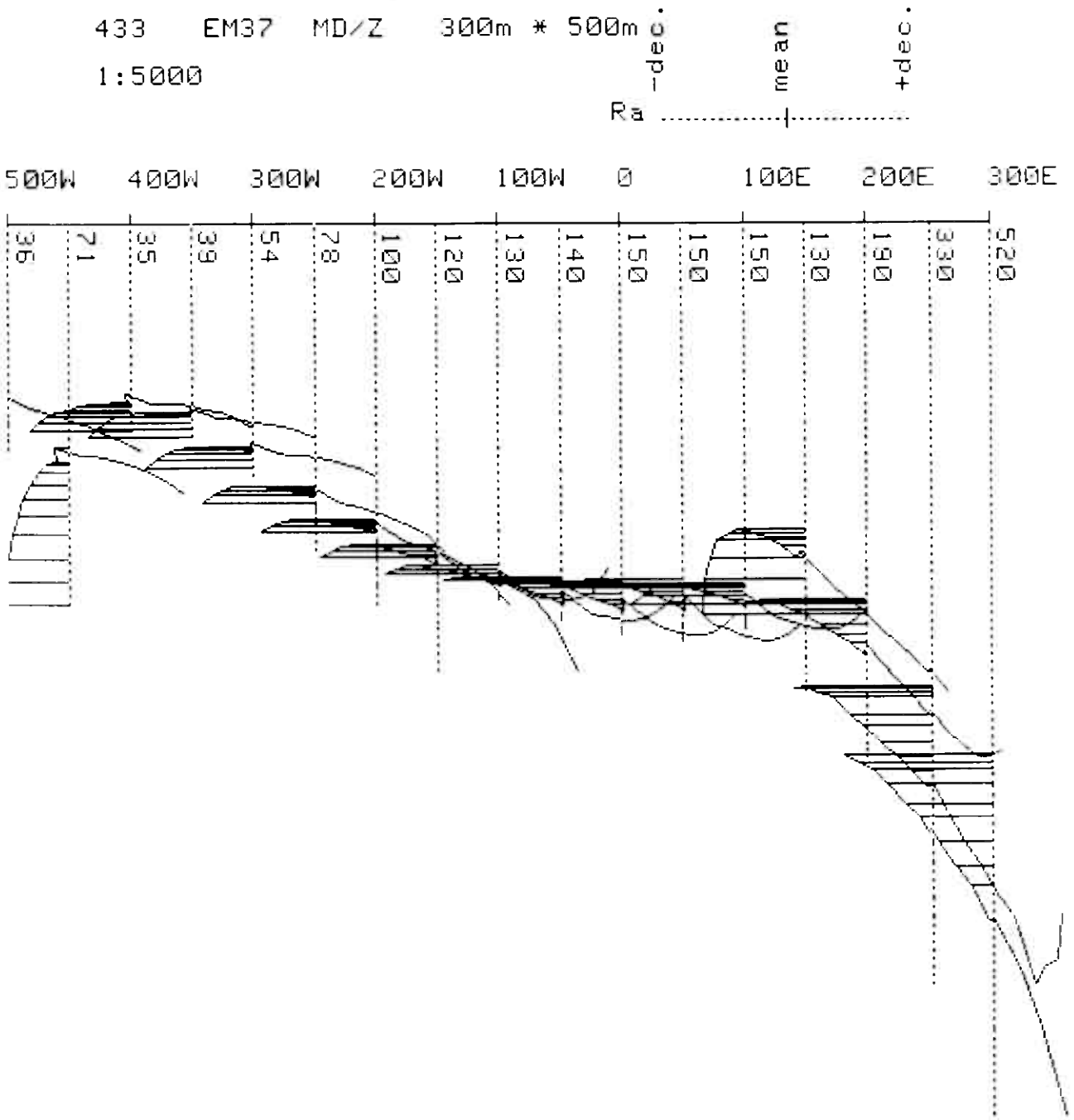


OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 100 S	App. 4/5

Area 43 MIKKUJAURE 3 Prof.500S

433 EM37 MD/Z 300m * 500m

1:5000

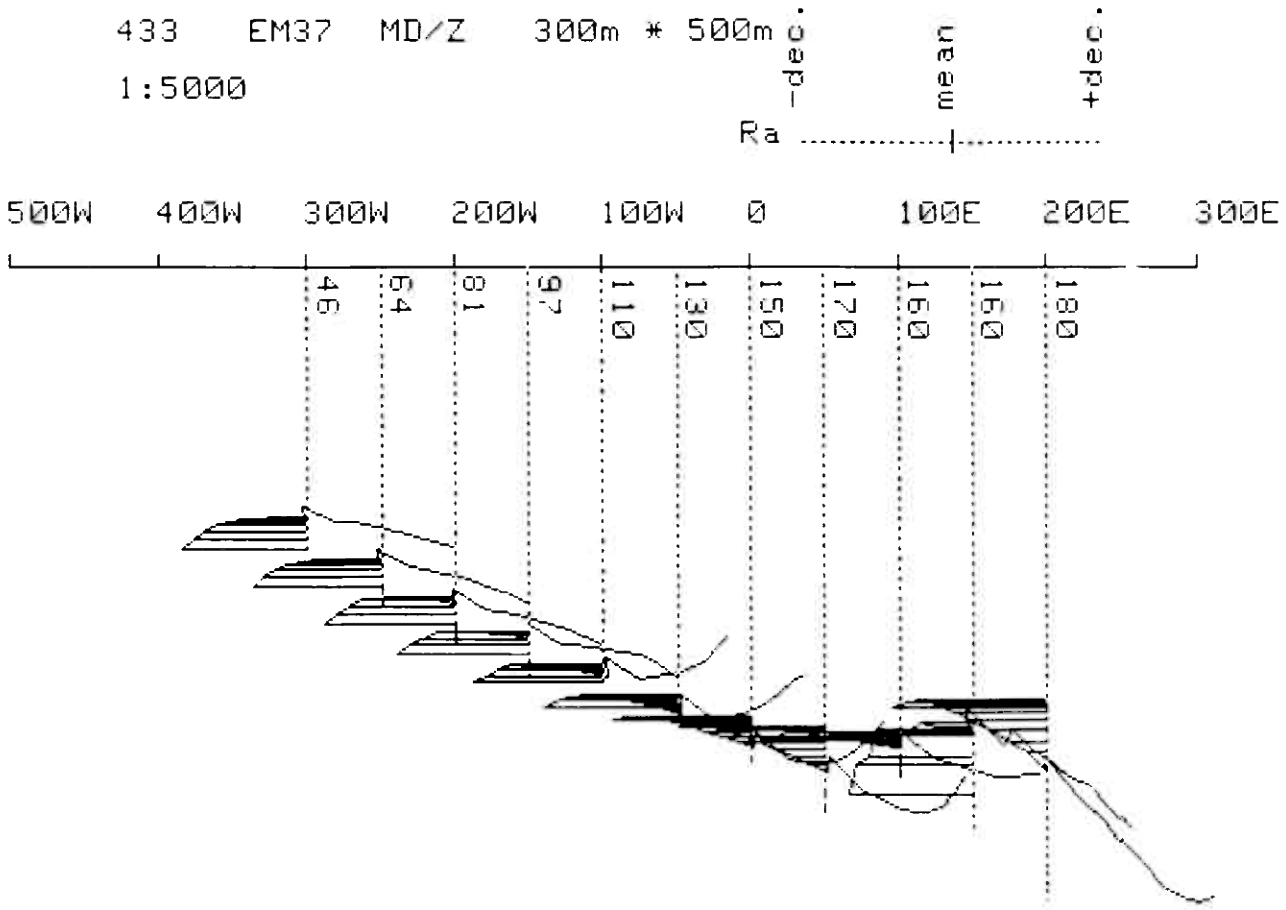


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 4/6	

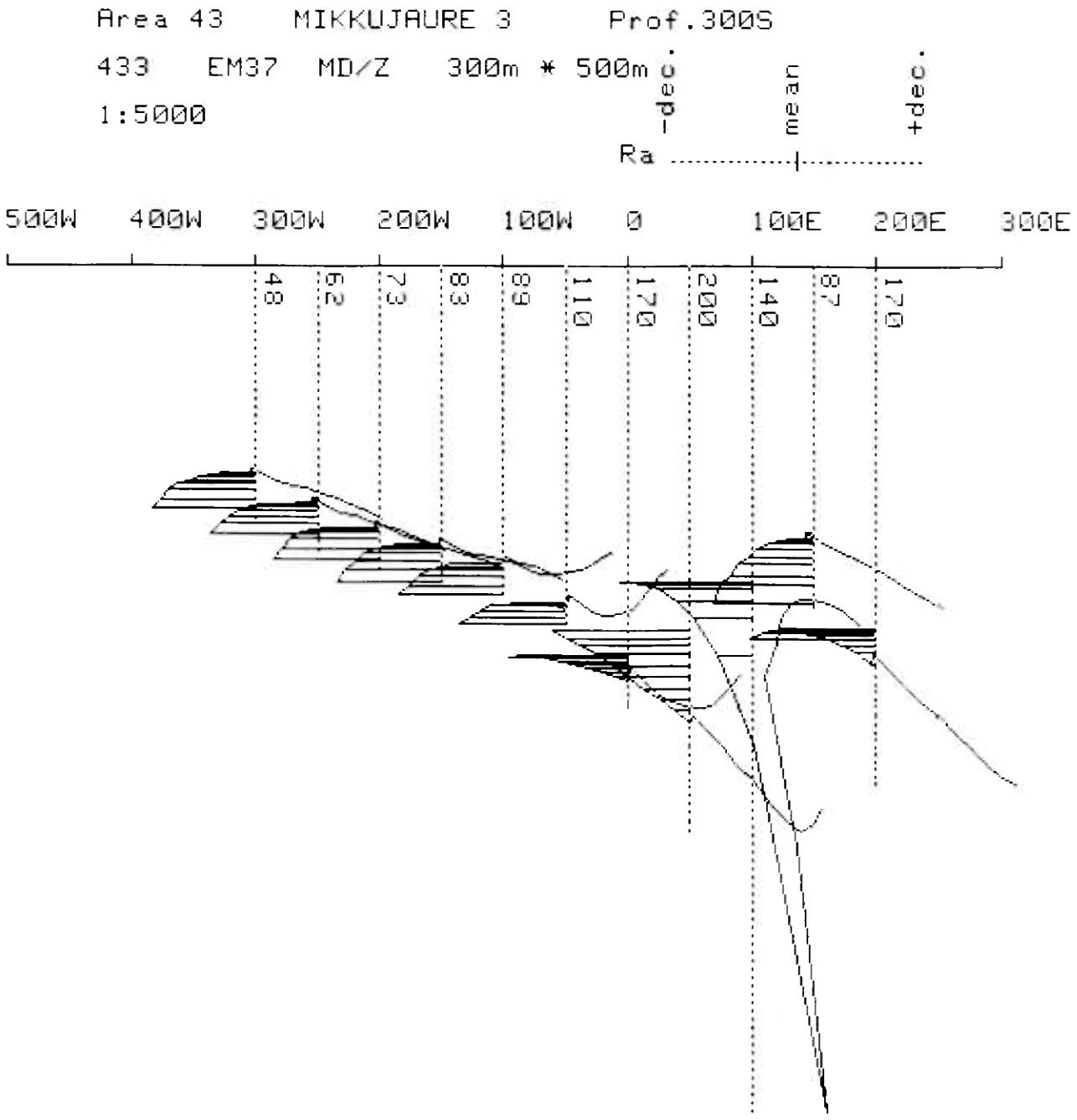
Area 43 MIKKUJAURE 3 Prof.400S

433 EM37 MD/Z 300m * 500m

1:5000



OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 4/7	

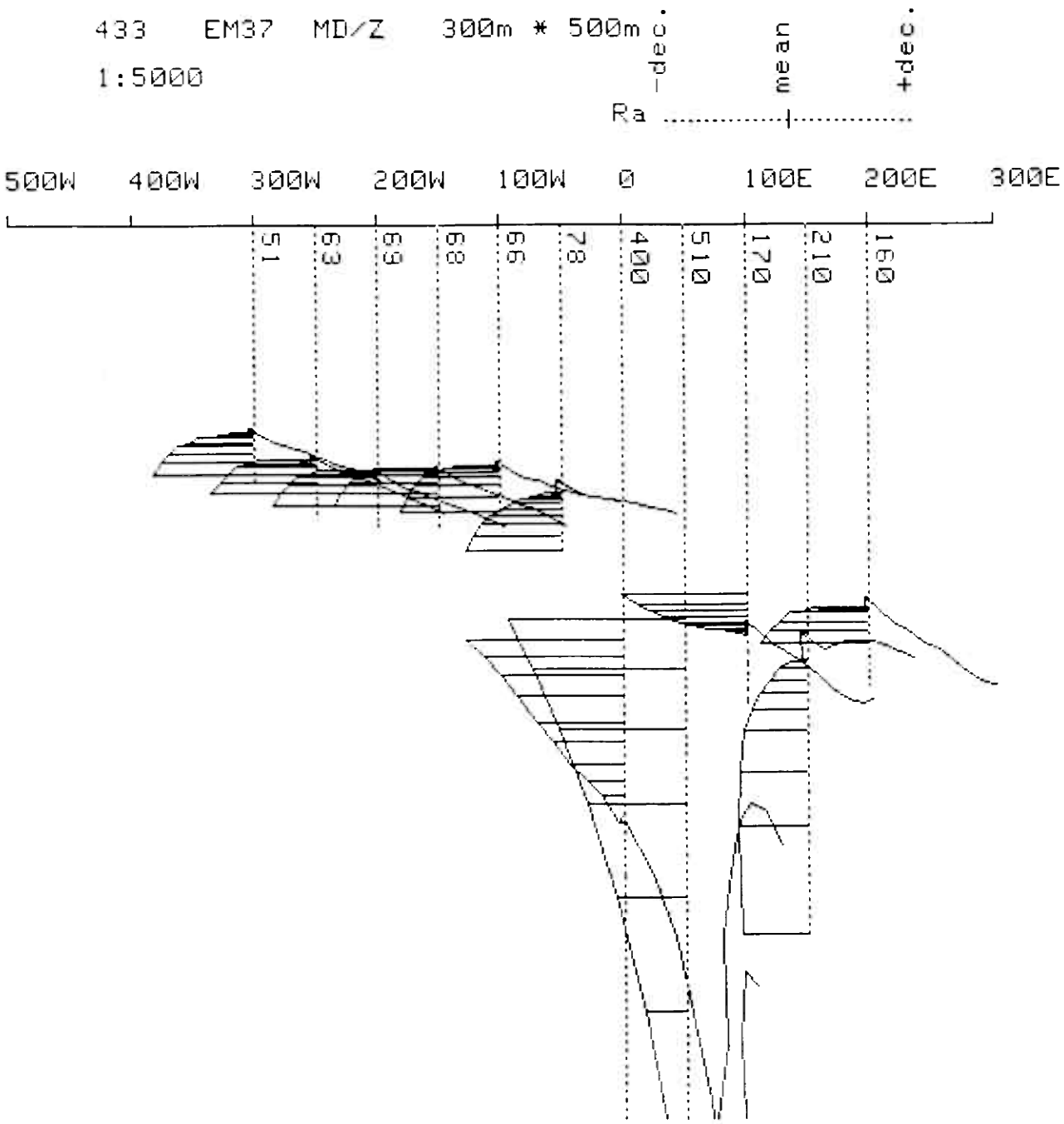


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 4/8	

Area 43 MIKKUJAURE 3 Prof.200S

433 EM37 MD/Z 300m * 500m

1:5000

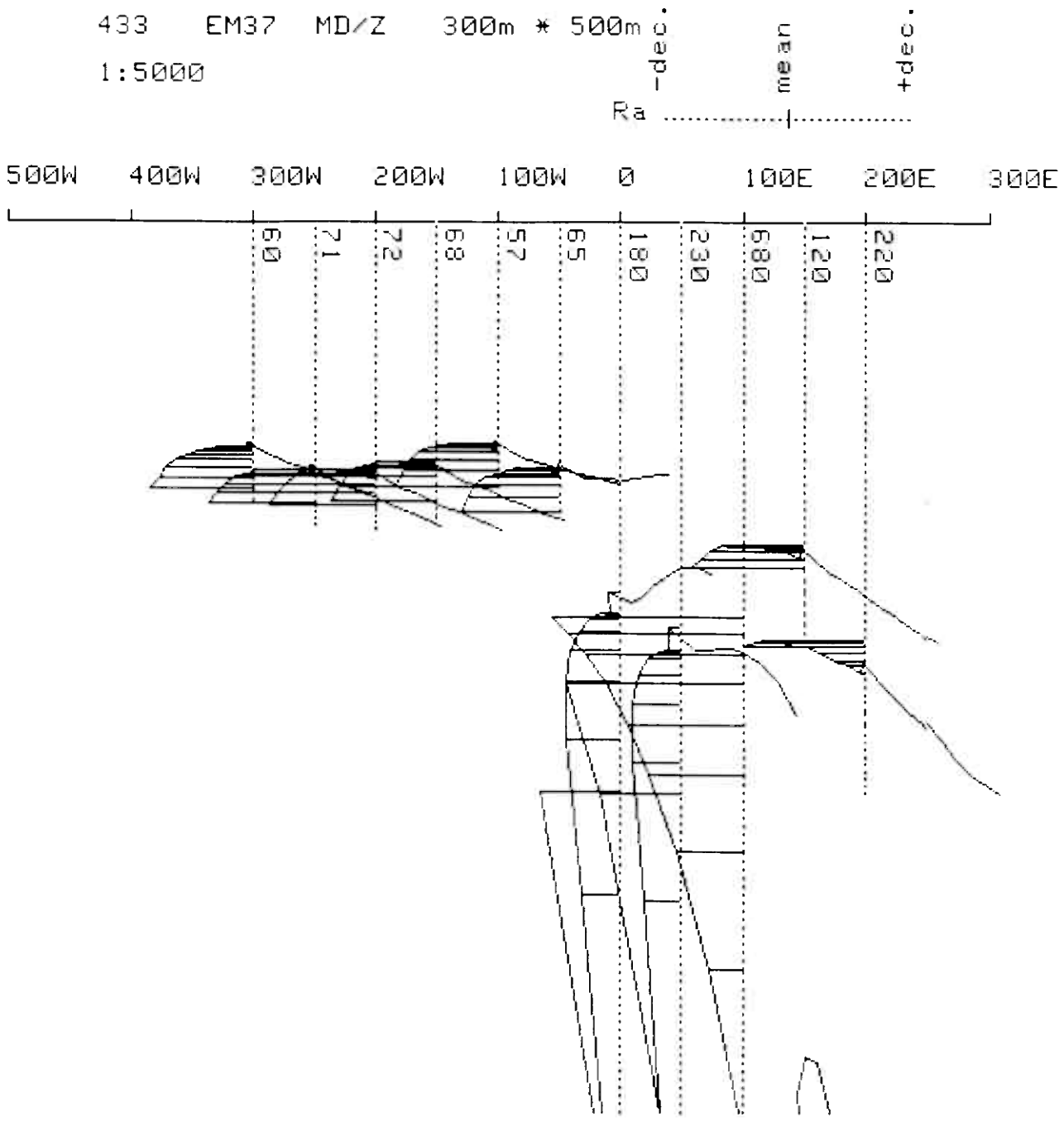


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 4/9	

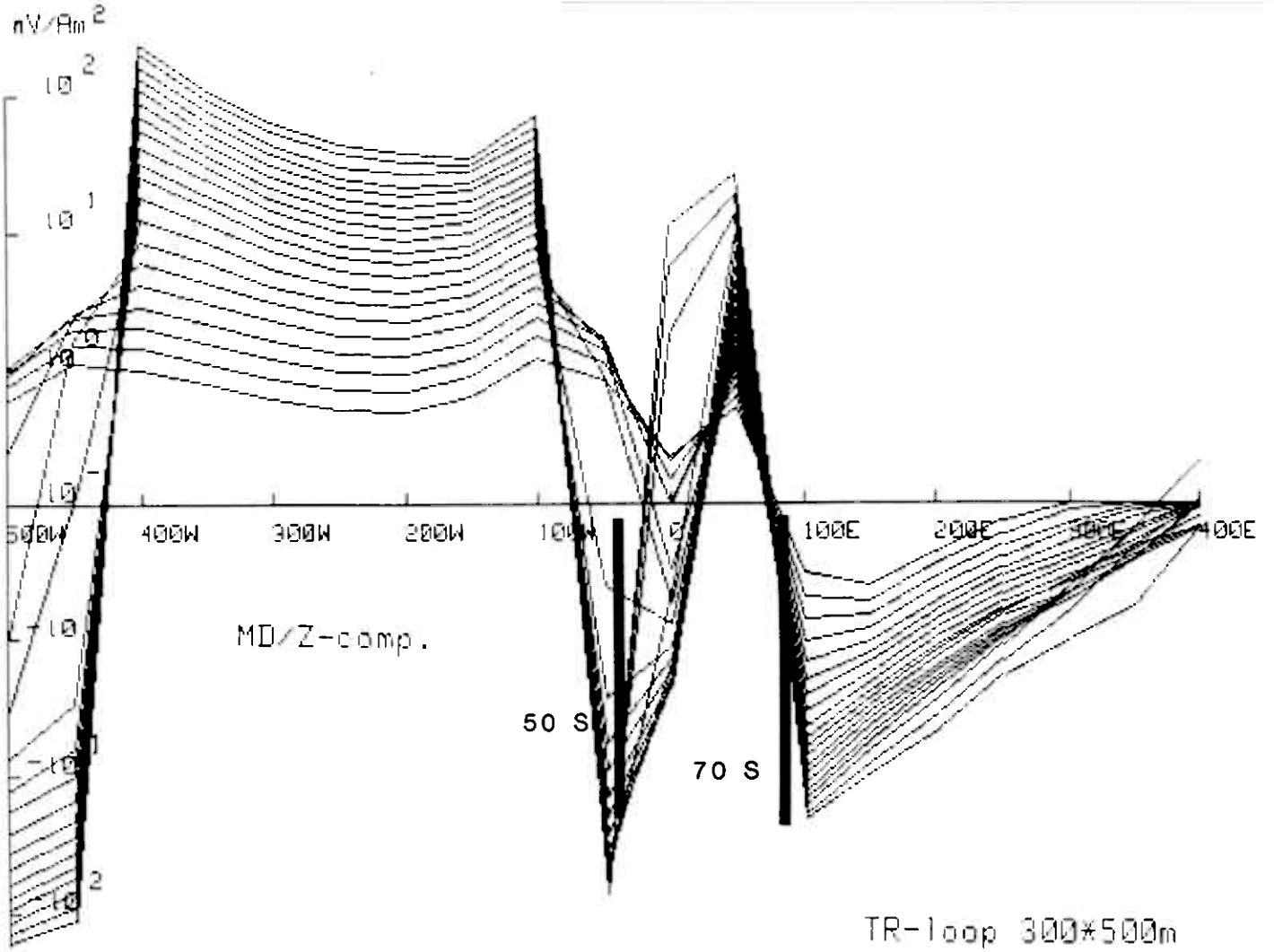
Area 43 MIKKUJAURE 3 Prof.100S

433 EM37 MD/Z 300m * 500m

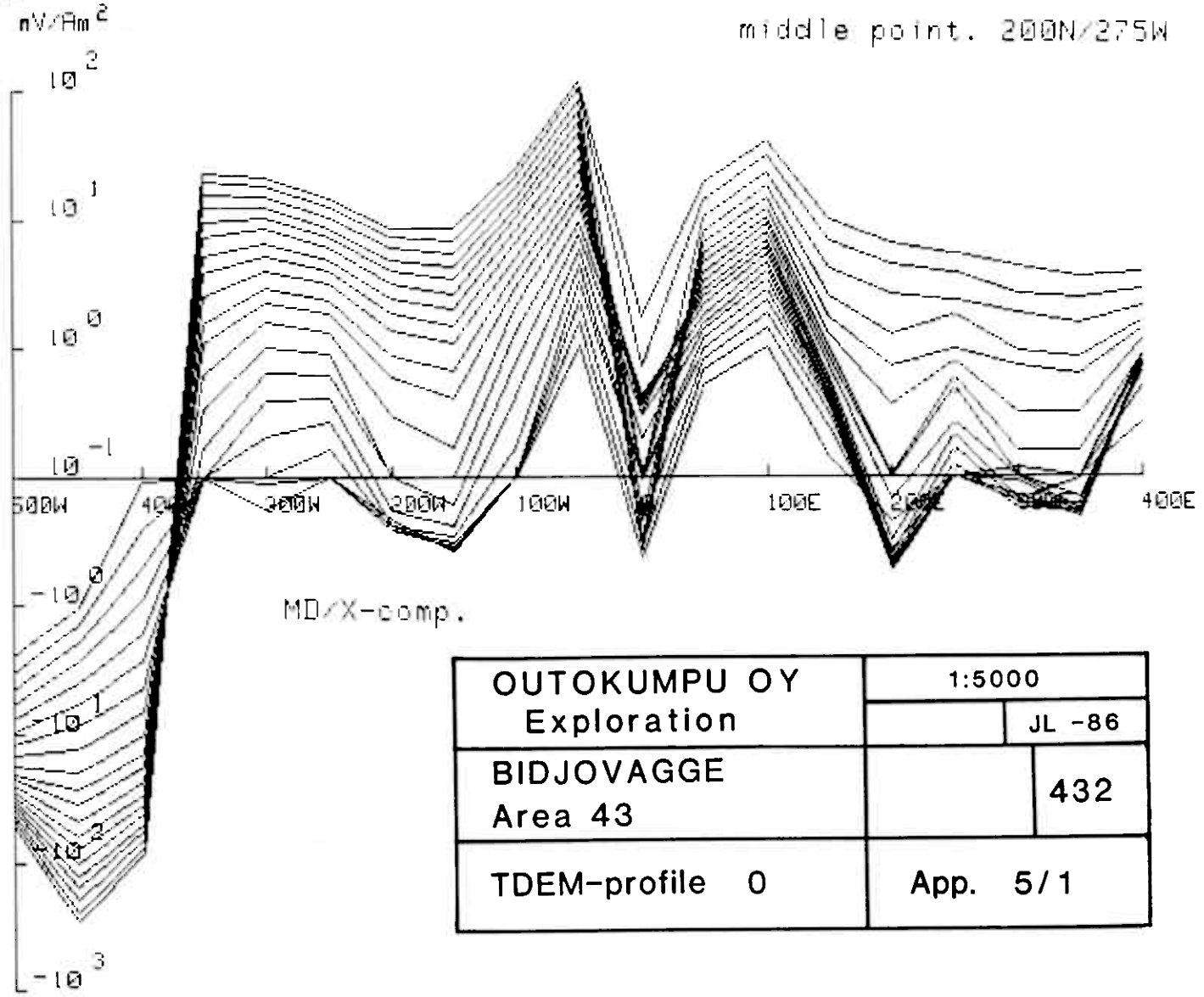
1:5000



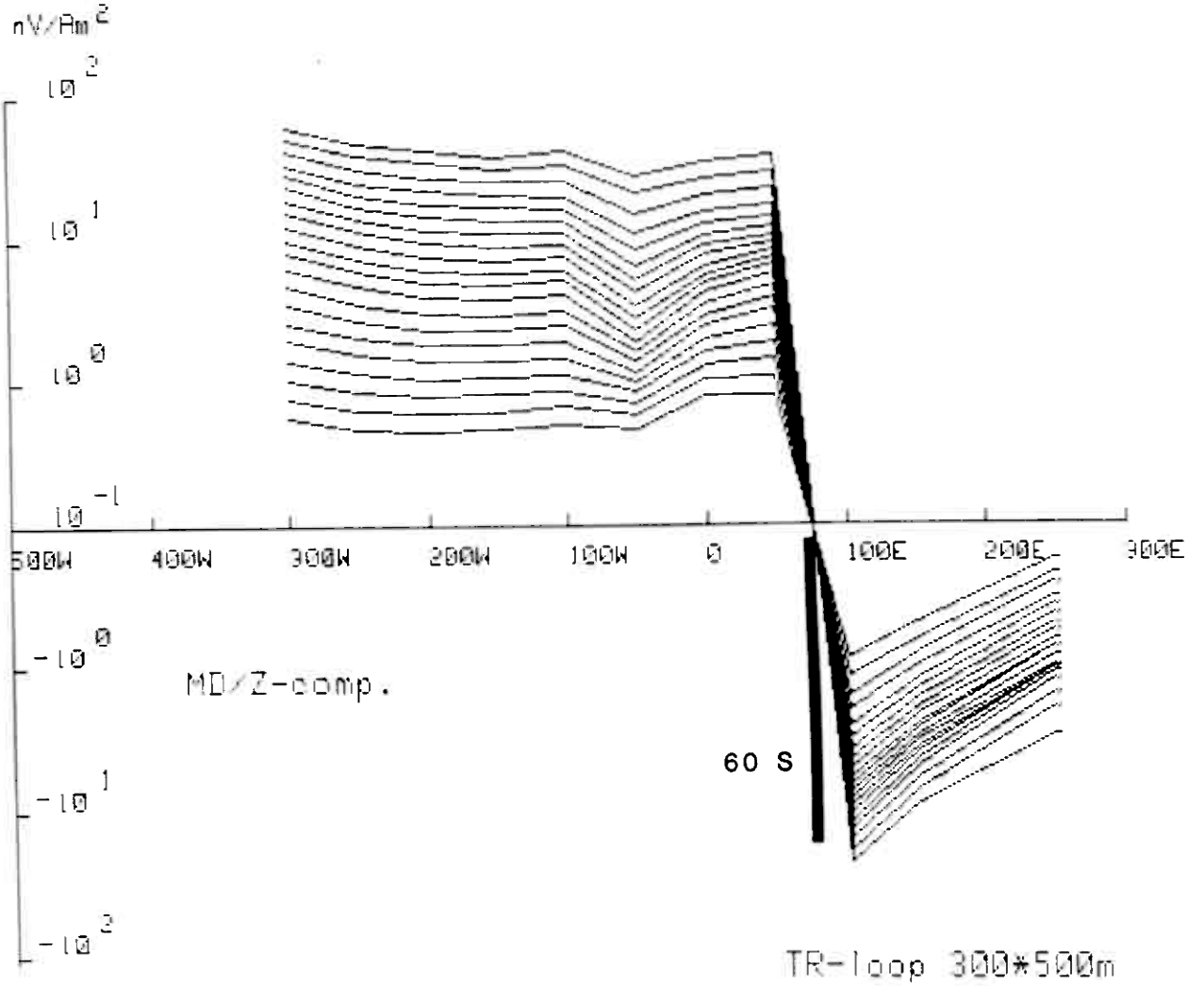
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 4/10	



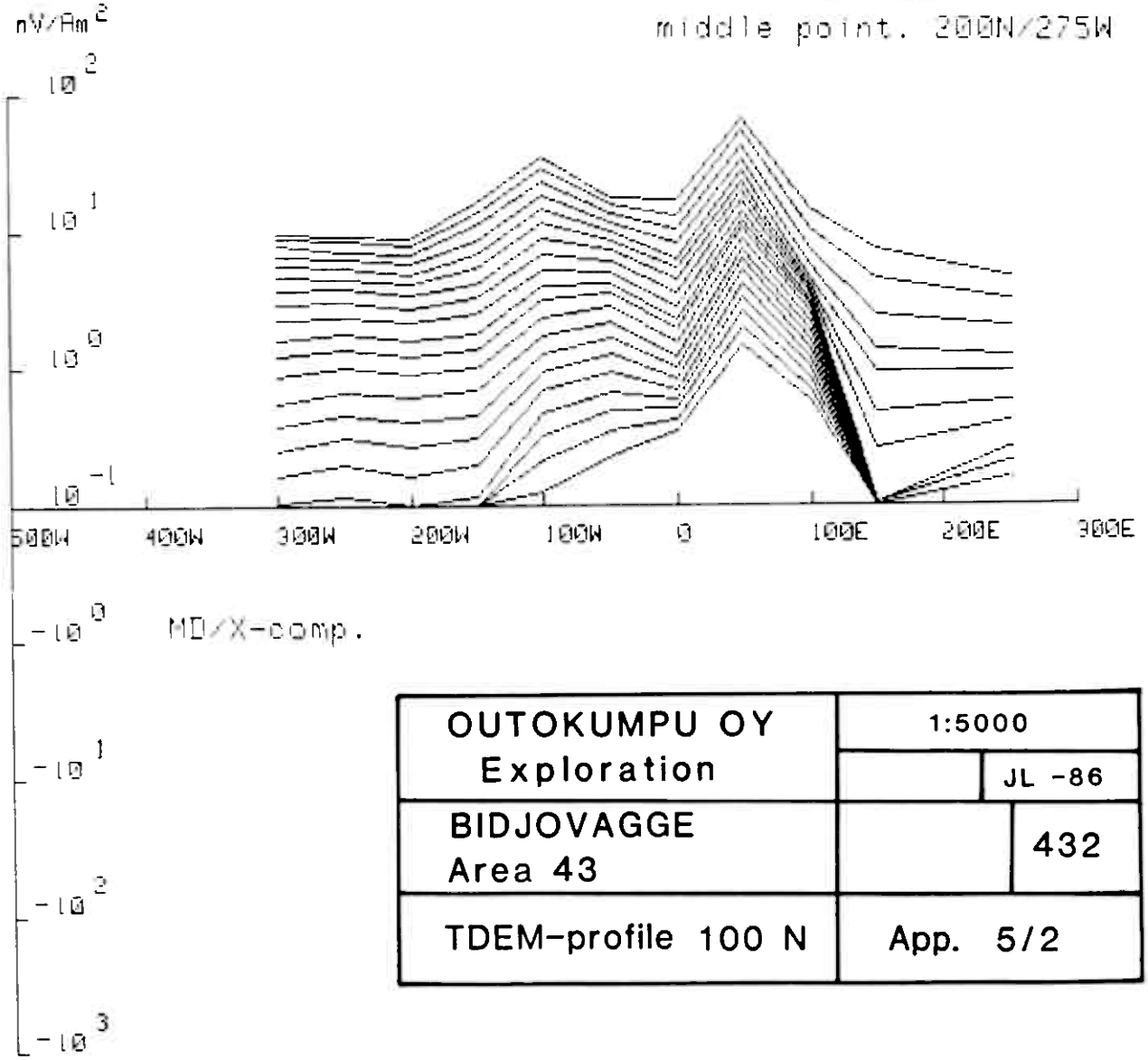
TR-loop 300*500m
middle point. 200N/275W



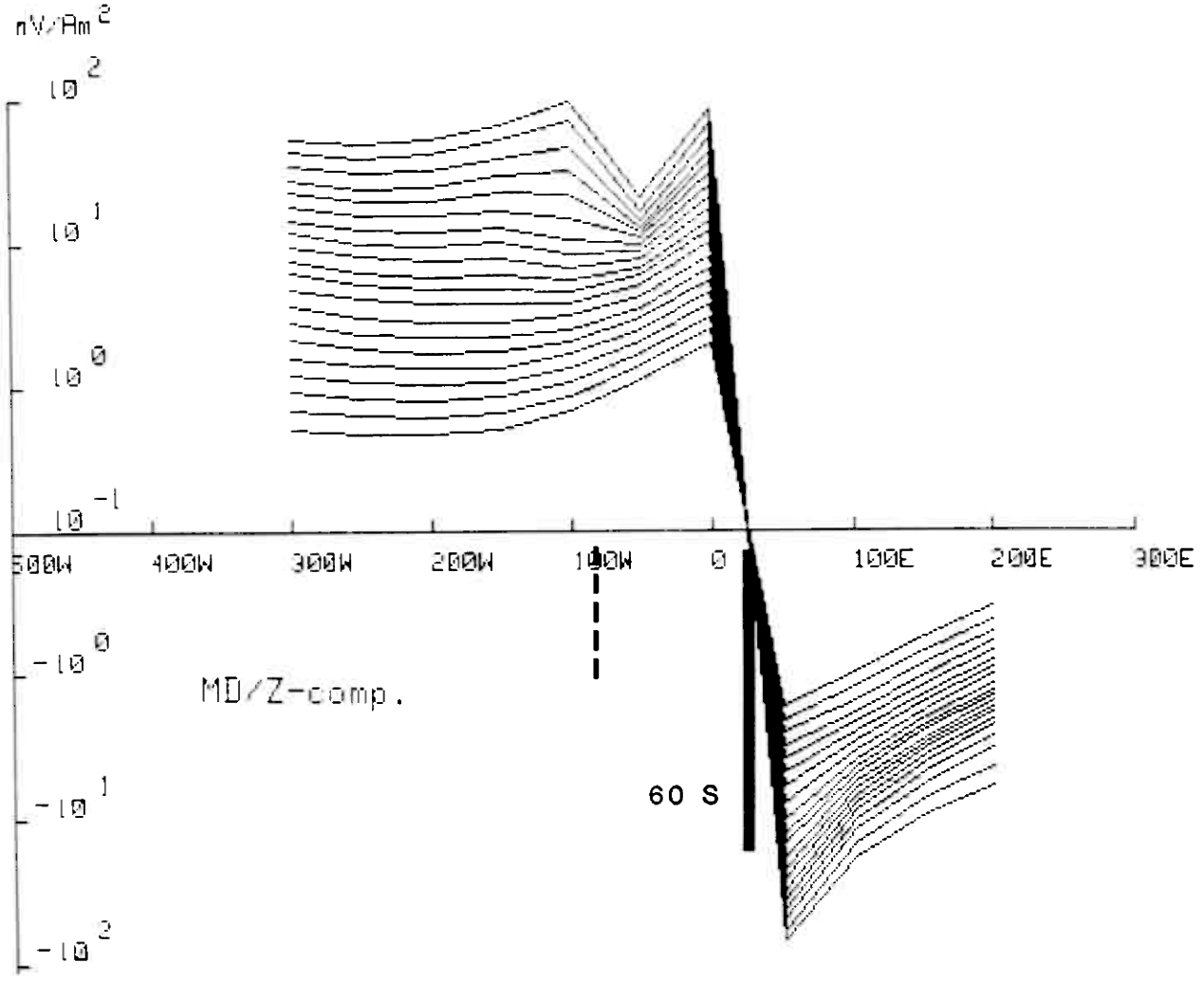
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 0	App. 5/1	



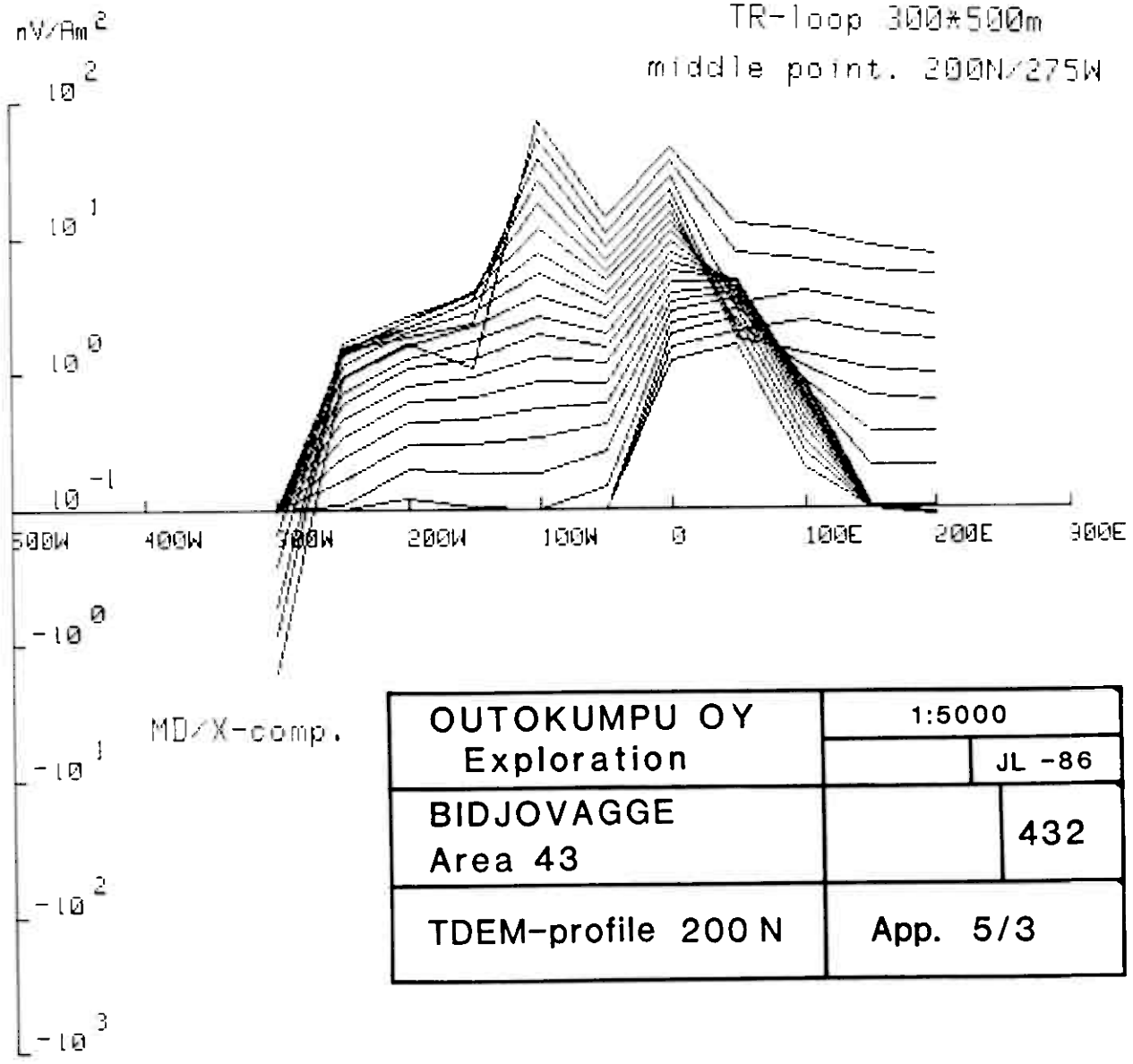
TR-loop 300*500m
middle point. 200N/275W



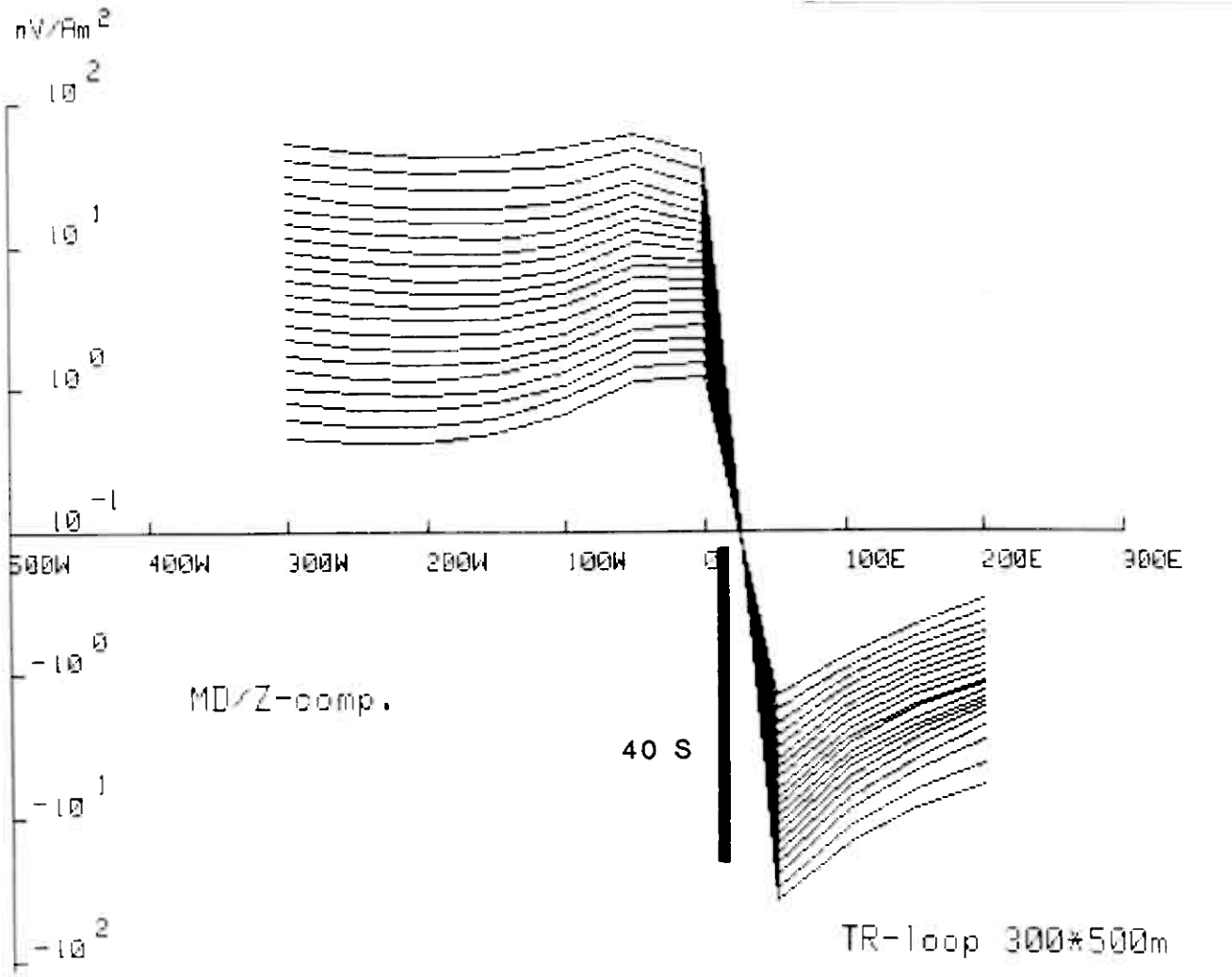
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 100 N	App. 5/2



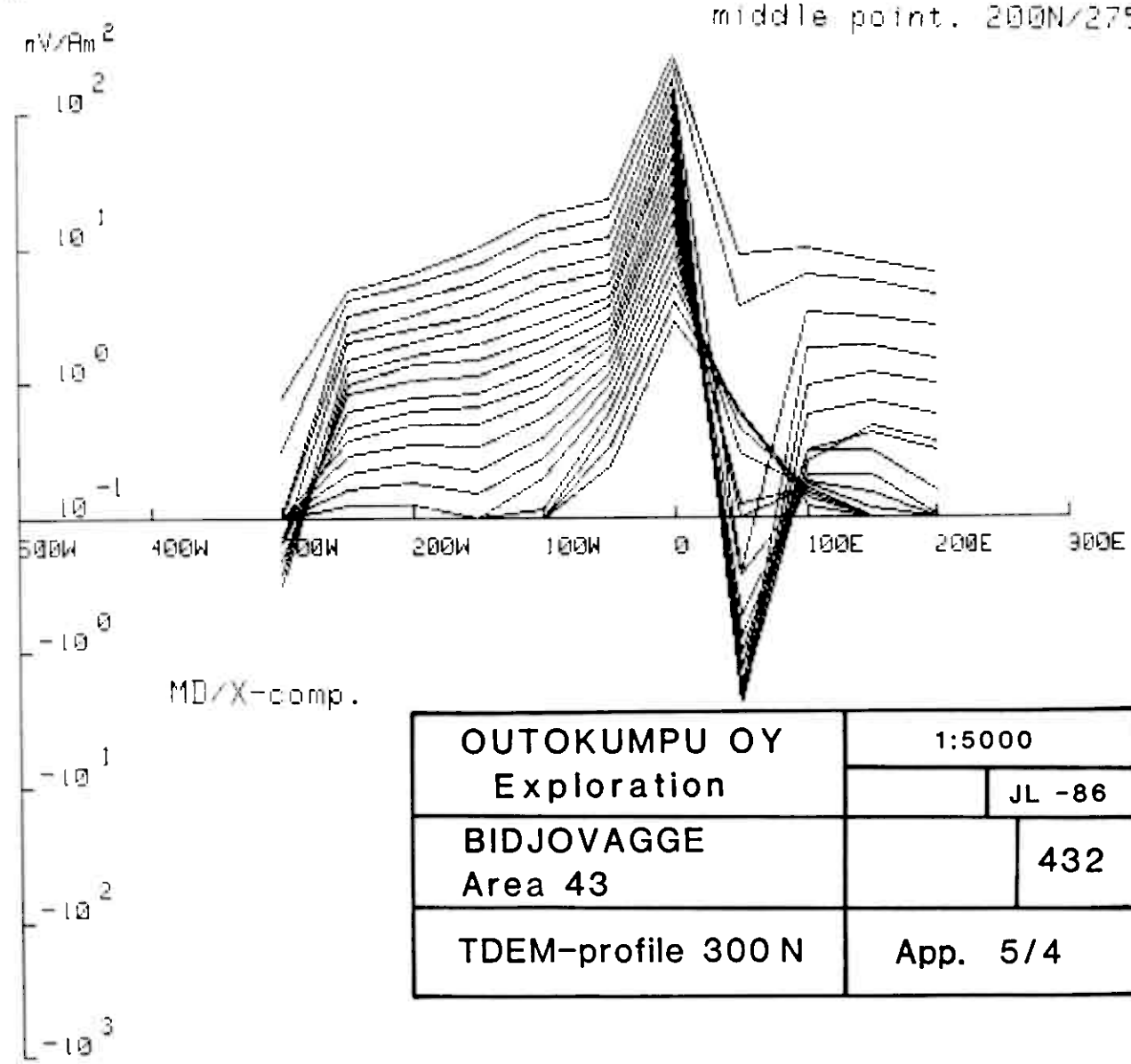
TR-loop 300*500m
middle point. 200N/275W



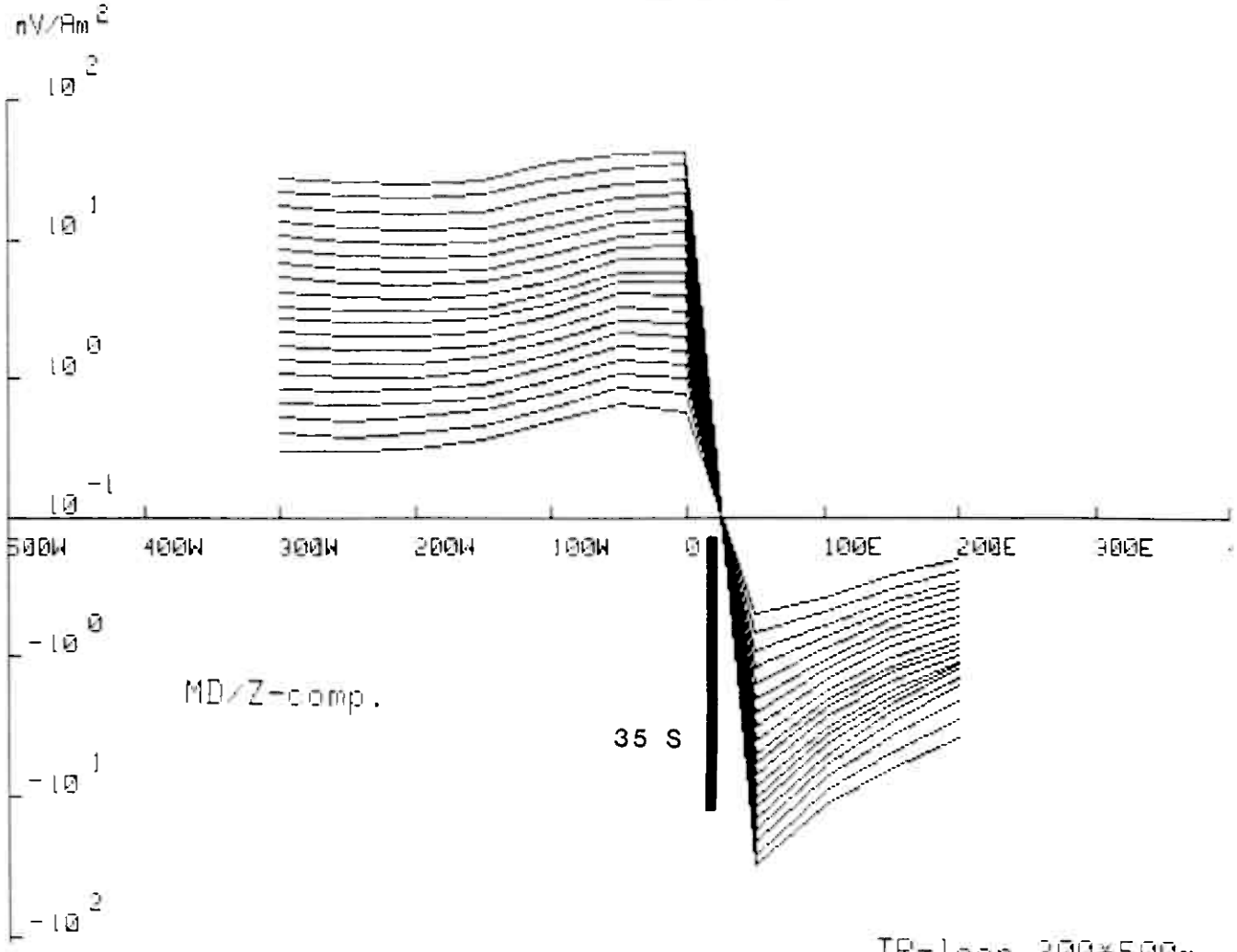
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 200 N	App. 5/3	



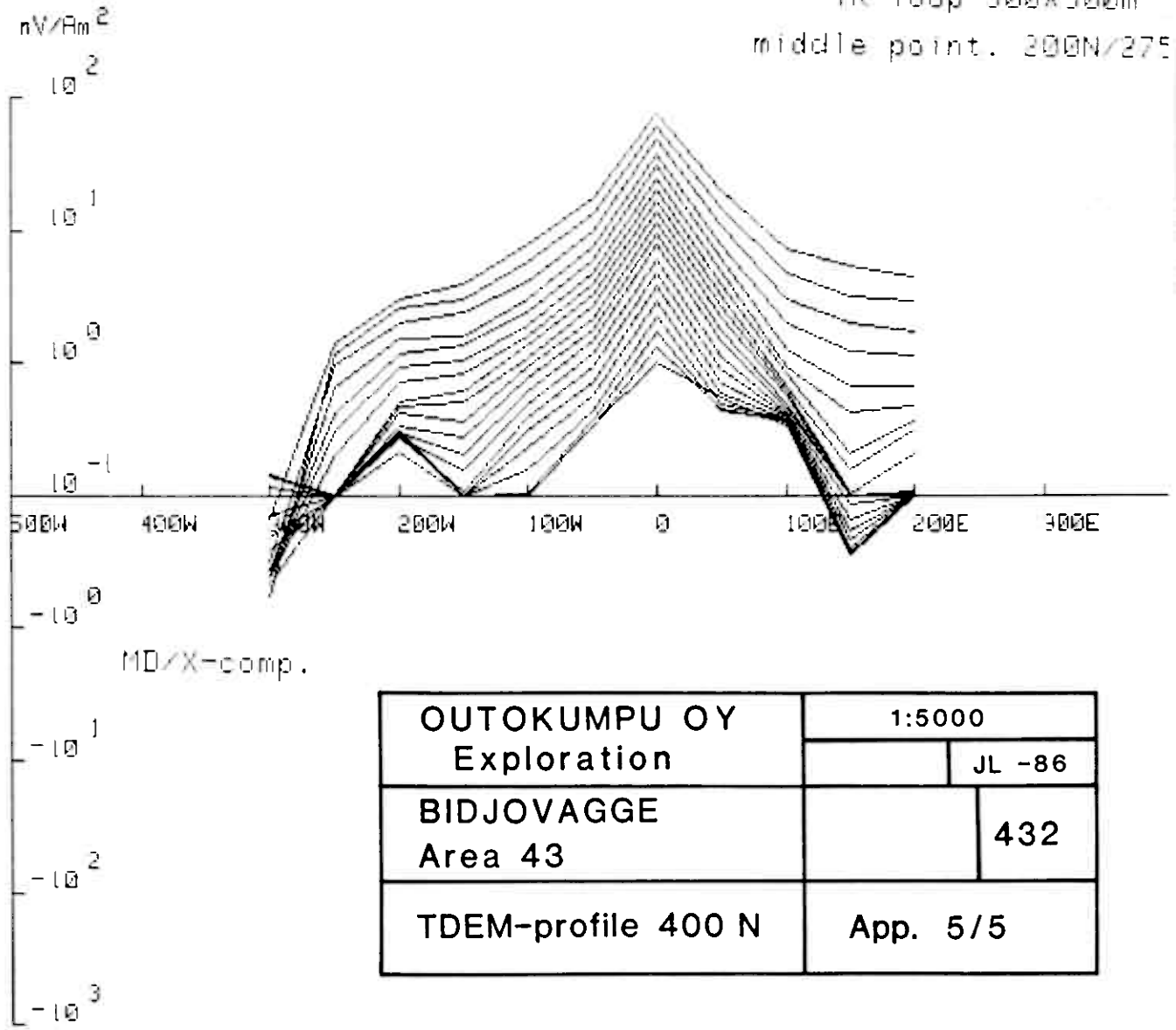
TR-loop 300*500m
middle point. 200N/275W



OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 300 N	App. 5/4



TR-loop 300*500m
middle point. 200N/275

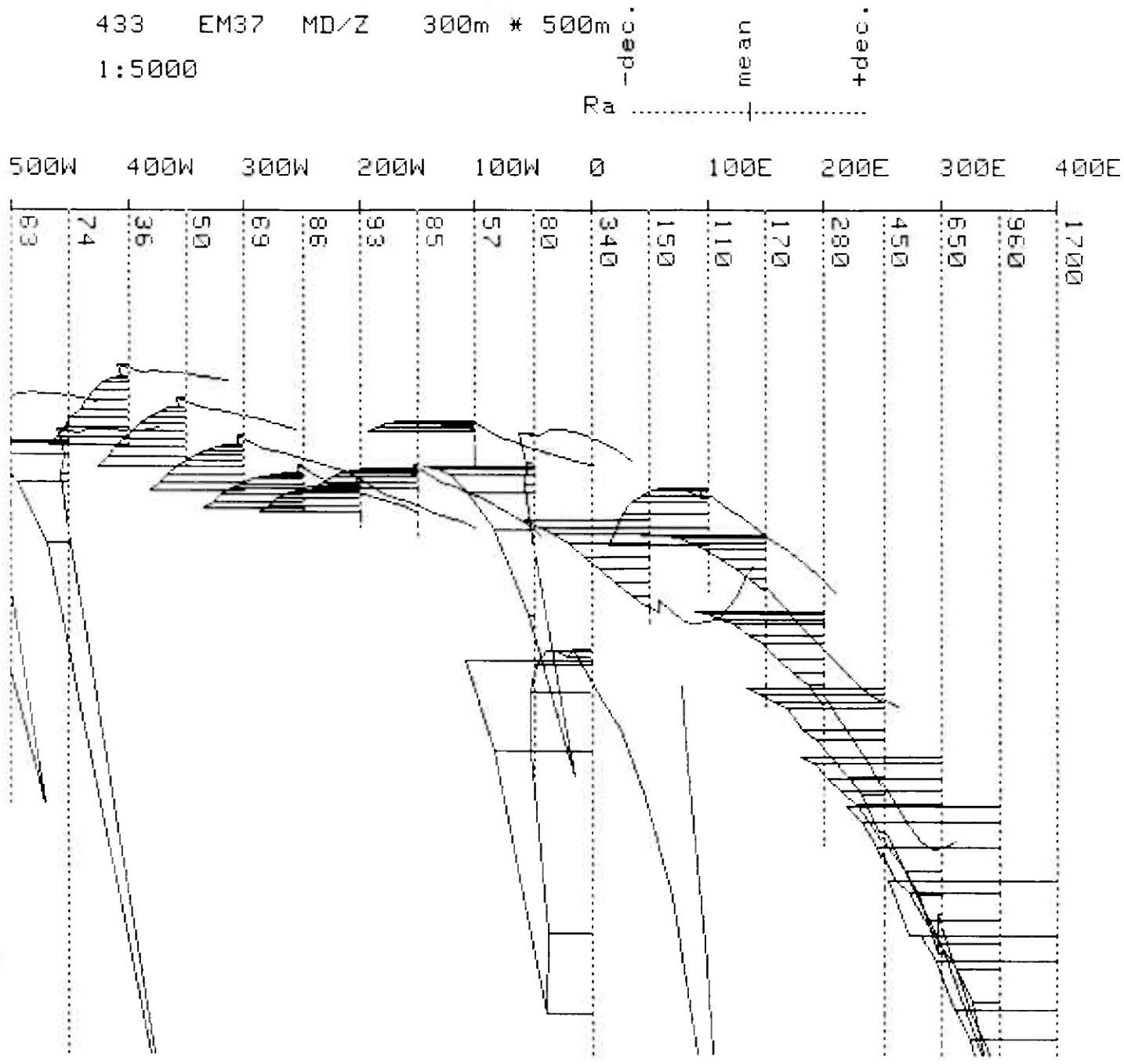


OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 400 N	App. 5/5

Area 43 MIKKUJAURE 4 Prof.0

433 EM37 MD/Z 300m * 500m

1:5000

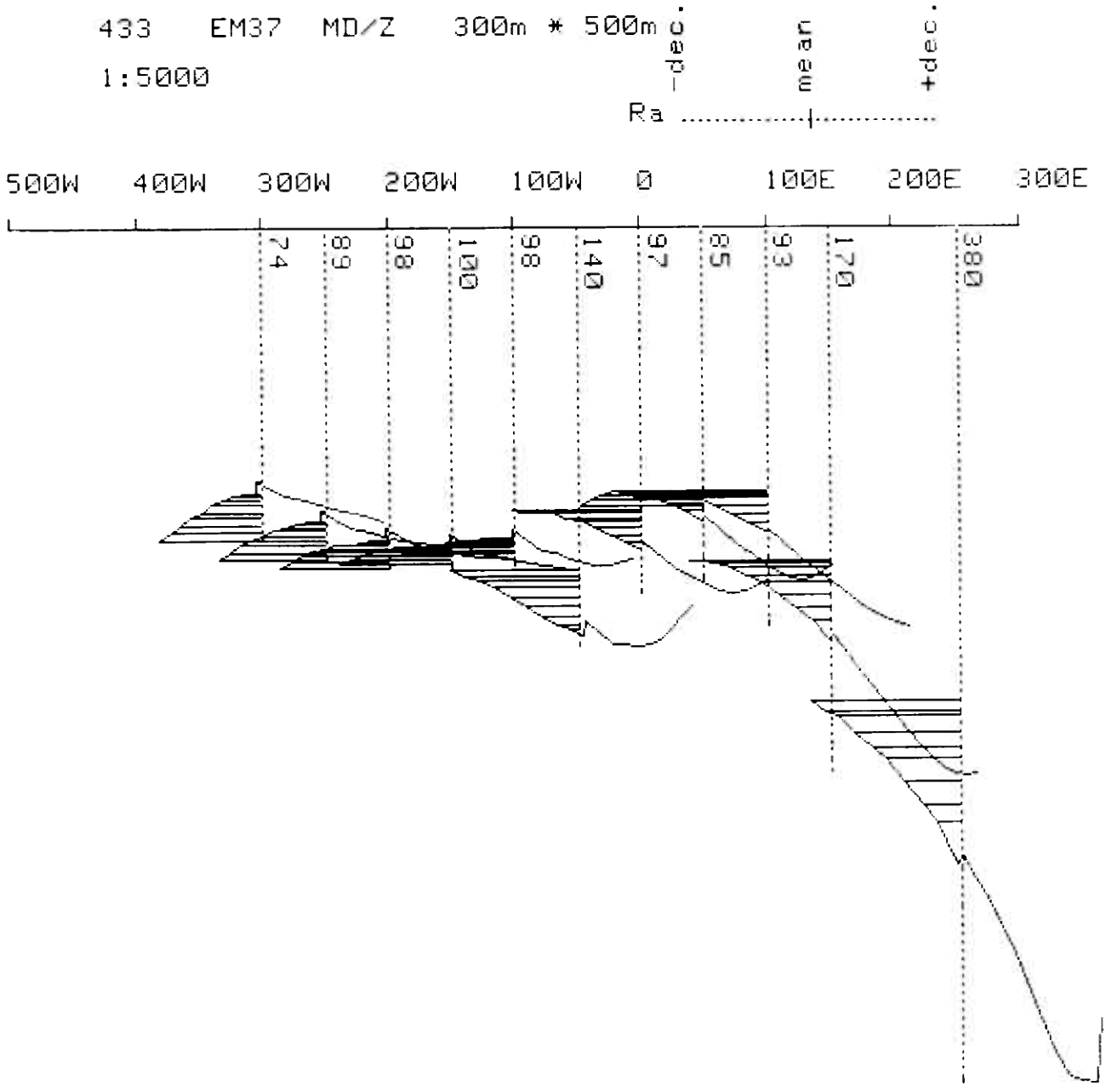


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 5/6	

Area 43 MIKKUJAURE 4 Prof.100N

433 EM37 MD/Z 300m * 500m

1:5000

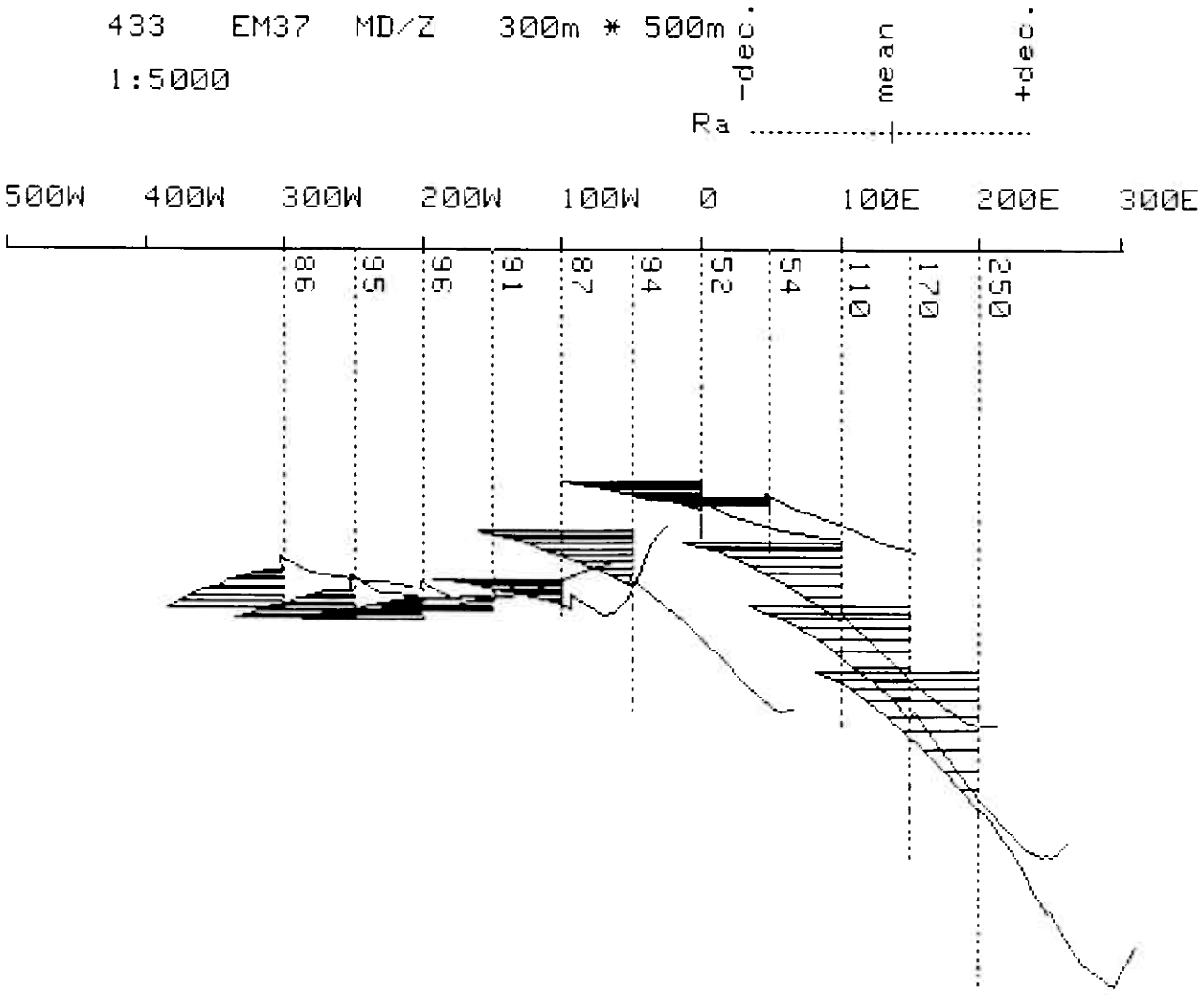


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 5/7	

Area 43 MIKKUJAURE 4 Prof.200N

433 EM37 MD/Z 300m * 500m

1:5000

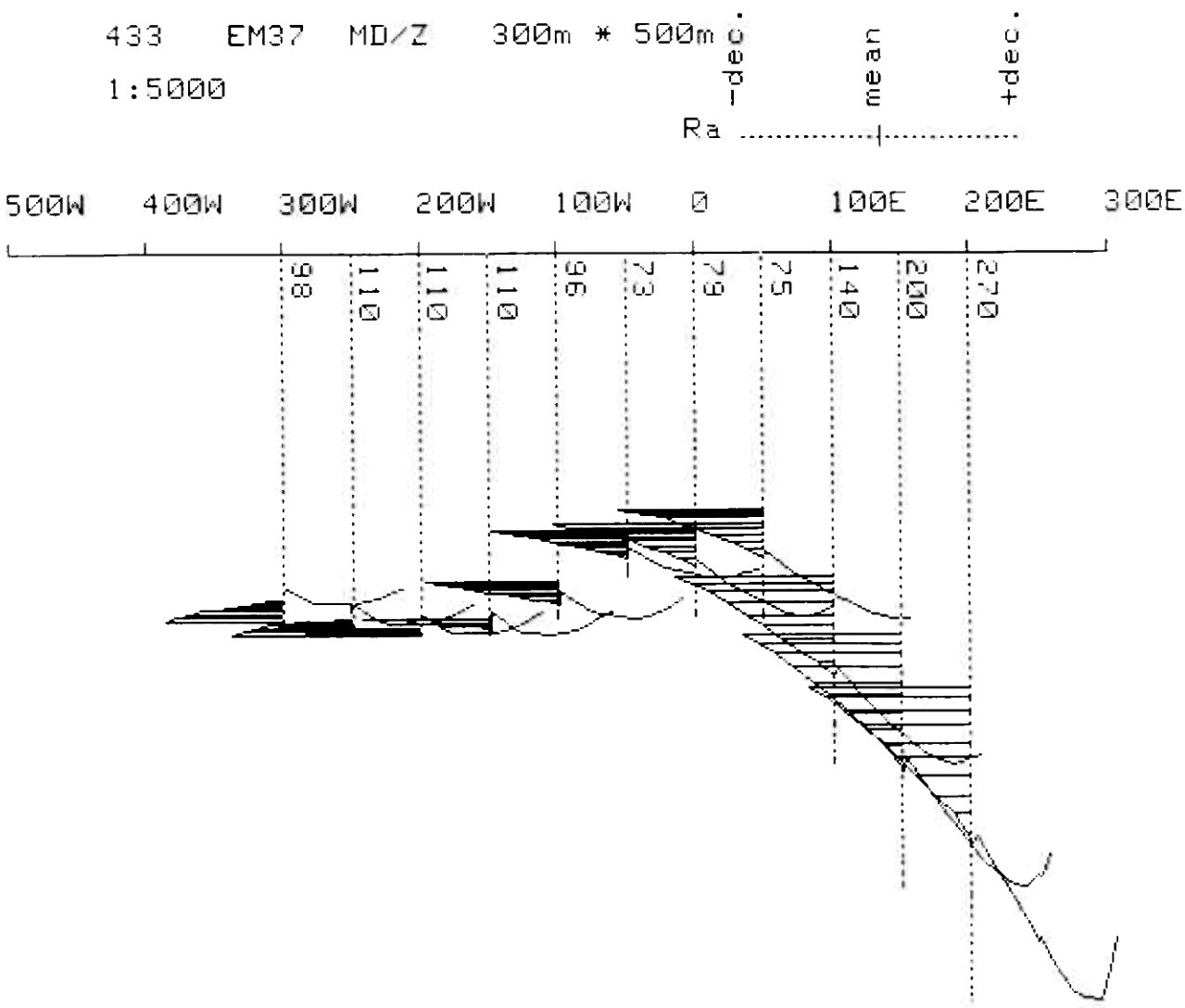


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 5/8	

Area 43 MIKKUJAURE 4 Prof.300N

433 EM37 MD/Z 300m * 500m

1:5000

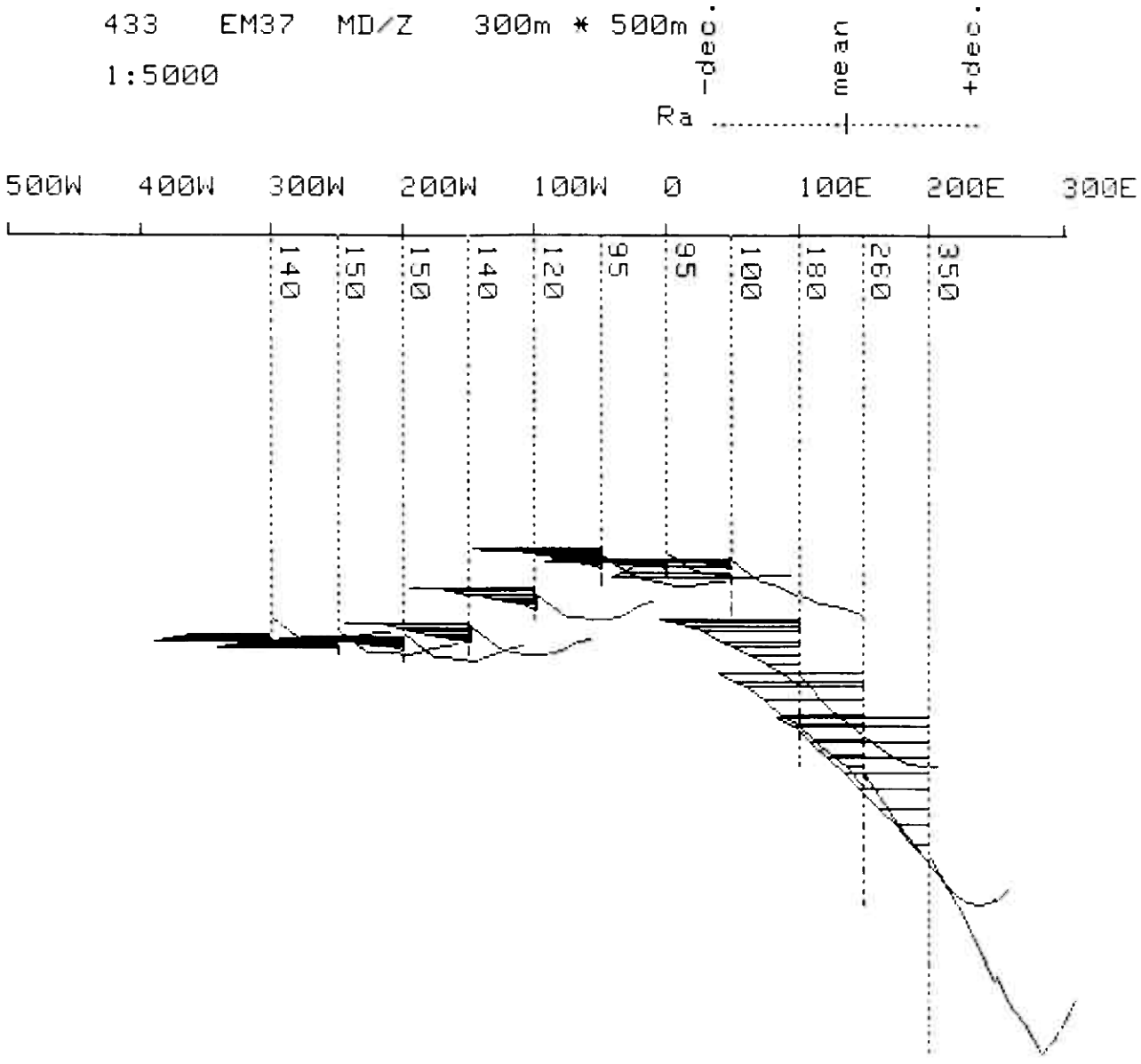


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 5/9	

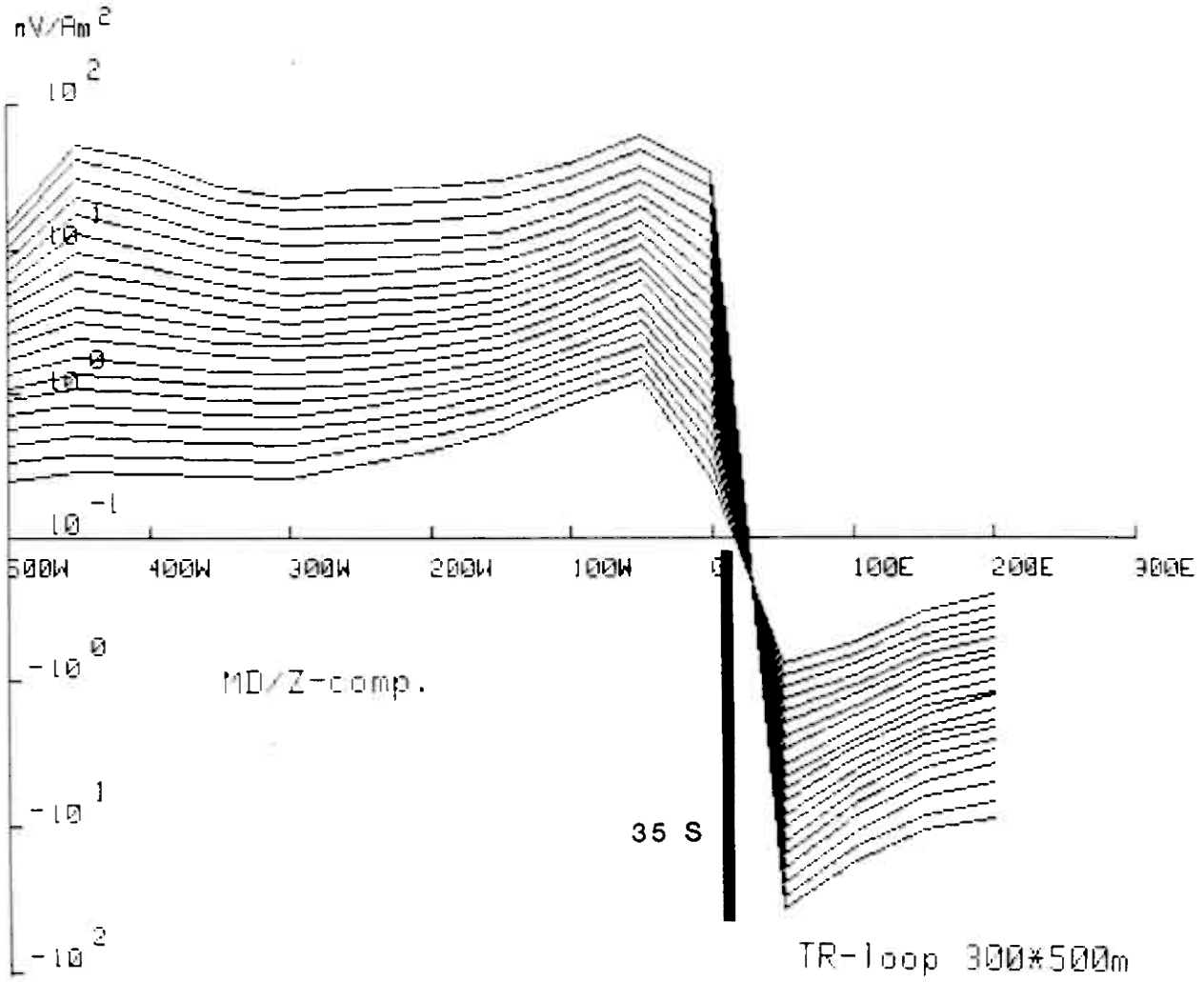
Area 43 MIKKUJAURE 4 Prof.400N

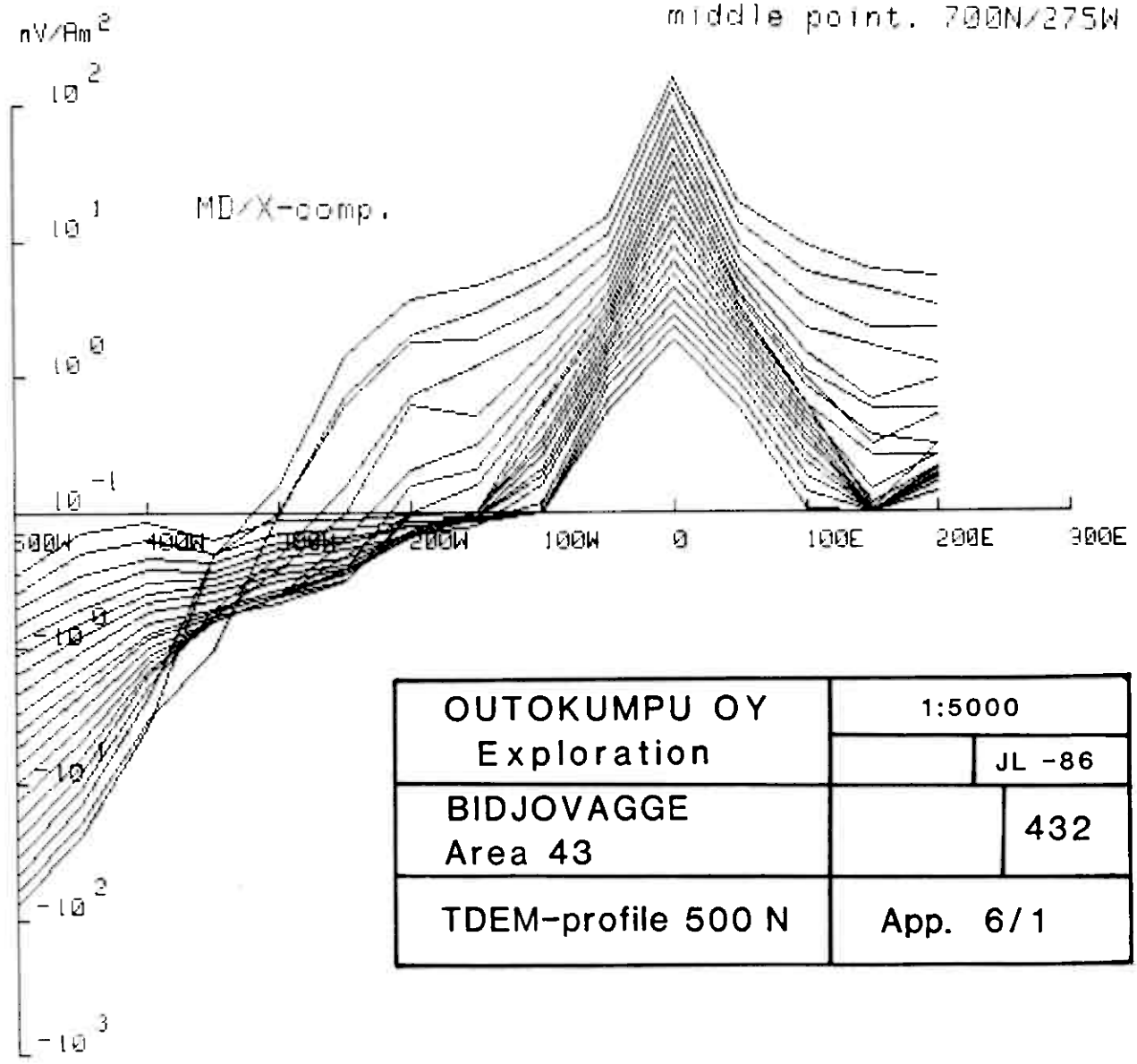
433 EM37 MD/Z 300m * 500m

1:5000

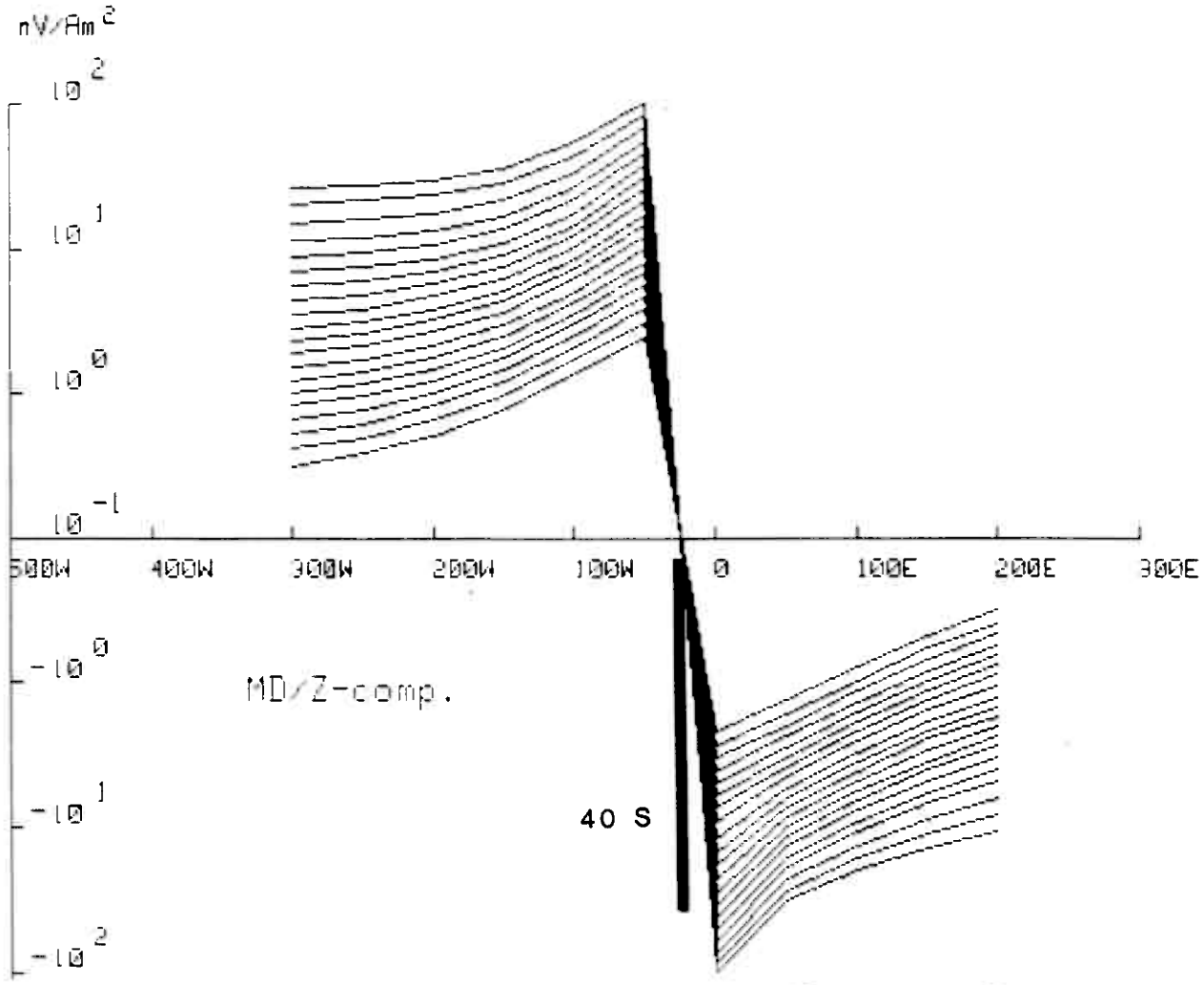


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 5/10	

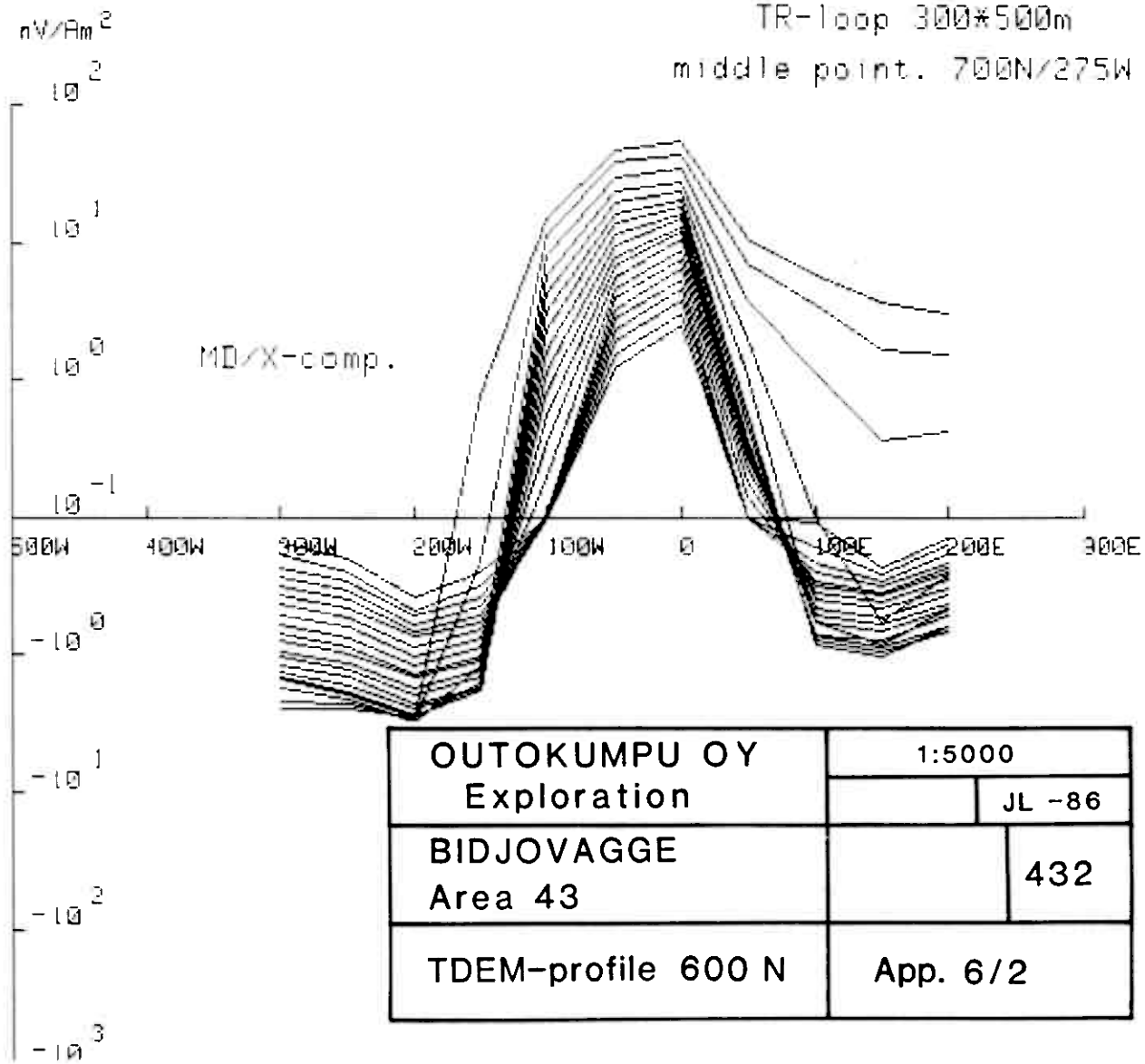




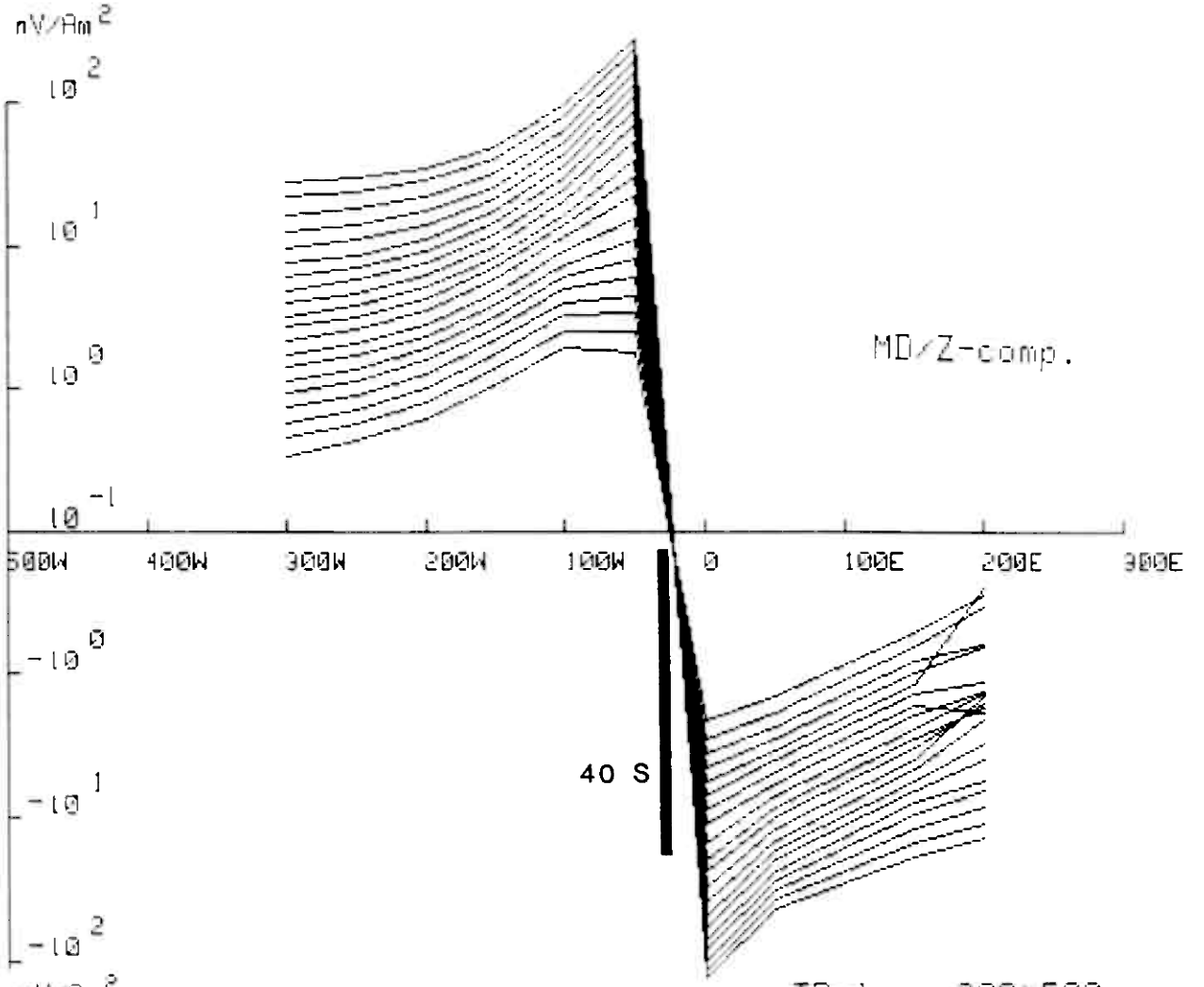
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 500 N	App. 6/1



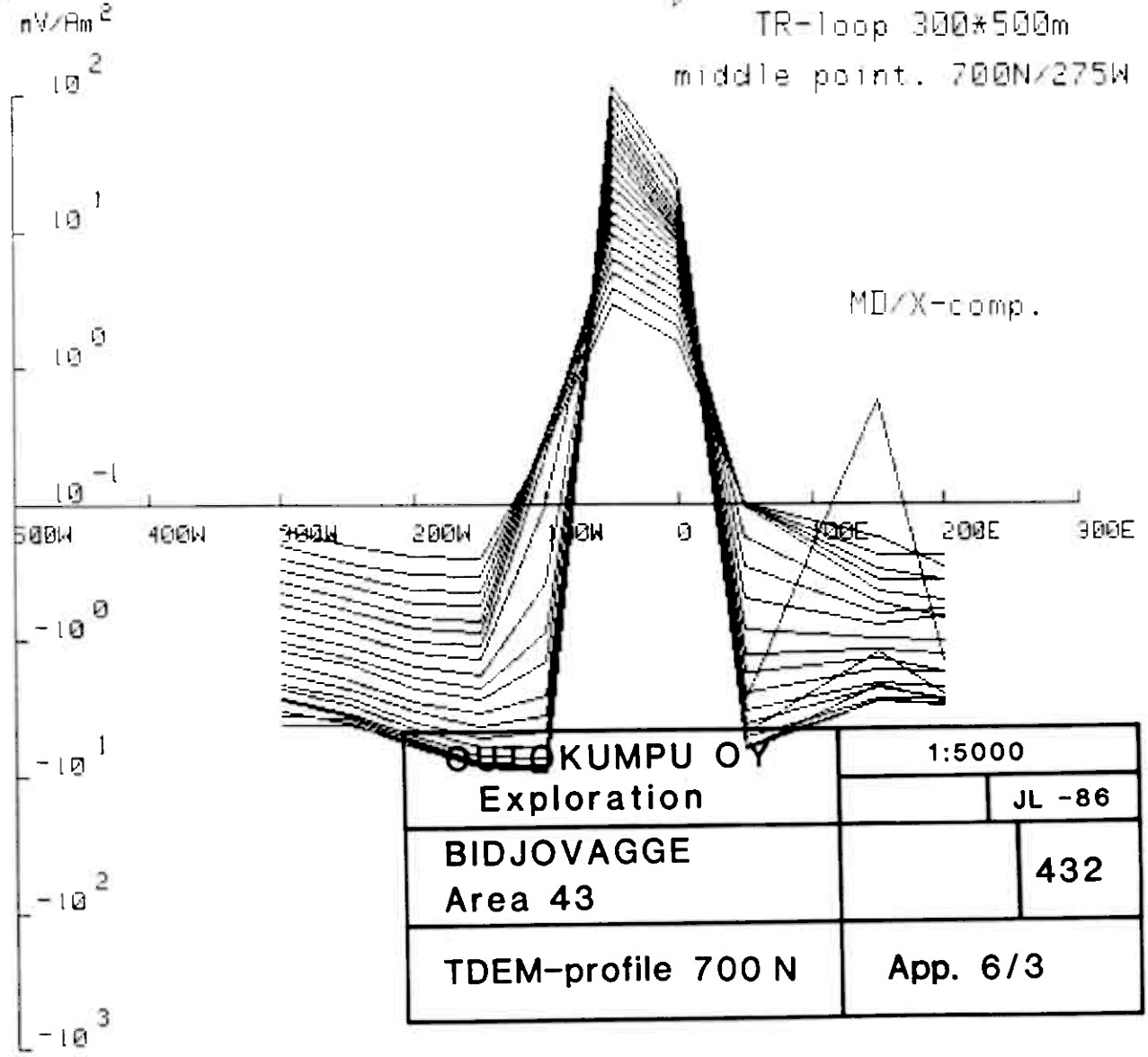
TR-loop 300*500m
middle point. 700N/275W



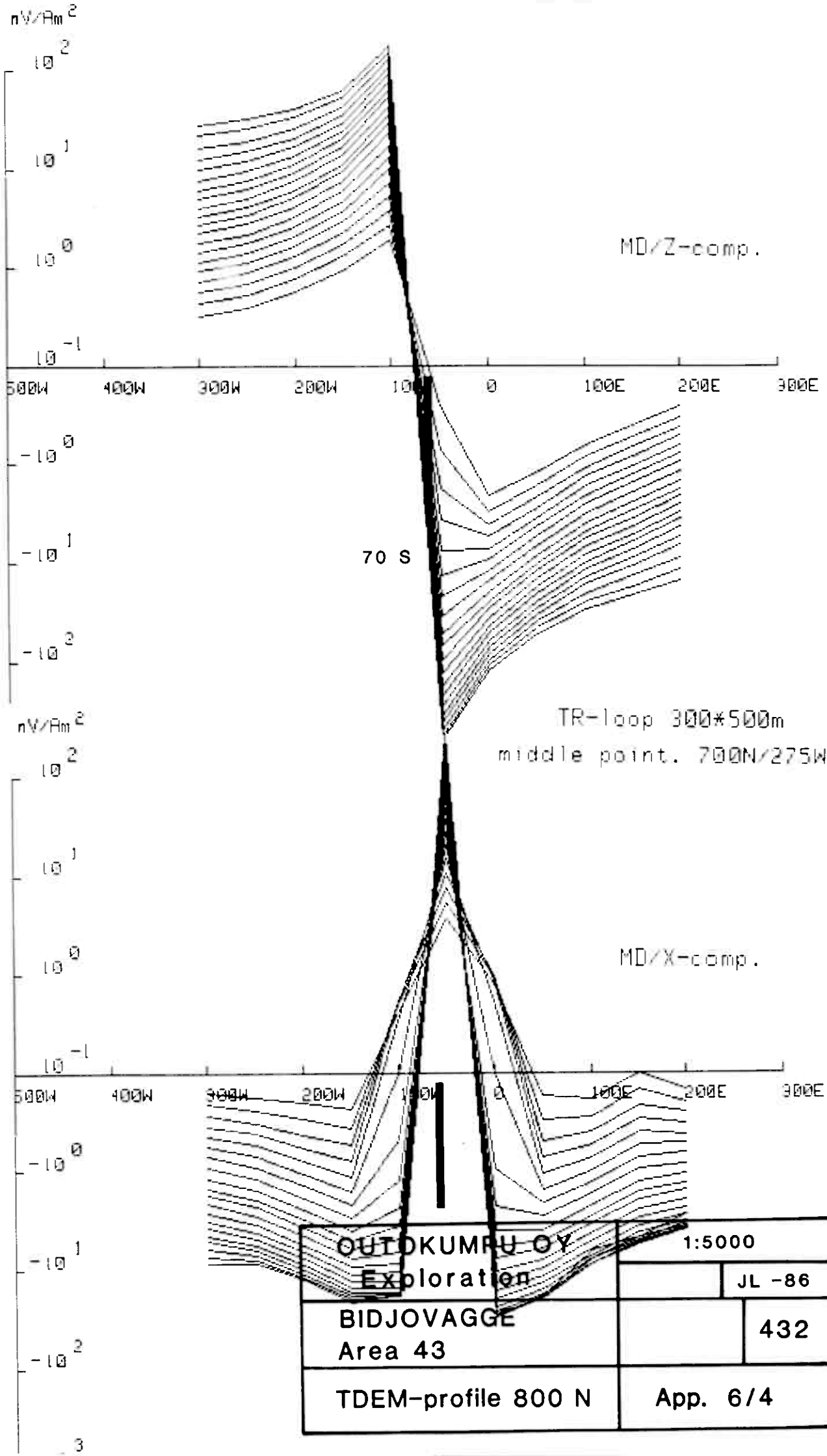
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 600 N	App. 6/2



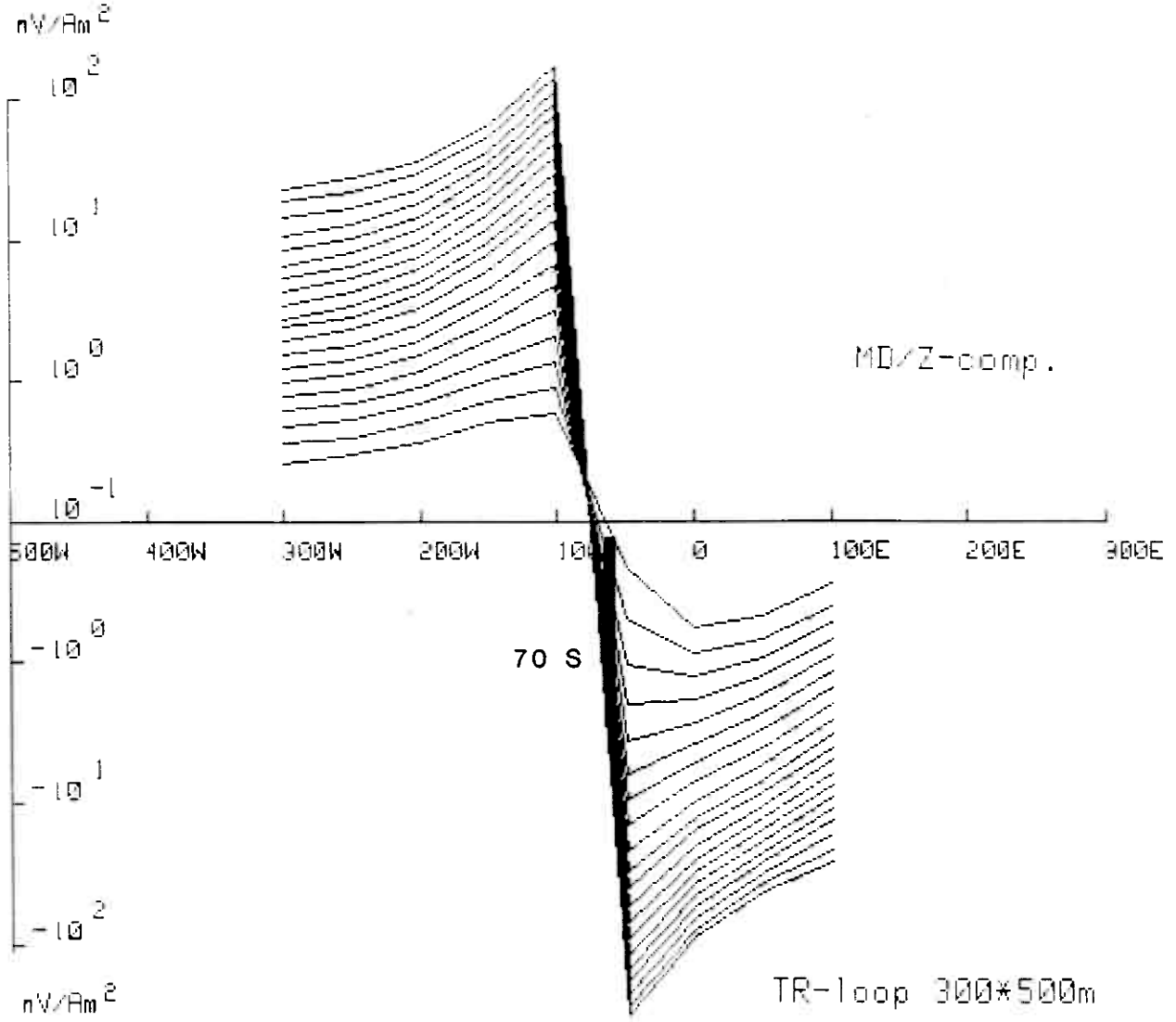
TR-loop 300*500m
middle point. 700N/275W



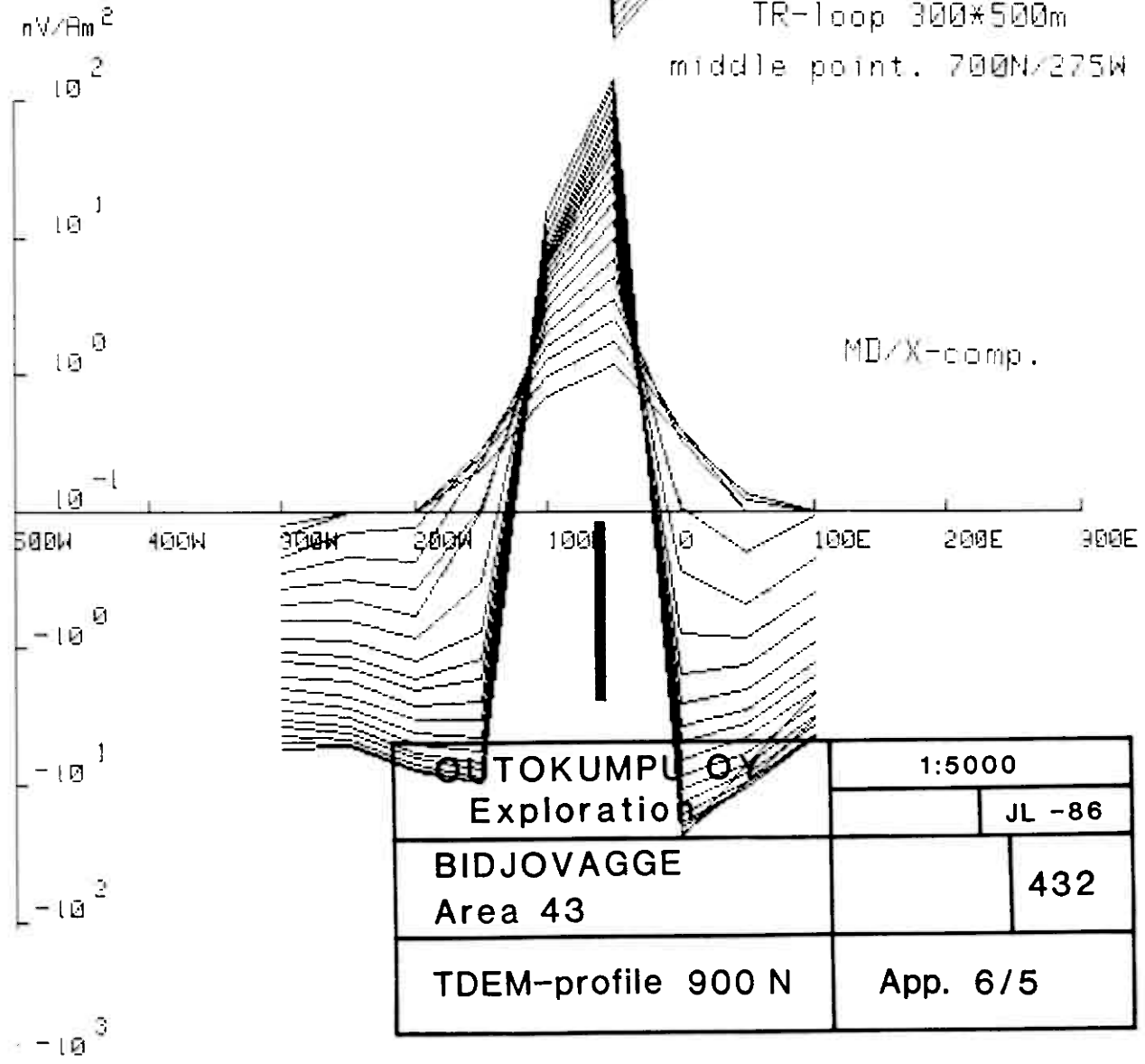
OULOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 700 N	App. 6/3	



OUTOKUMPU OY Exploration	1:5000
	JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 800 N	App. 6/4



TR-loop 300*500m
middle point. 700N/275W

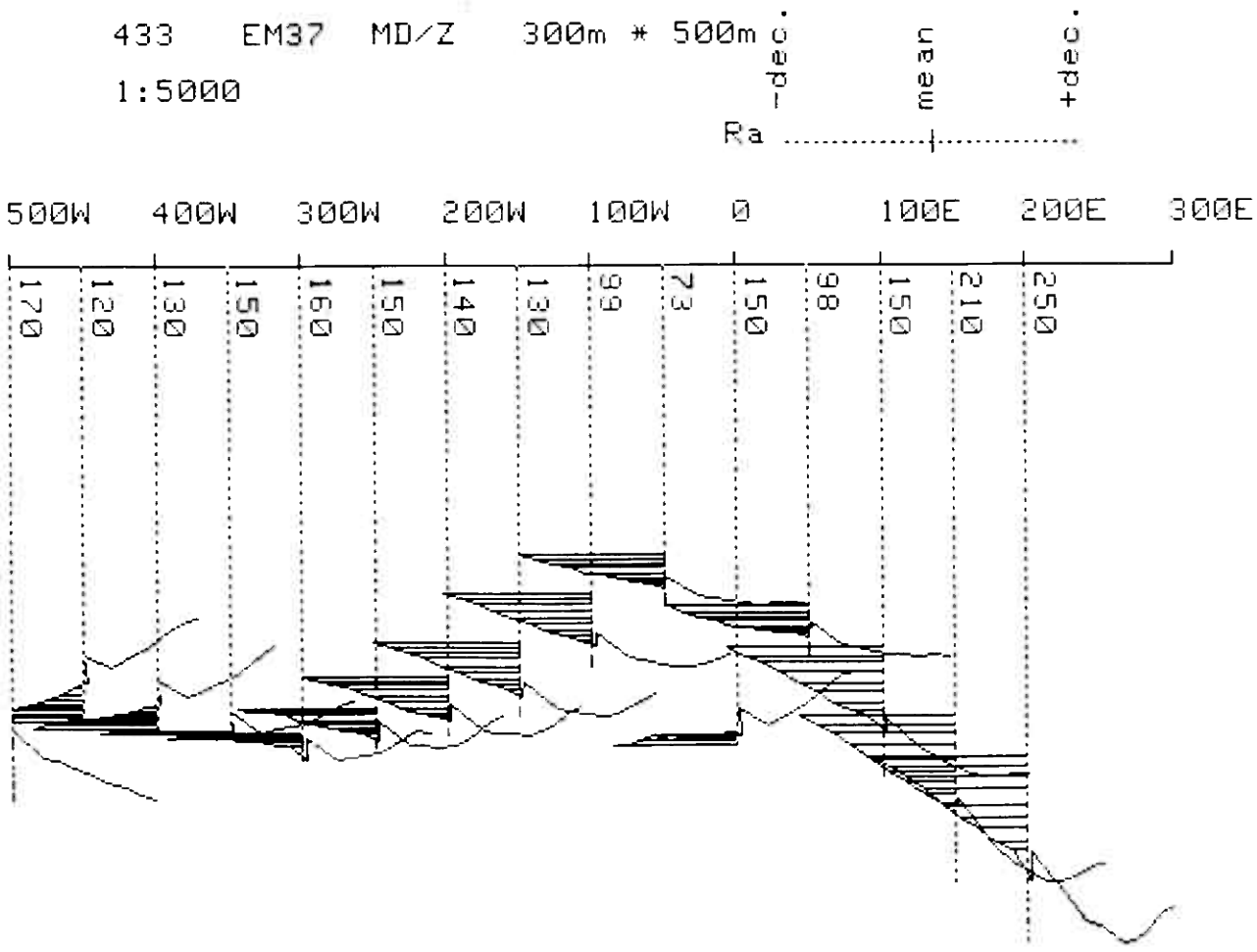


OUTOKUMPU OY Exploration	1:5000	JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 900 N	App. 6/5	

Area 43 MIKKUJAURE 5 Prof.500N

433 EM37 MD/Z 300m * 500m

1:5000

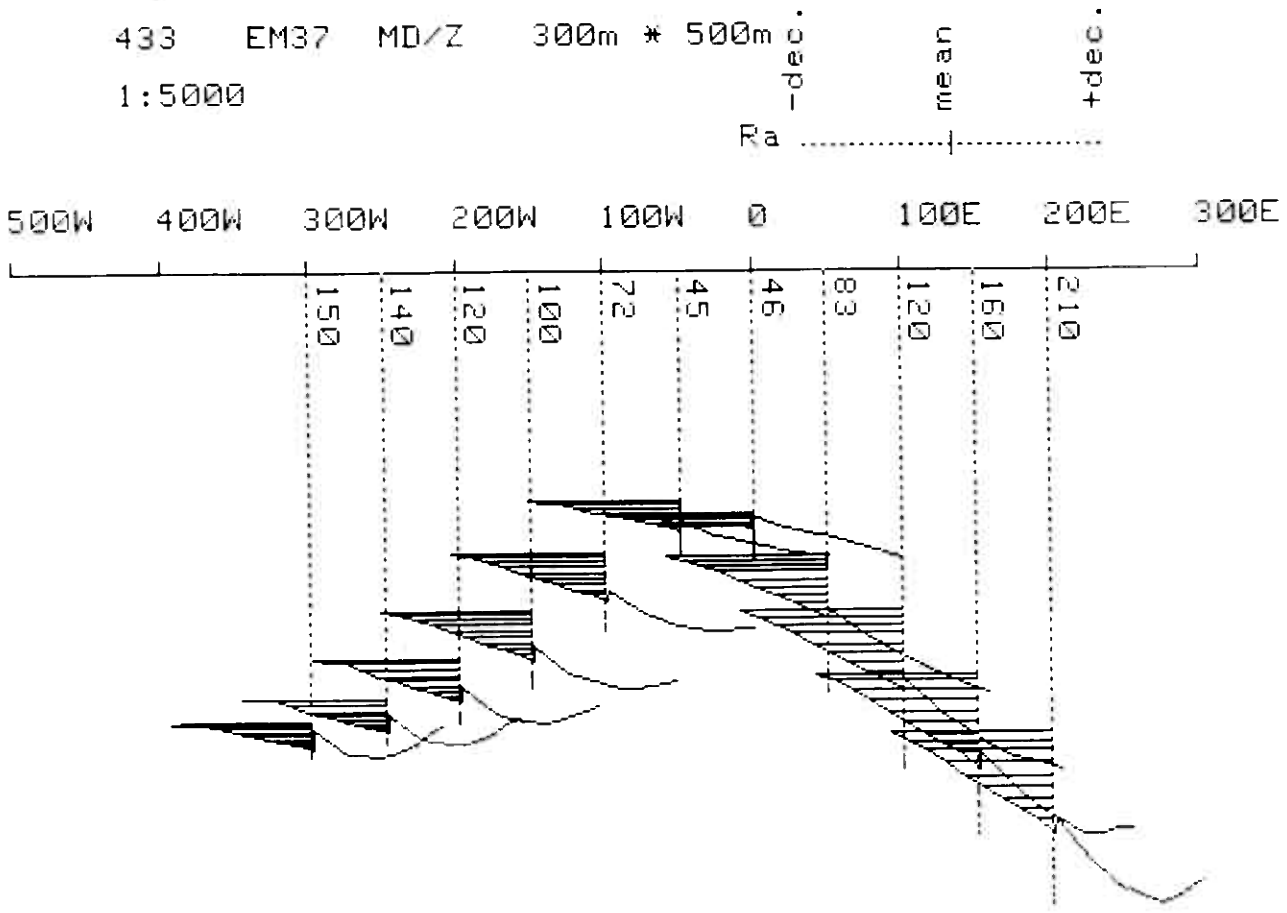


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 6/6	

Area 43 MIKKUJAURE 5 Prof.600N

433 EM37 MD/Z 300m * 500m

1:5000

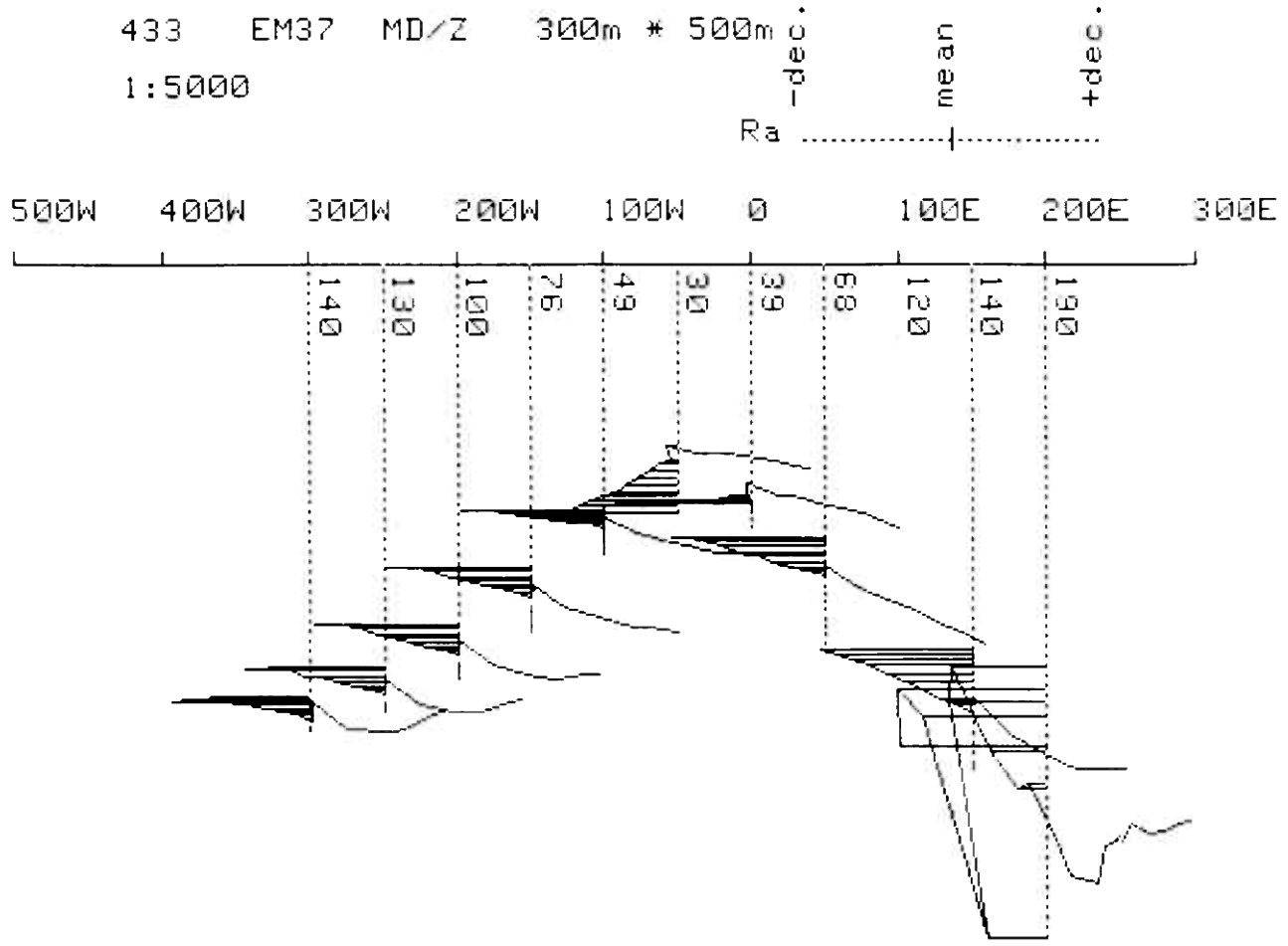


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 6/7	

Area 43 MIKKUJAURE 5 Prof.700N

433 EM37 MD/Z 300m * 500m

1:5000

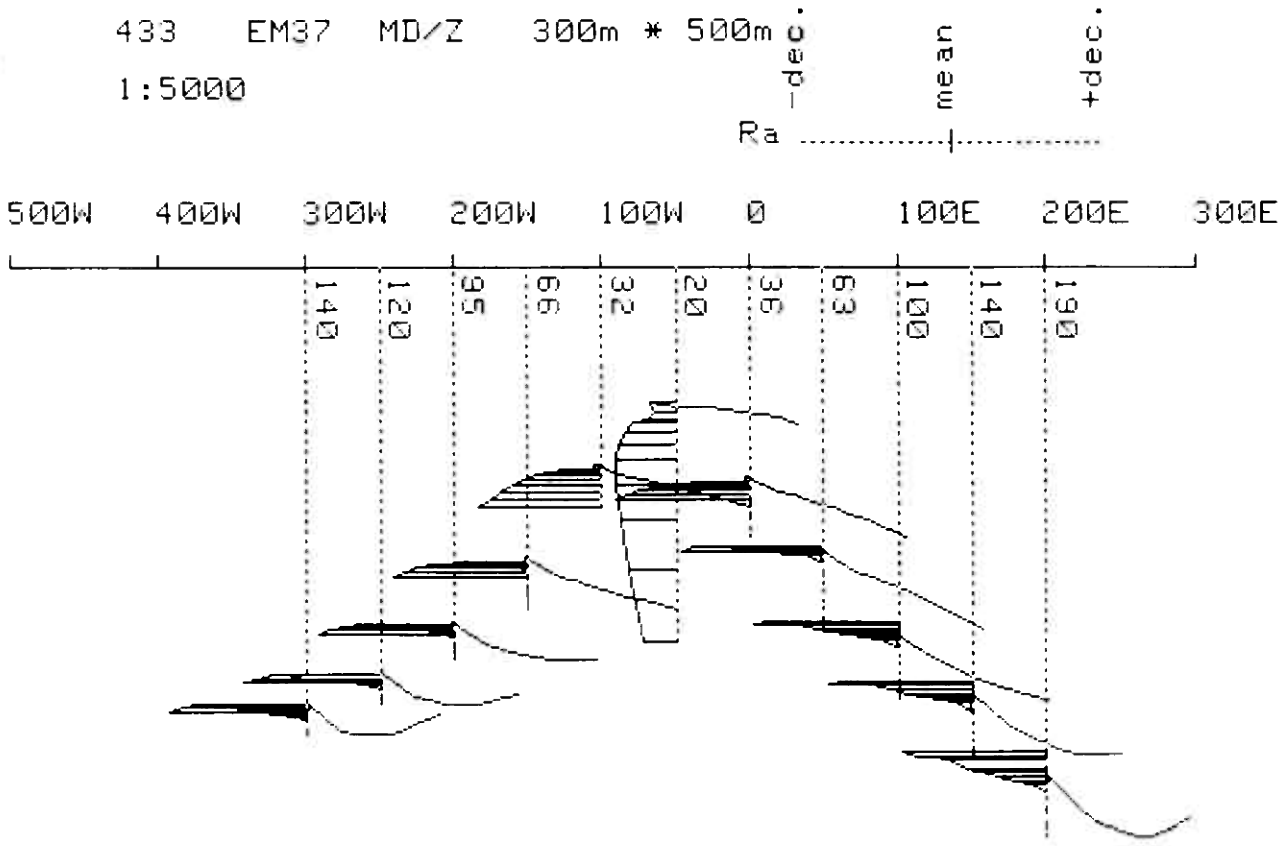


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 6/8	

Area 43 MIKKUJAURE 5 Prof.800N

433 EM37 MD/Z 300m * 500m

1:5000

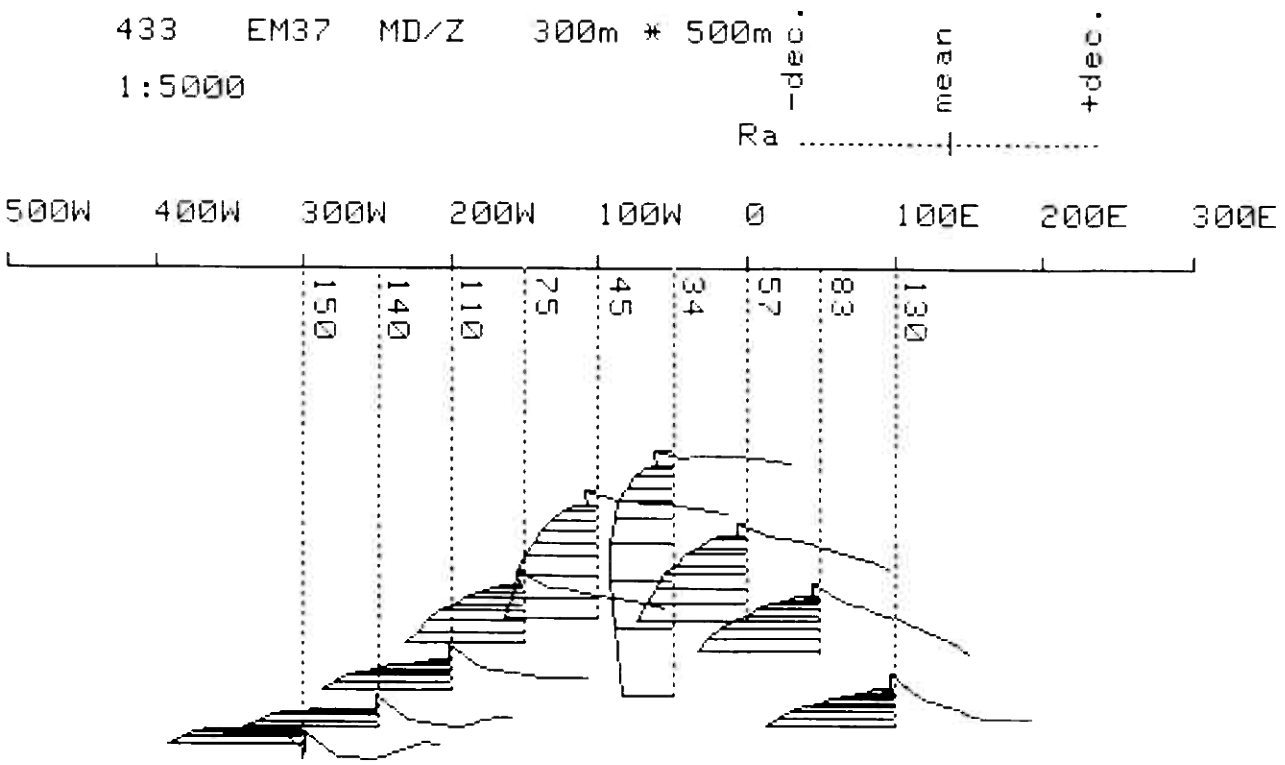


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 6/9	

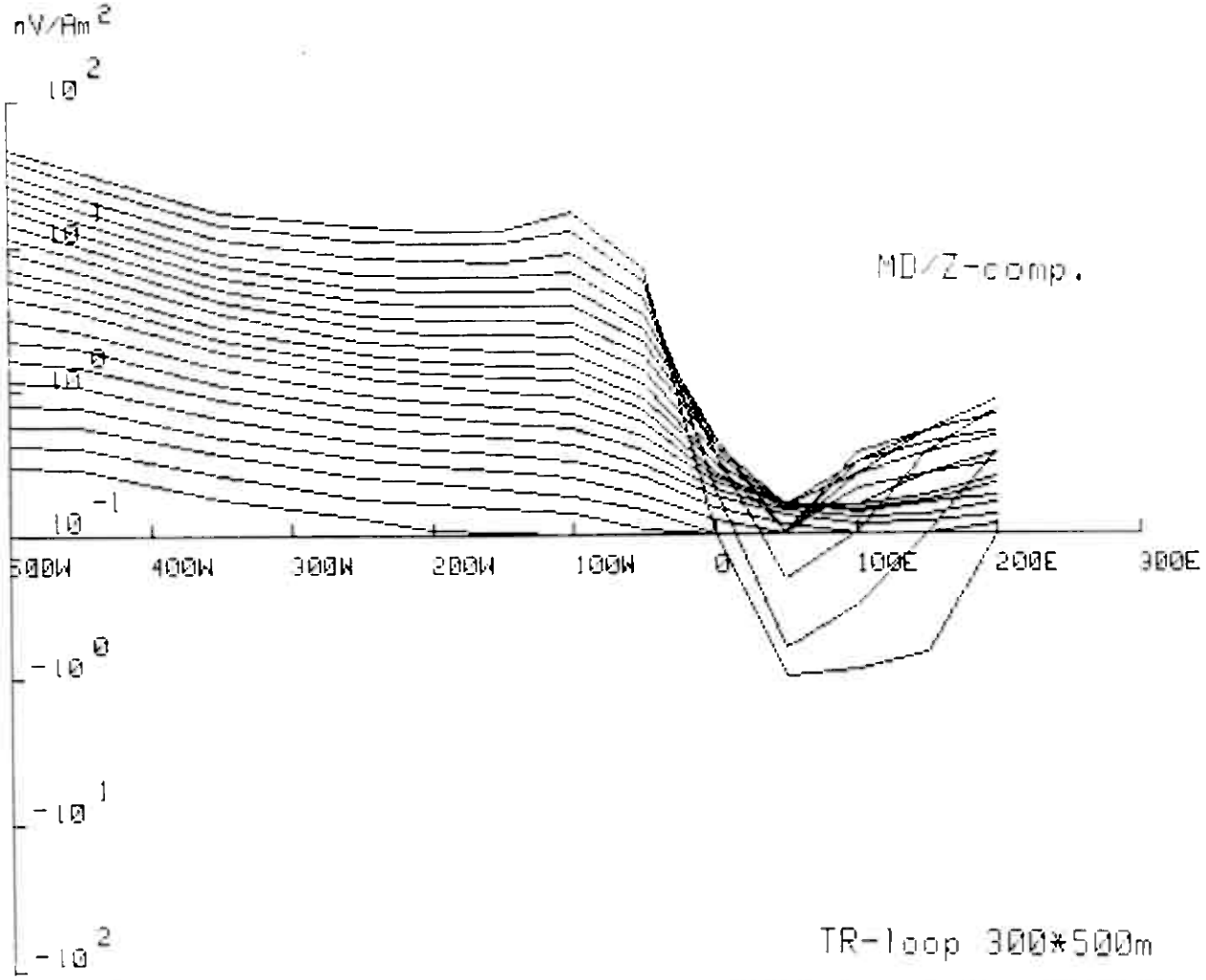
Area 43 MIKKUJAURE 5 Prof.900N

433 EM37 MD/Z 300m * 500m

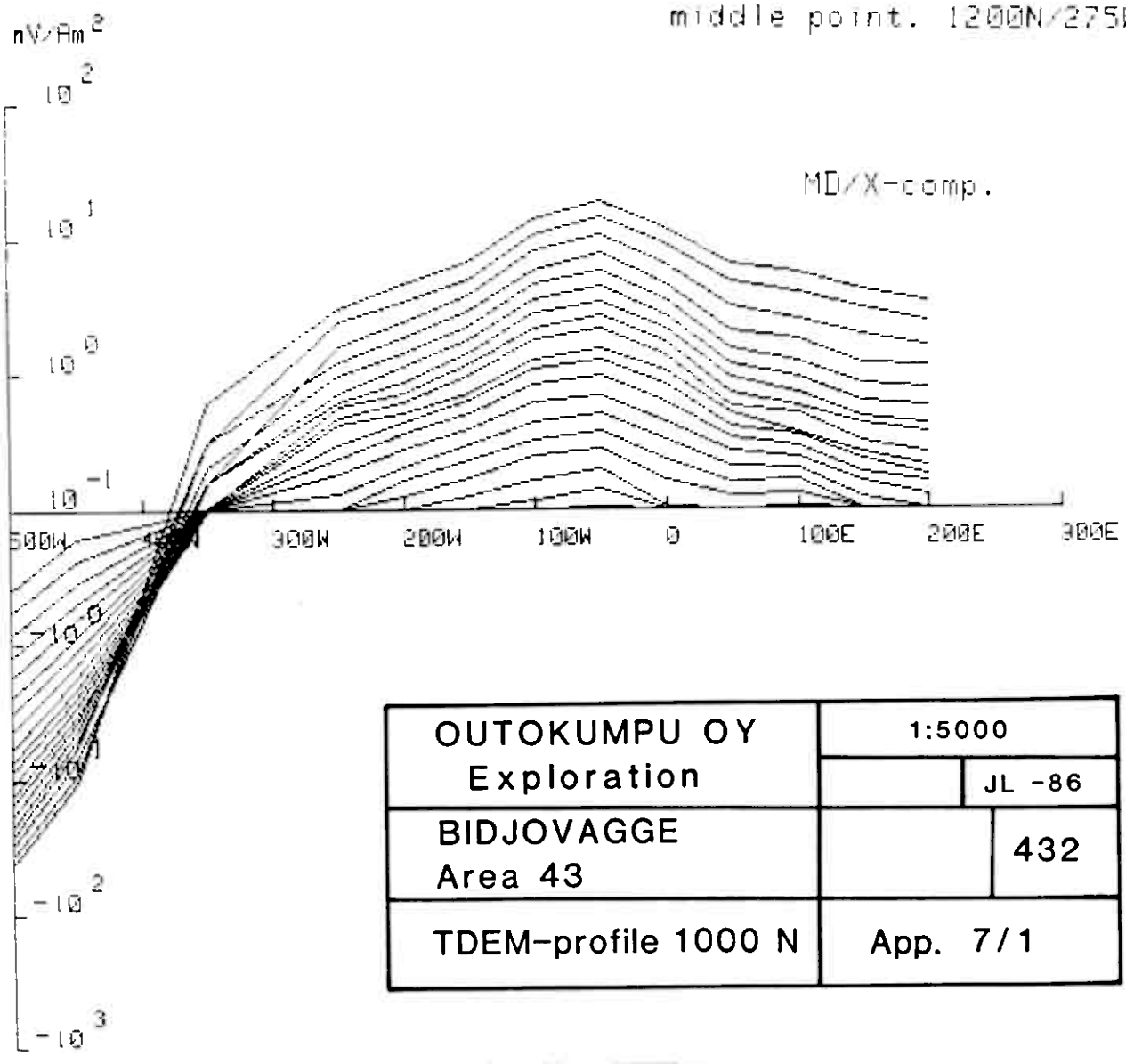
1:5000



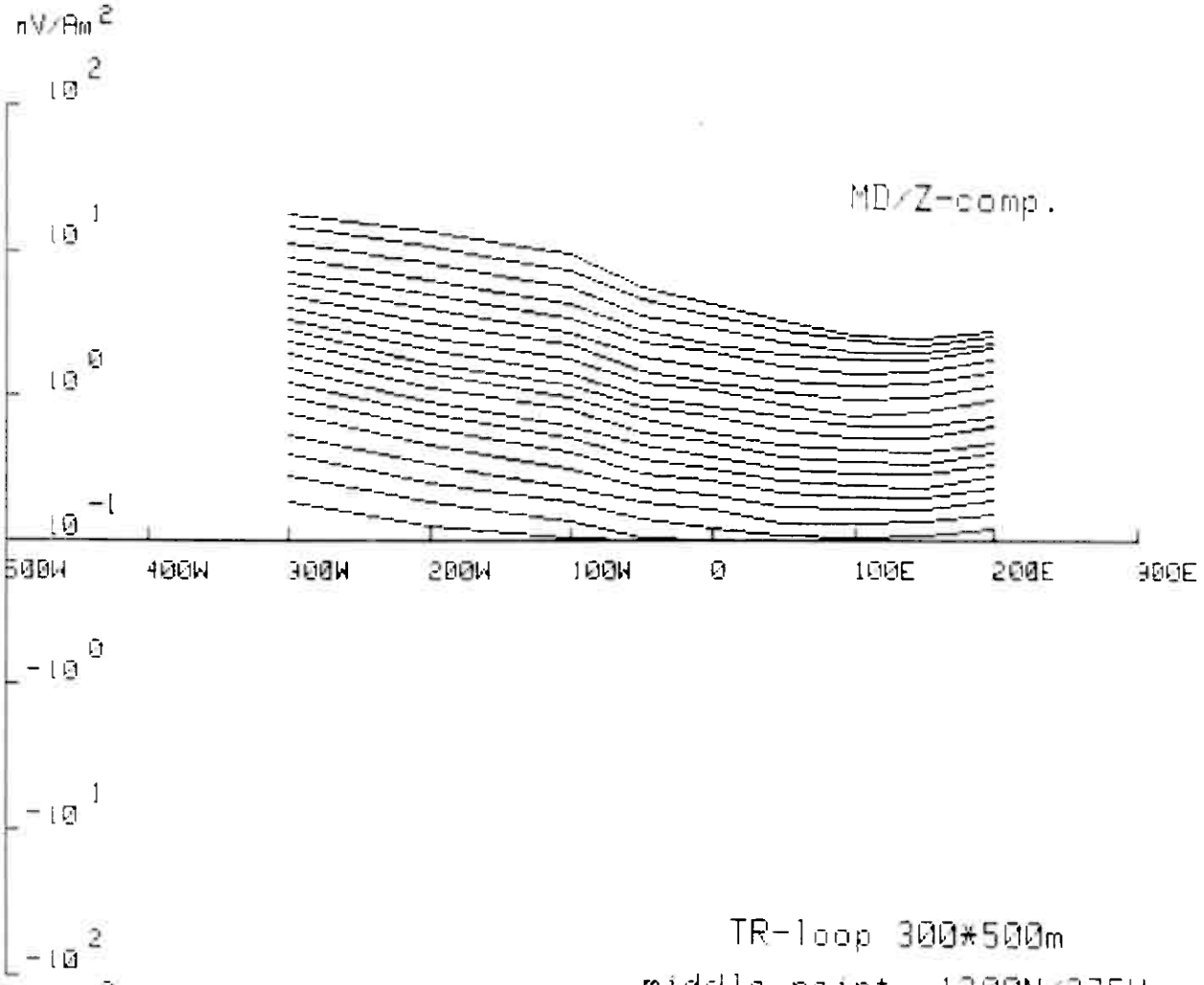
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 6/10	



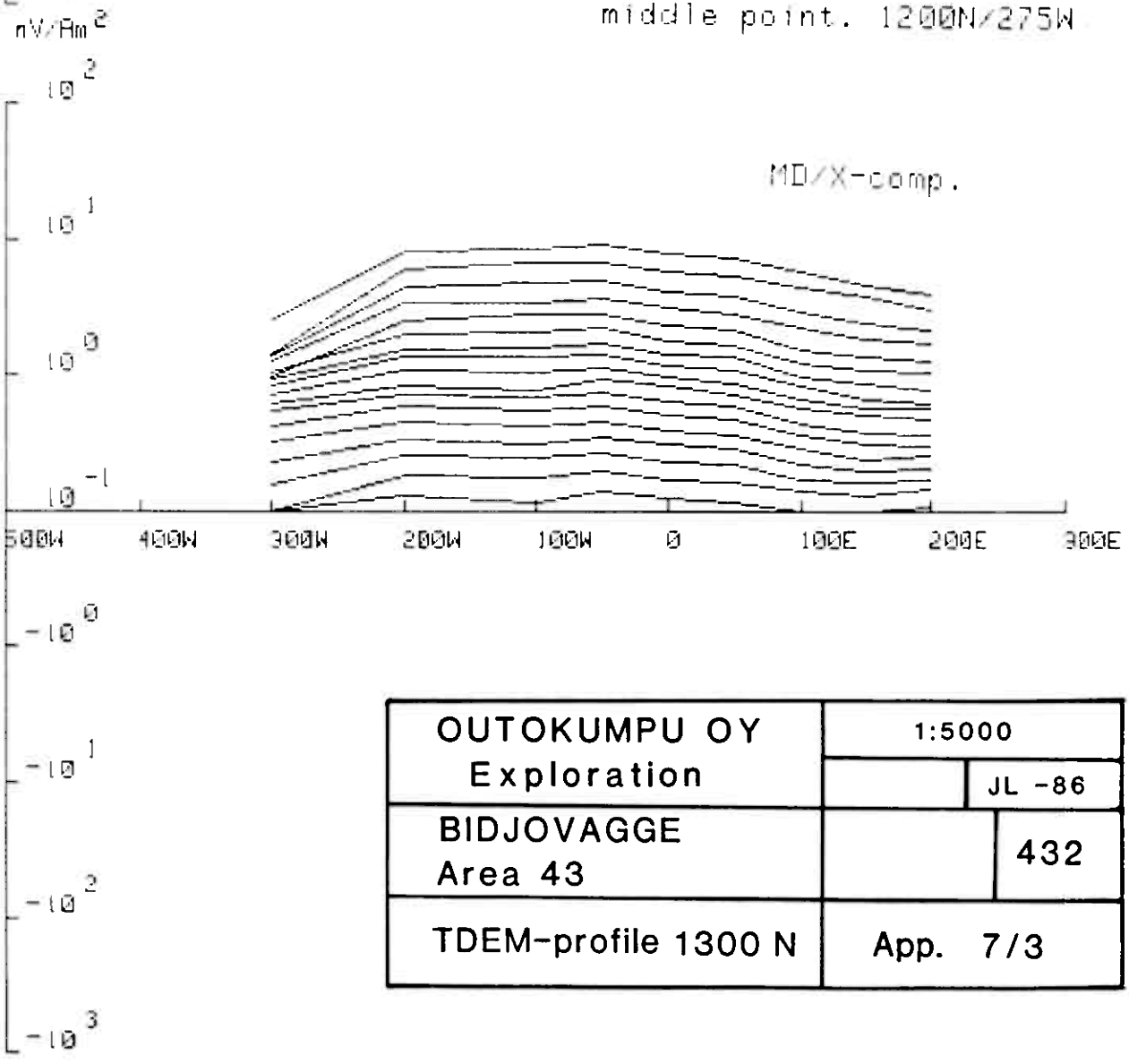
TR-loop 300*500m
middle point. 1200N/275W



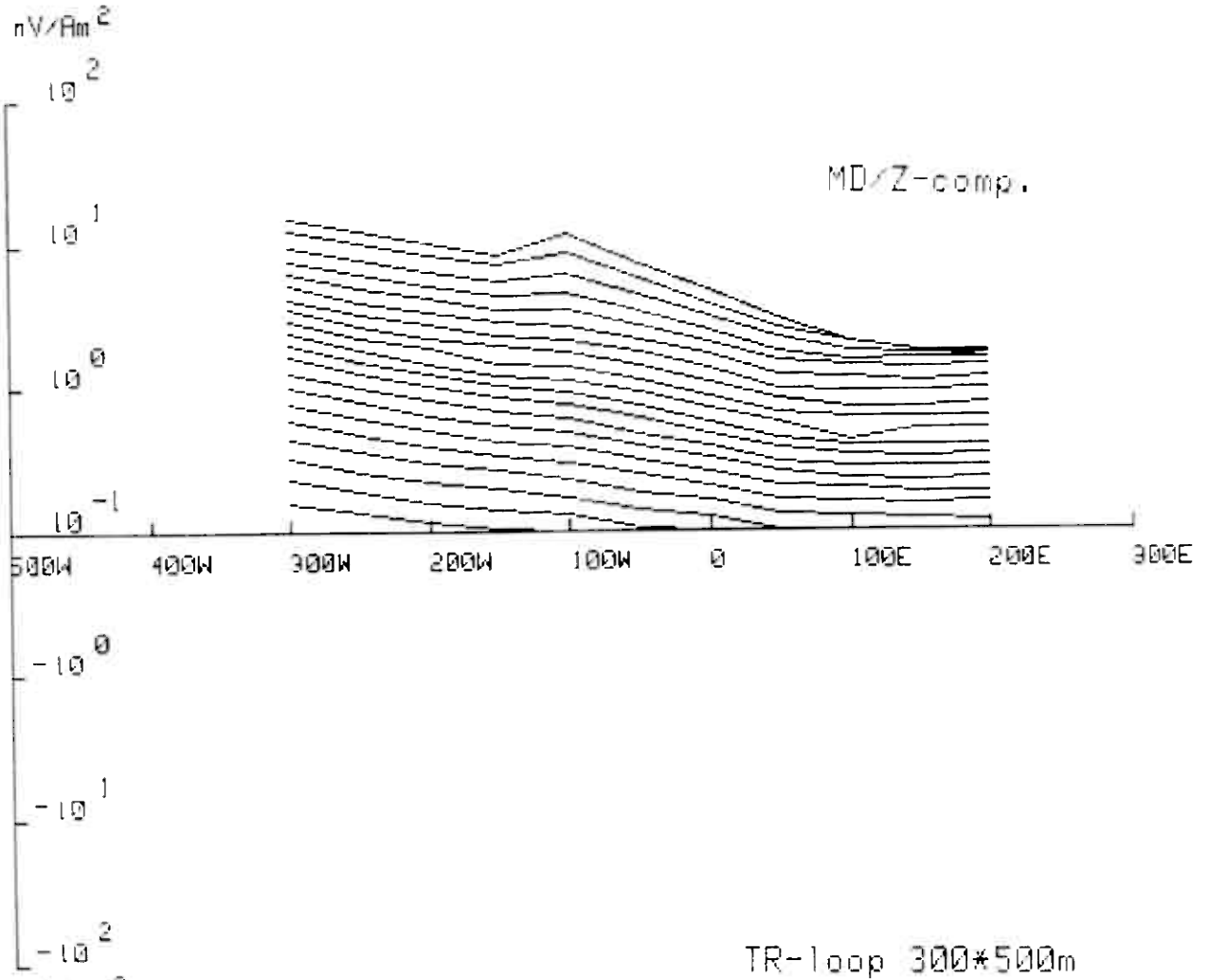
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1000 N	App. 7/1	



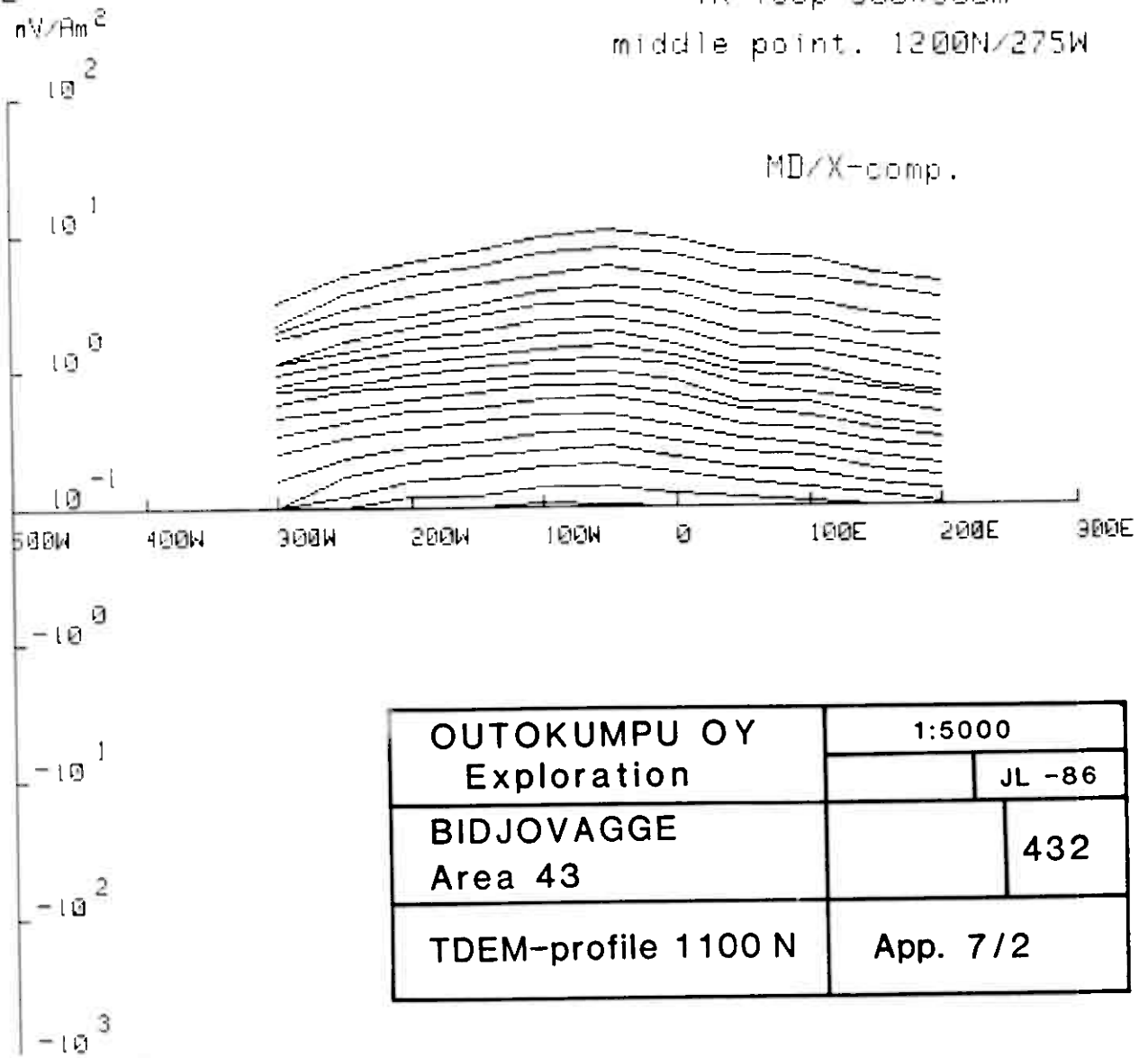
TR-loop 300*500m
middle point. 1200N/275W



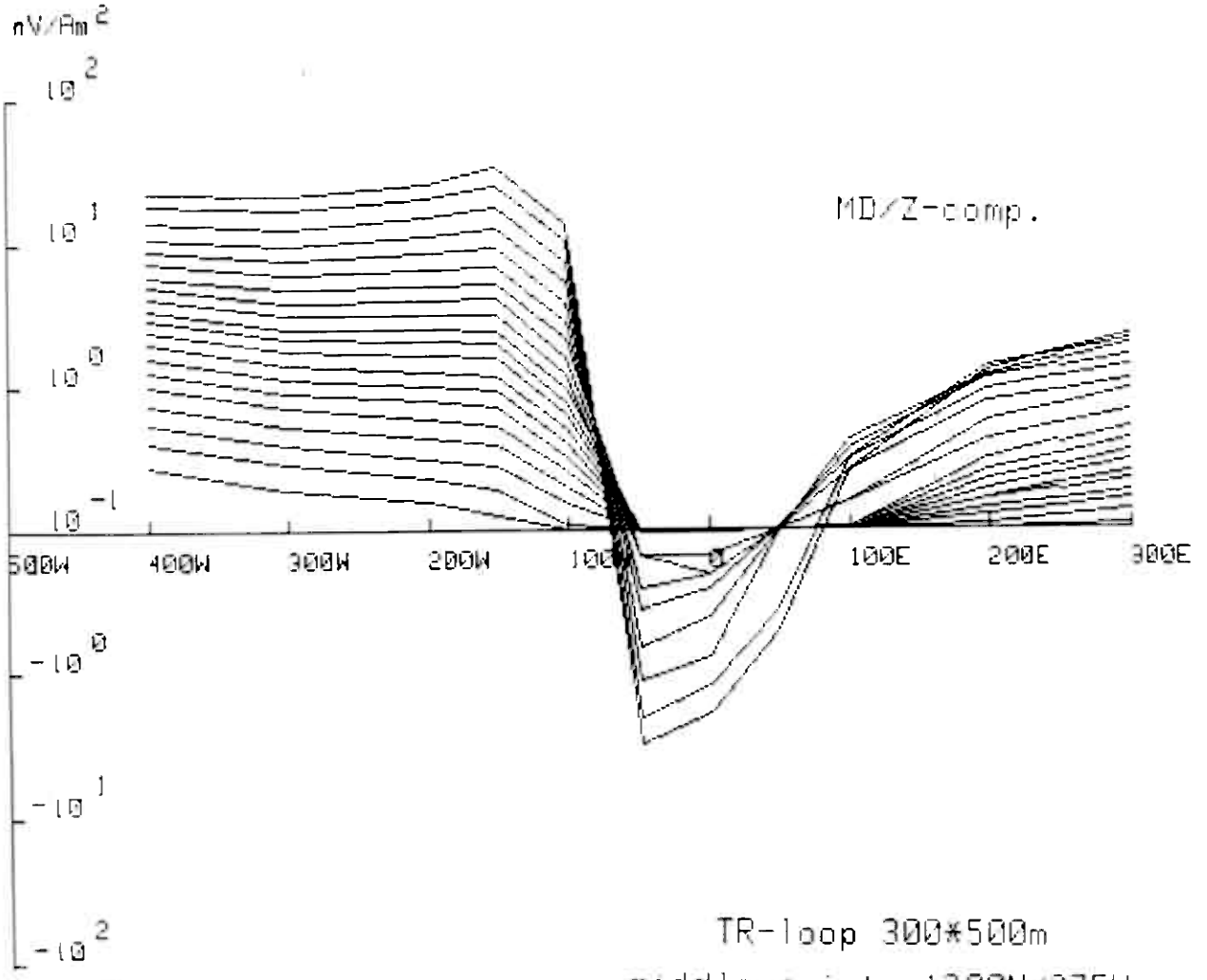
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 1300 N	App. 7/3



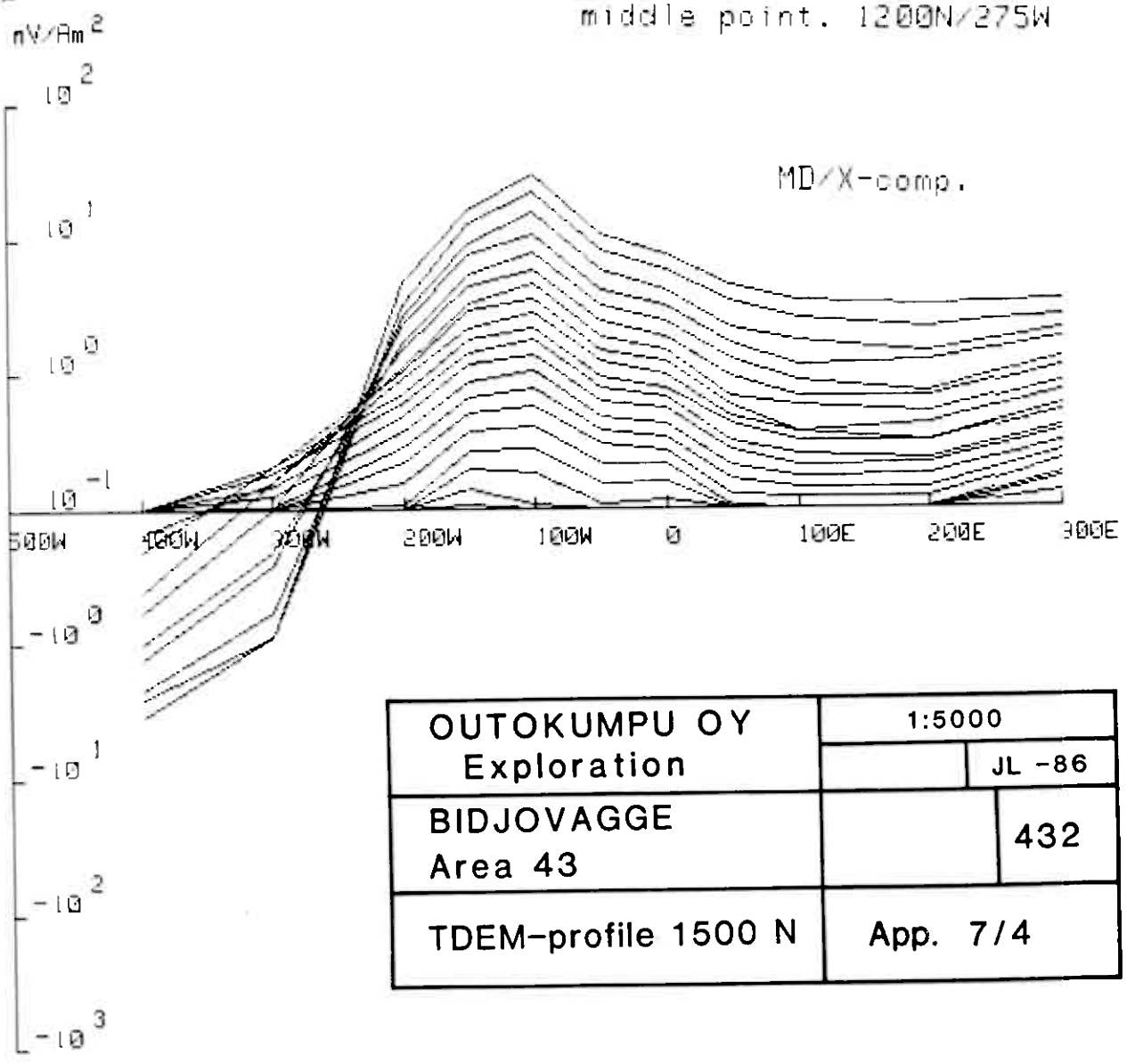
TR-loop 300*500m
middle point. 1200N/275W



OUTOKUMPU OY Exploration	1:5000	JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1100 N	App. 7/2	



TR-loop 300*500m
middle point. 1200N/275W

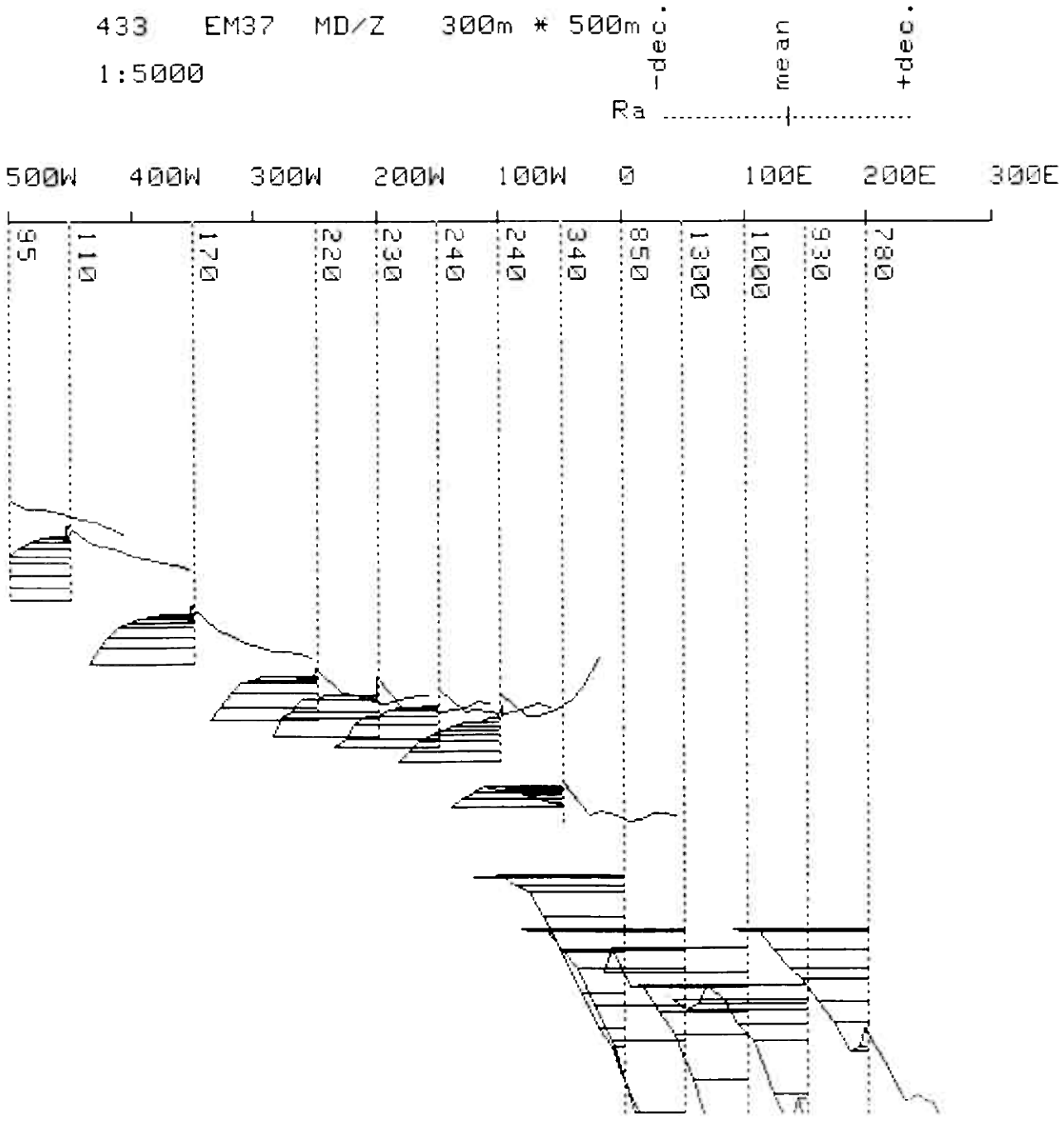


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 1500 N	App. 7/4	

Area 43 MIKKUJAURE 6 Prof.1000N

433 EM37 MD/Z 300m * 500m

1:5000

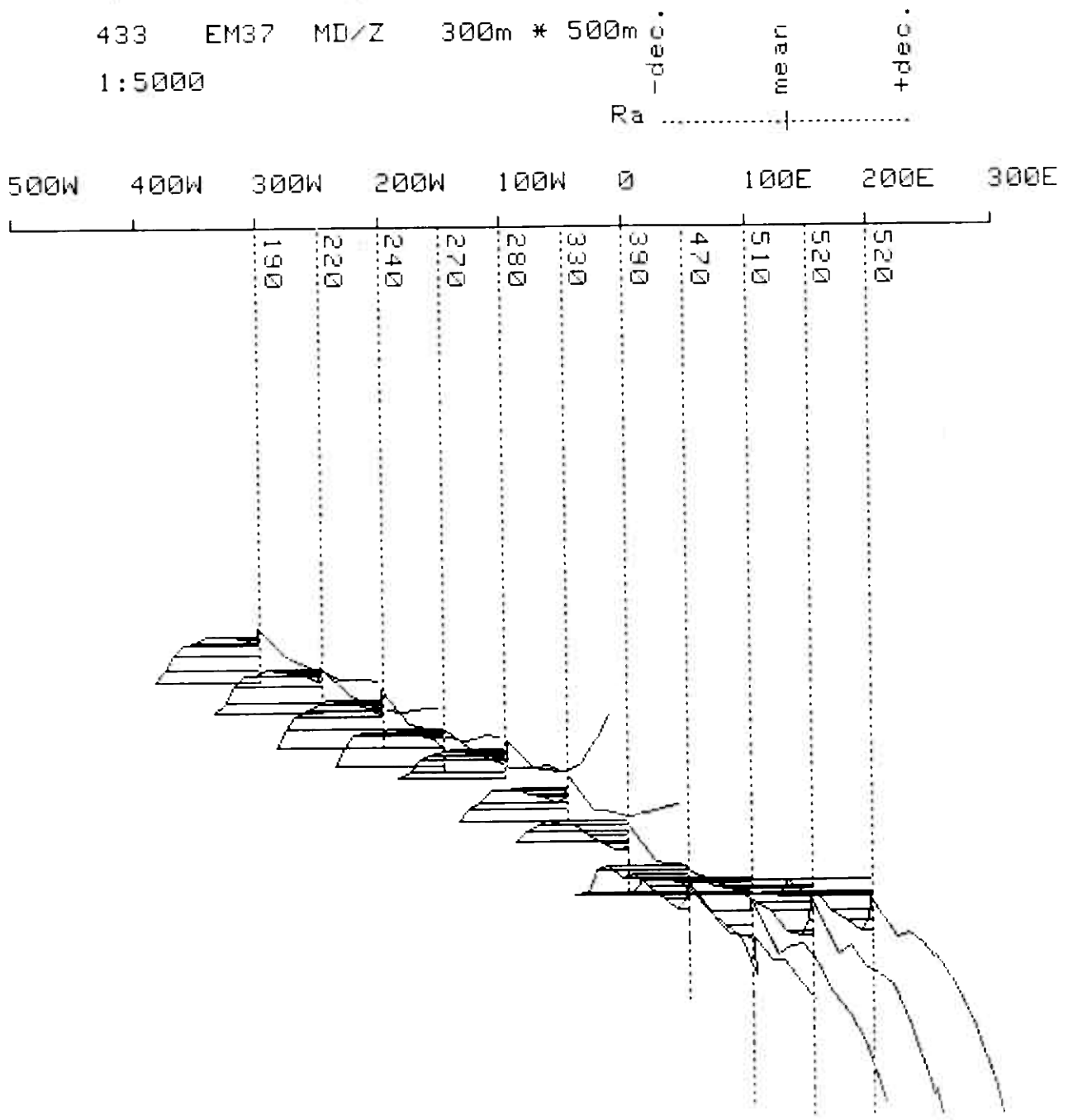


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 7/5	

Area 43 MIKKUJAURE 6 Prof.1100N

433 EM37 MD/Z 300m * 500m

1:5000

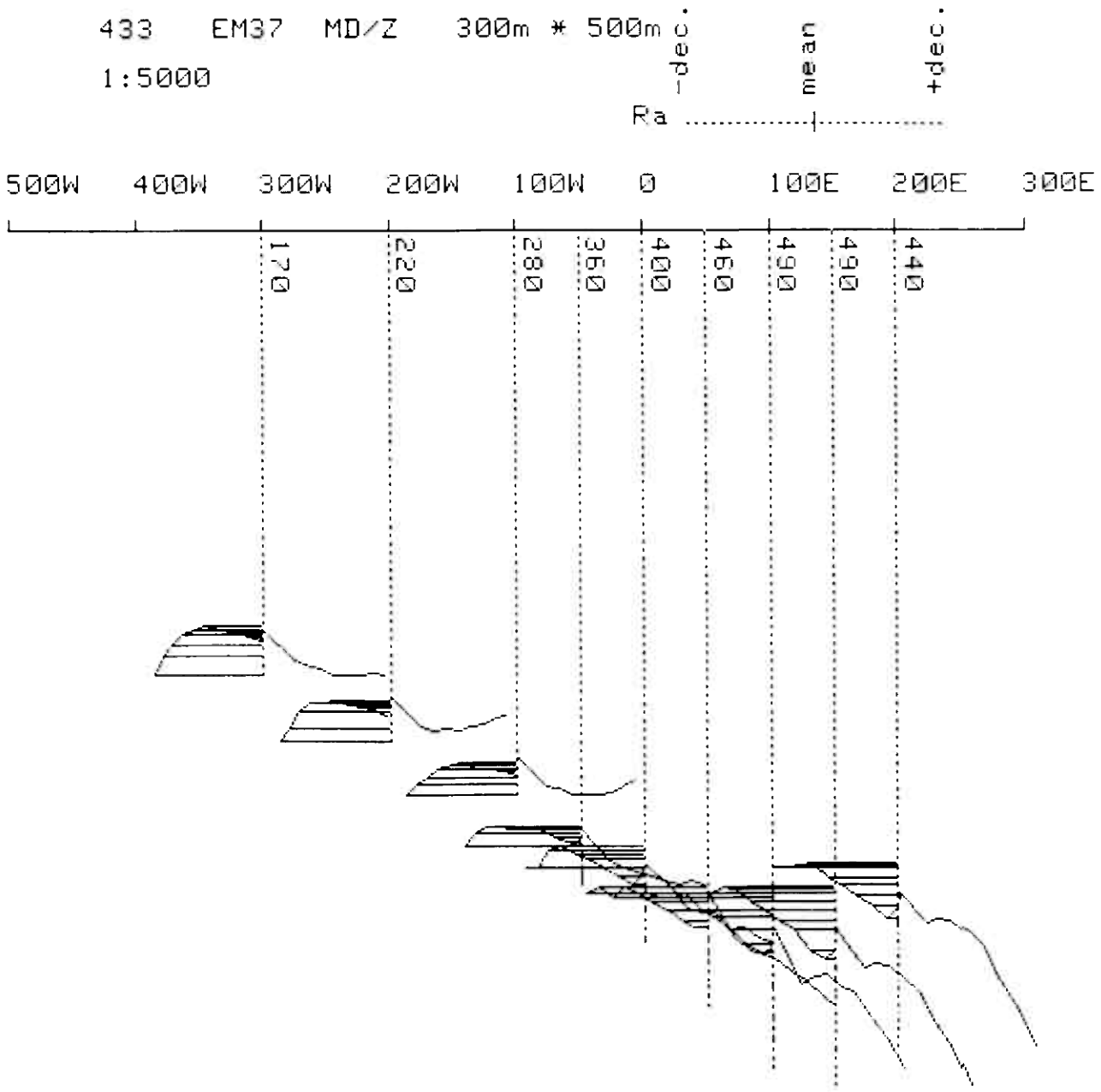


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 7/6	

Area 43 MIKKUJAURE 6 Prof.1300N

433 EM37 MD/Z 300m * 500m

1:5000

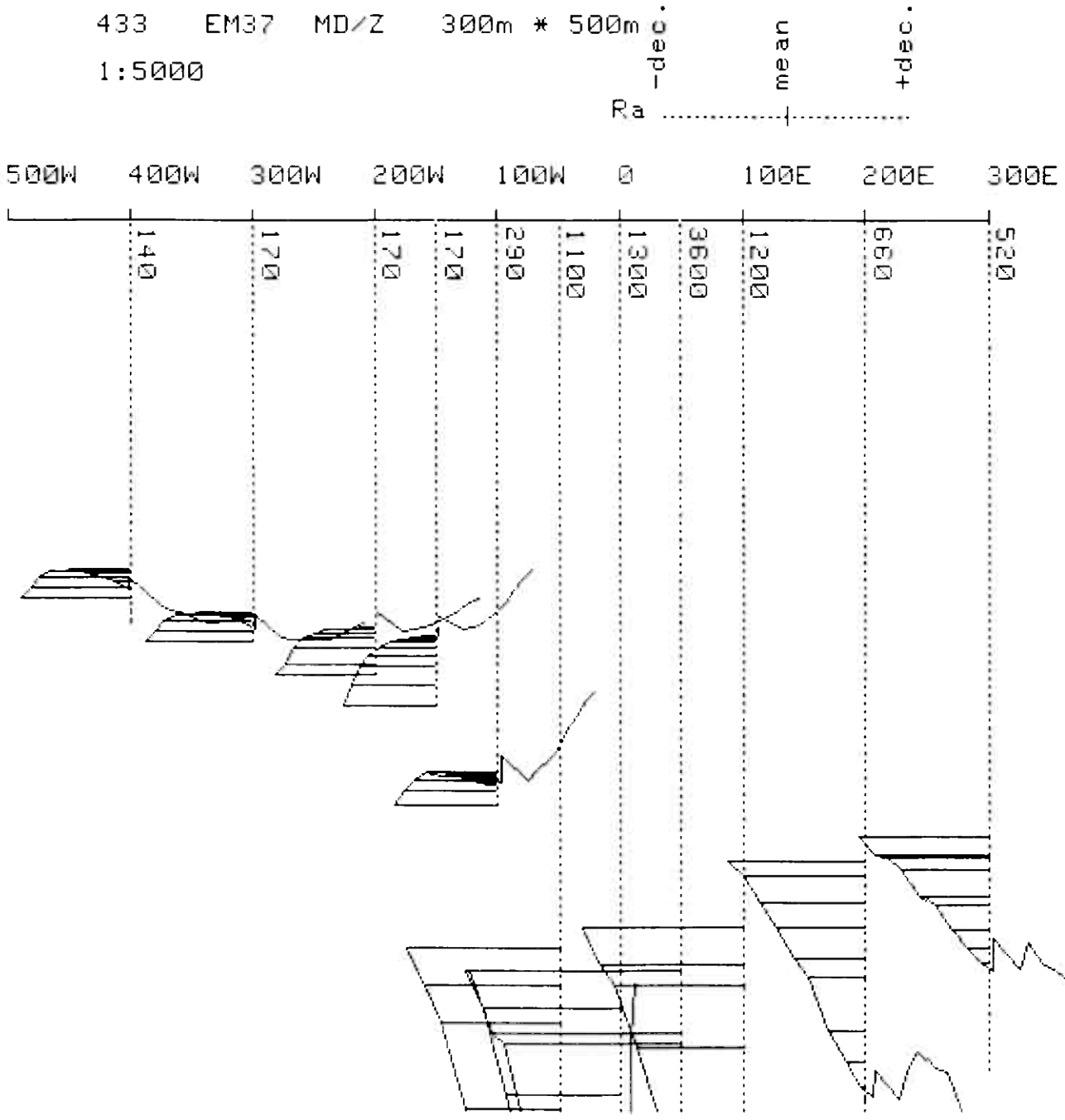


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 7/7	

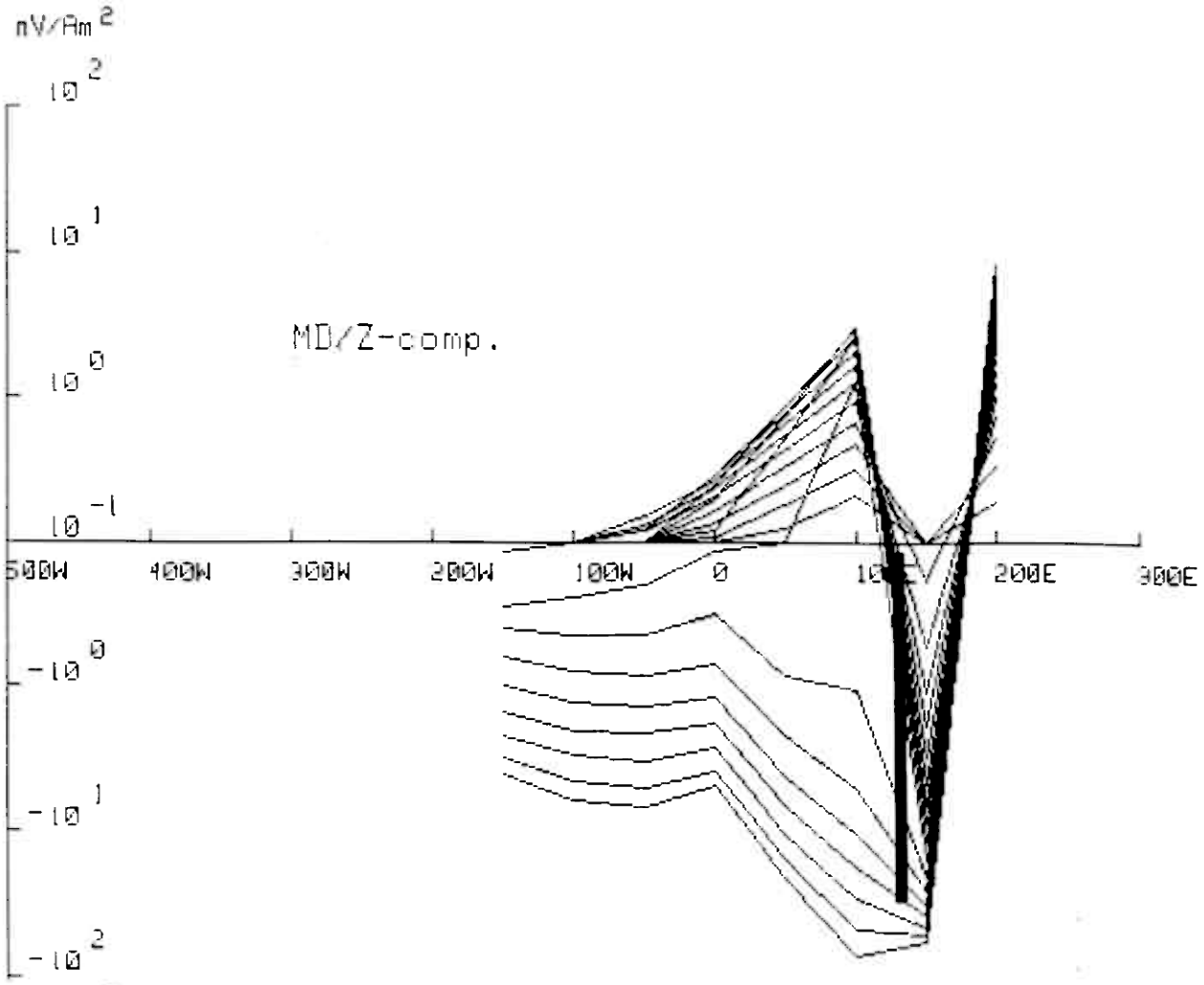
Area 43 MIKKUJAURE 6 Prof.1500N

433 EM37 MD/Z 300m * 500m

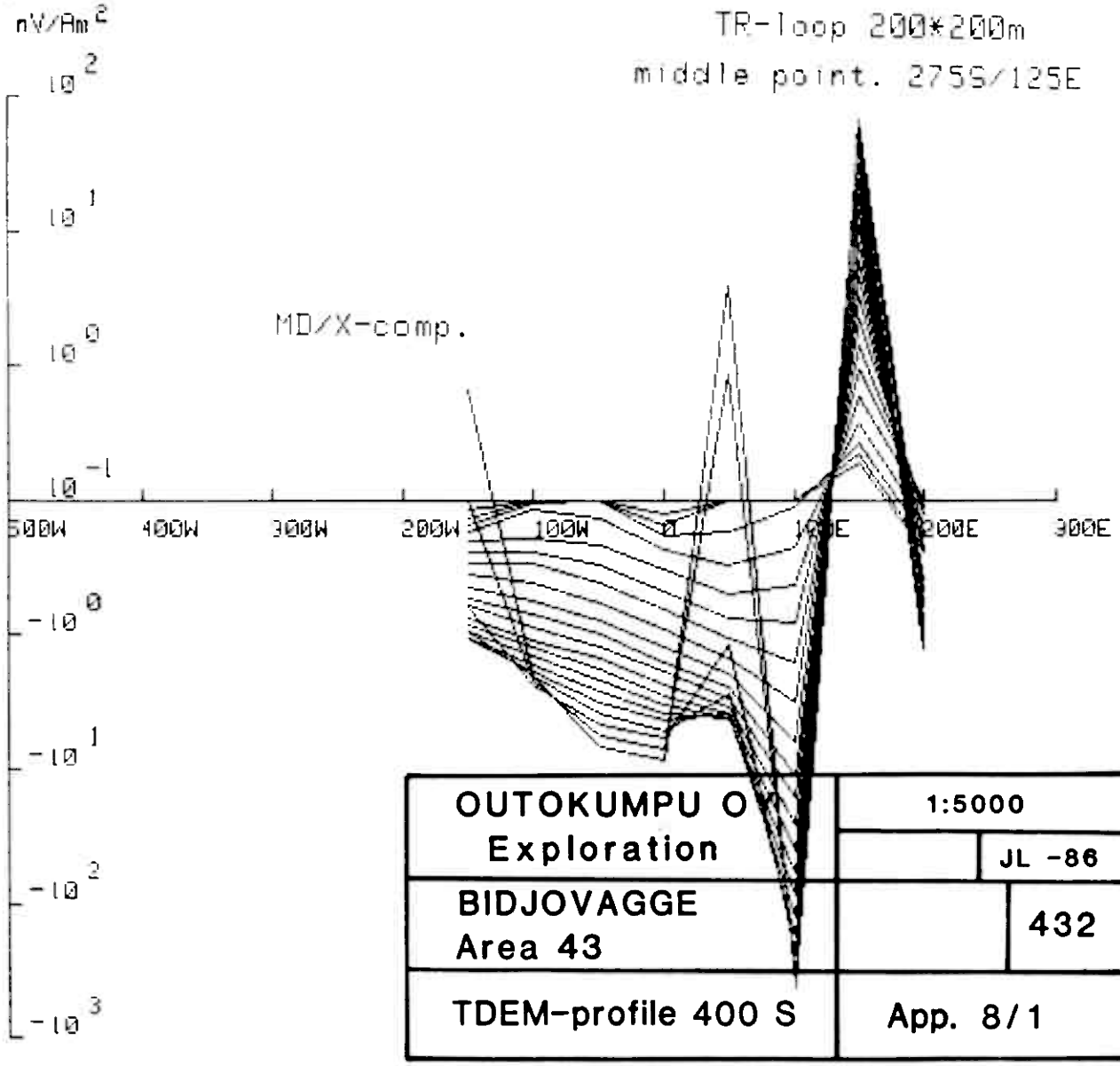
1:5000



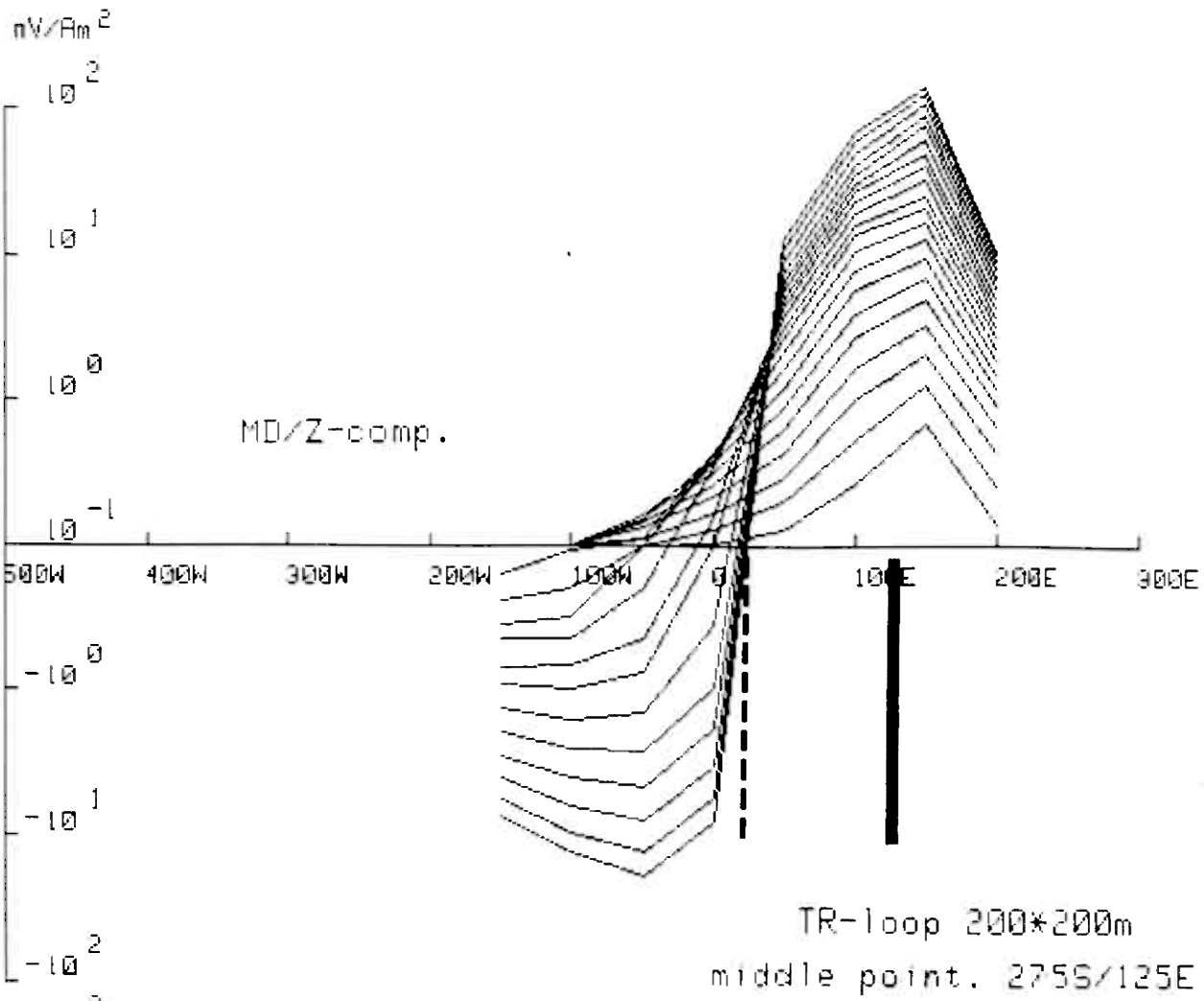
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 7/8	



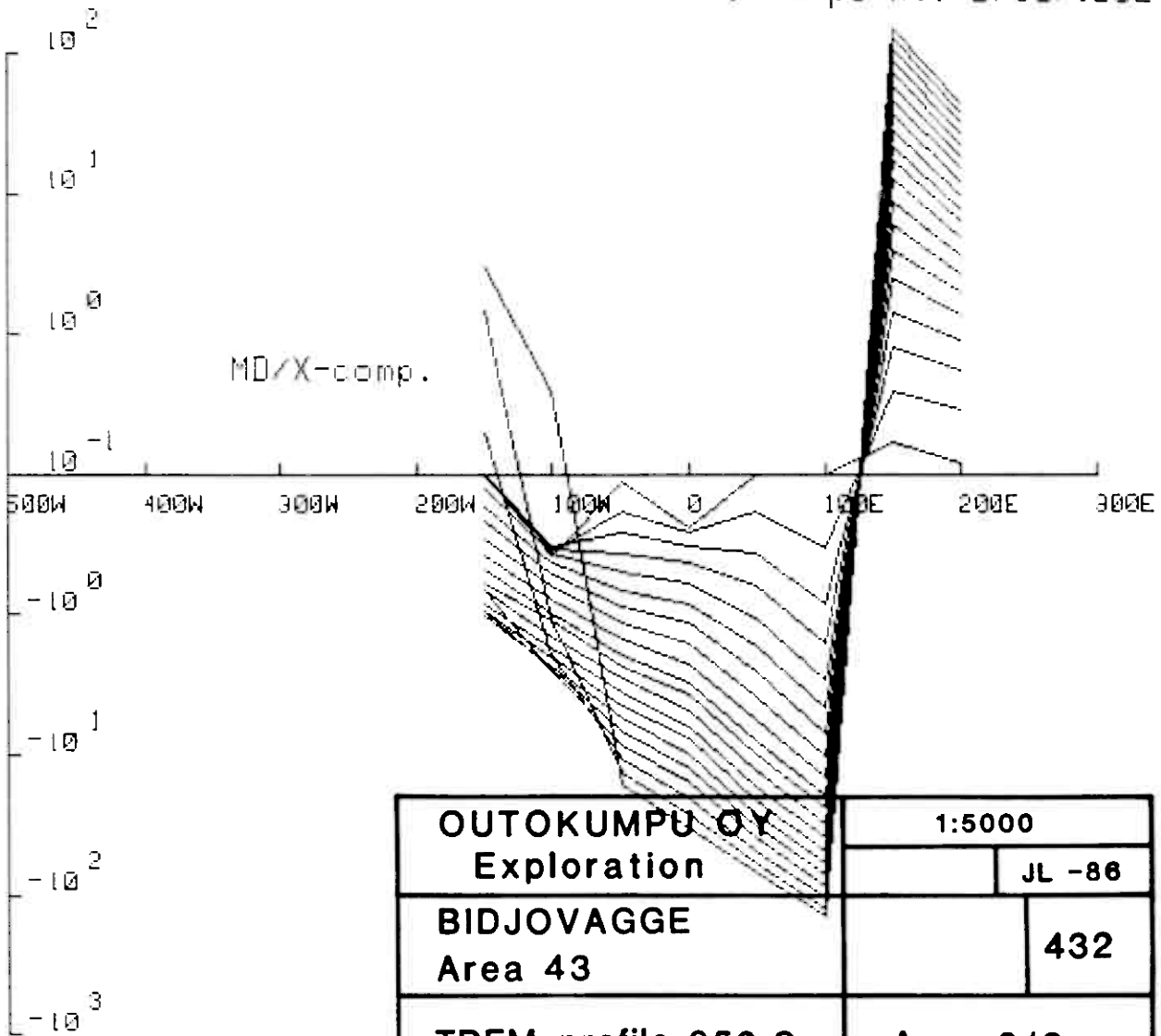
TR-loop 200*200m
middle point. 275S/125E



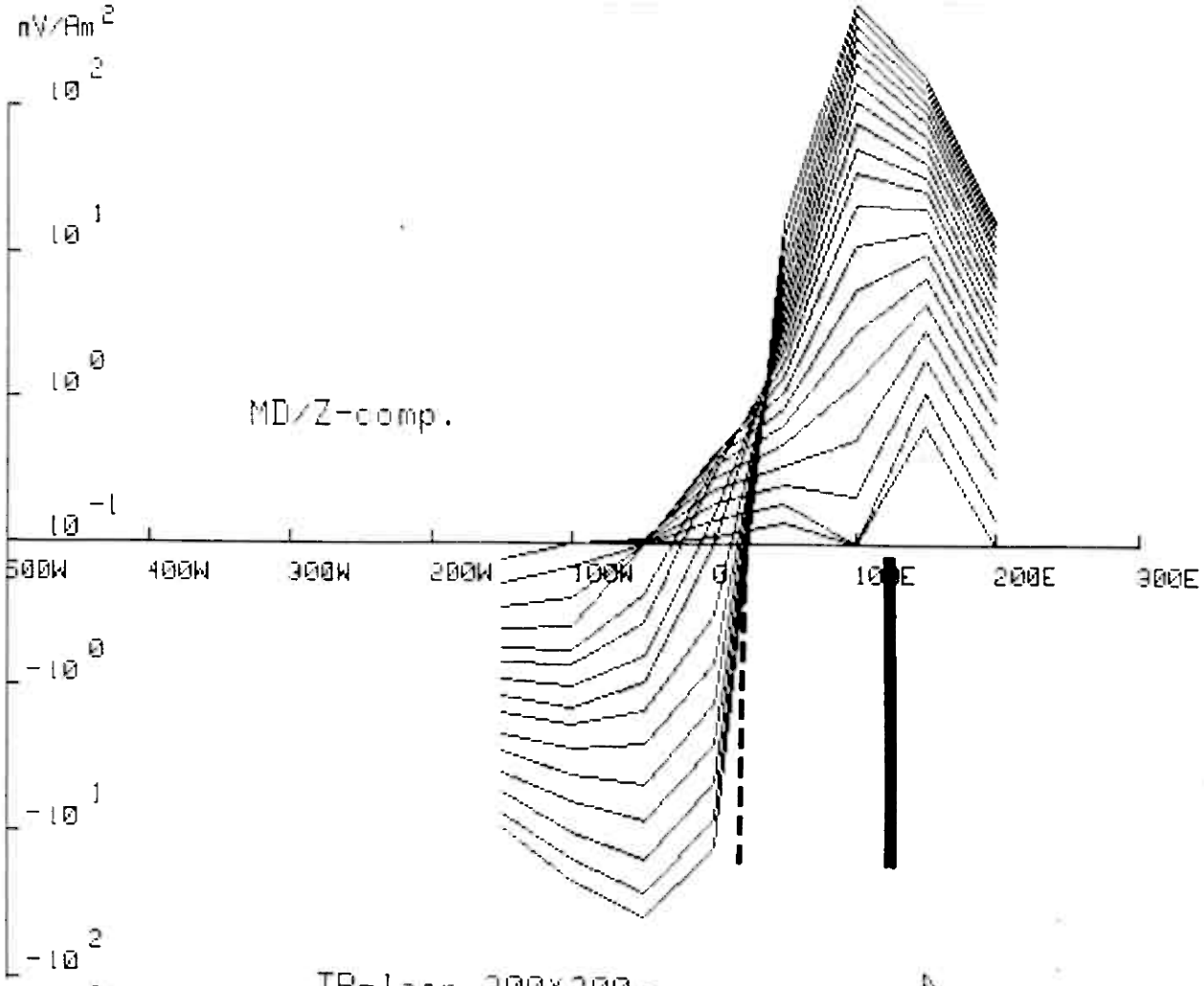
OUTOKUMPU O Exploration	1:5000
	JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 400 S	App. 8/1



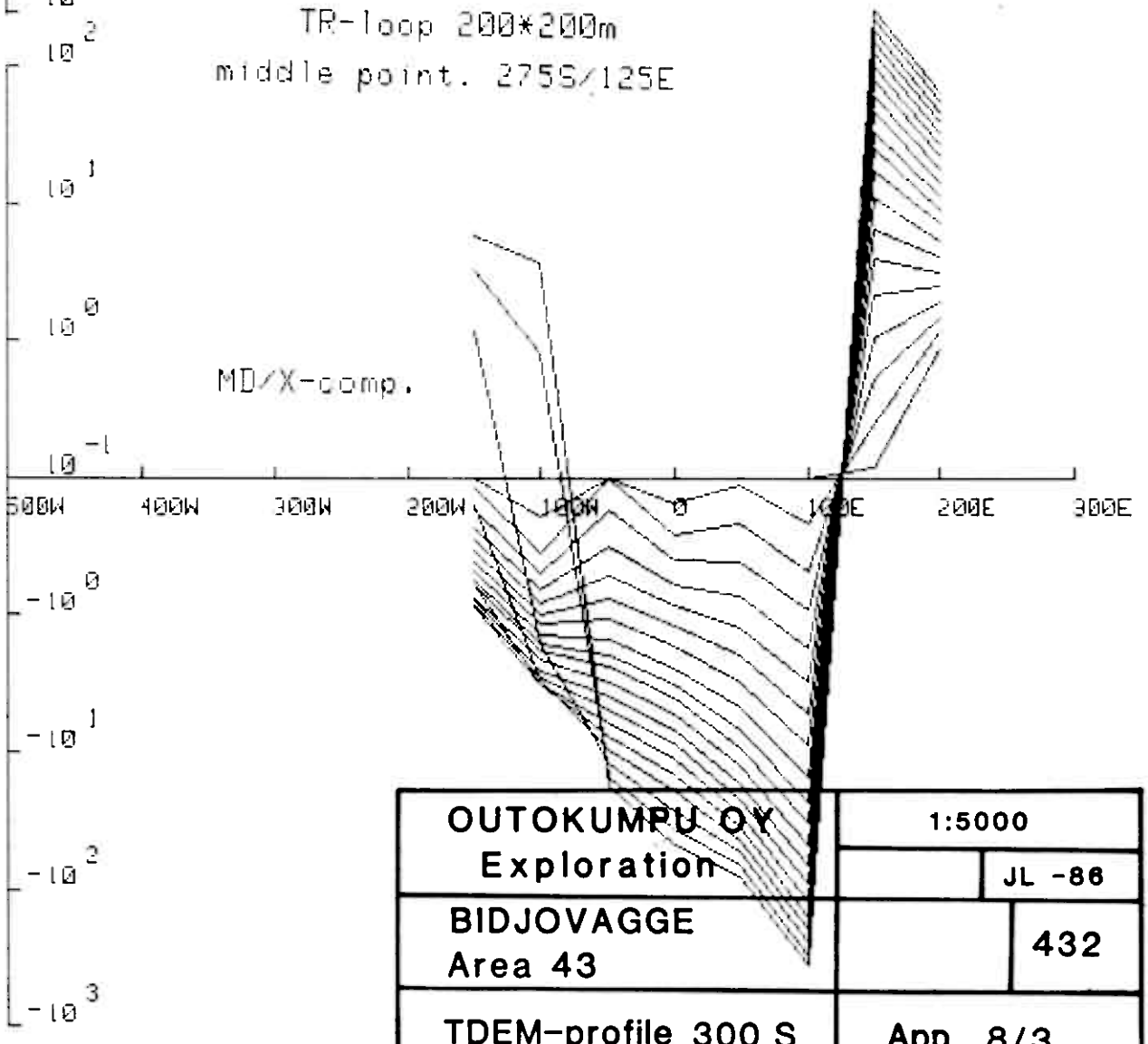
TR-loop 200*200m
middle point. 275S/125E



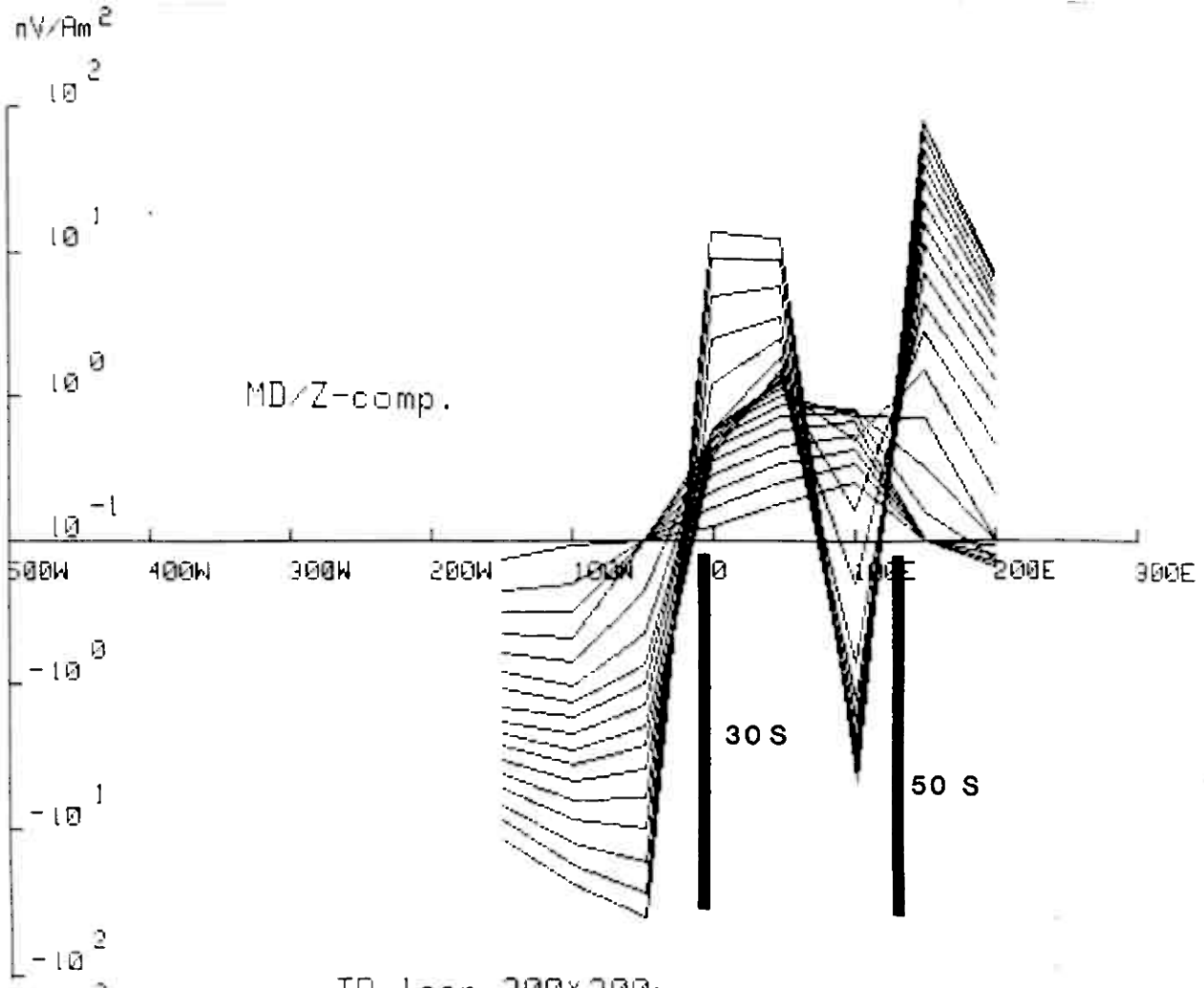
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 350 S	App. 8/2	



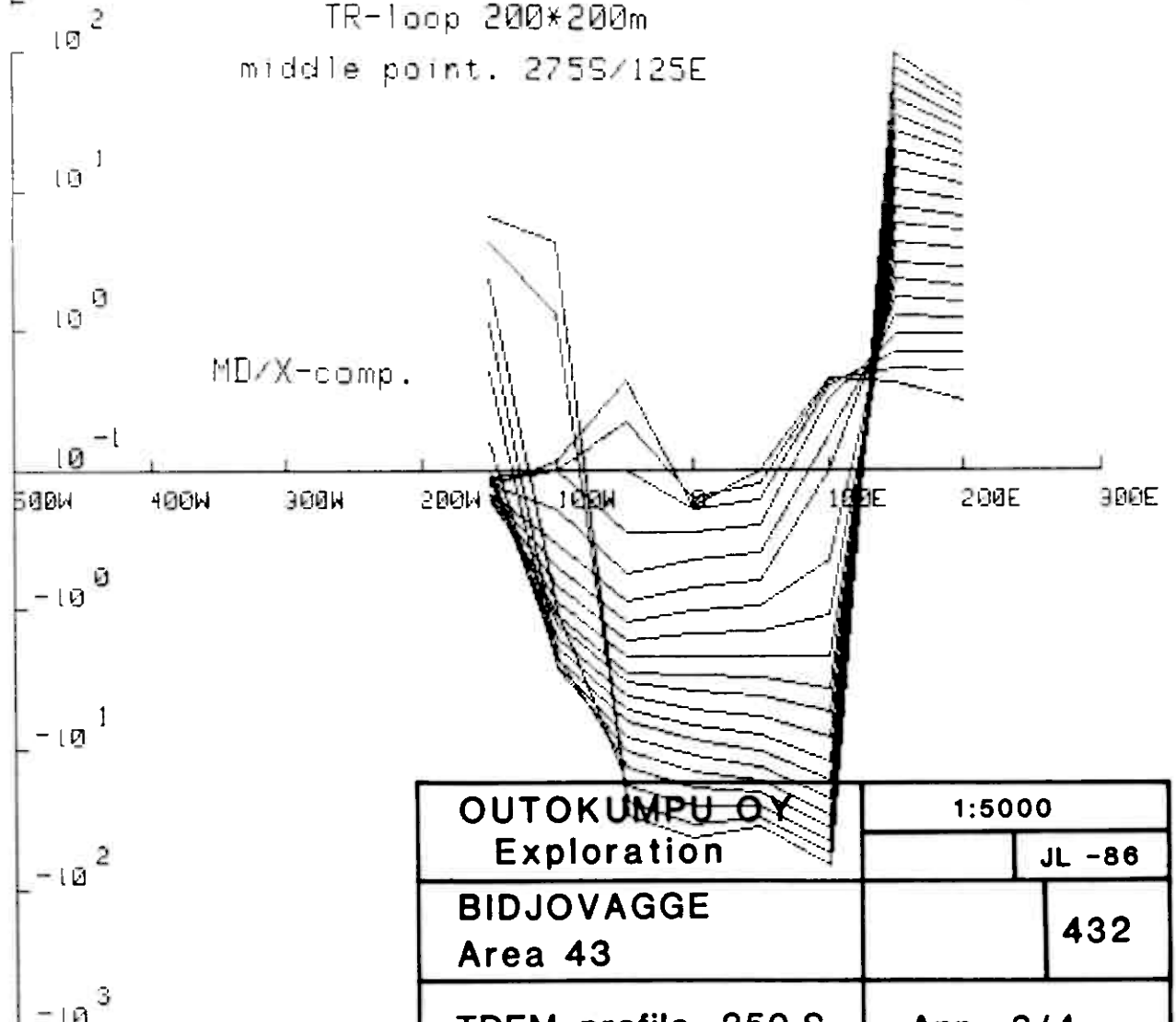
TR-loop 200*200m
middle point. 275S/125E



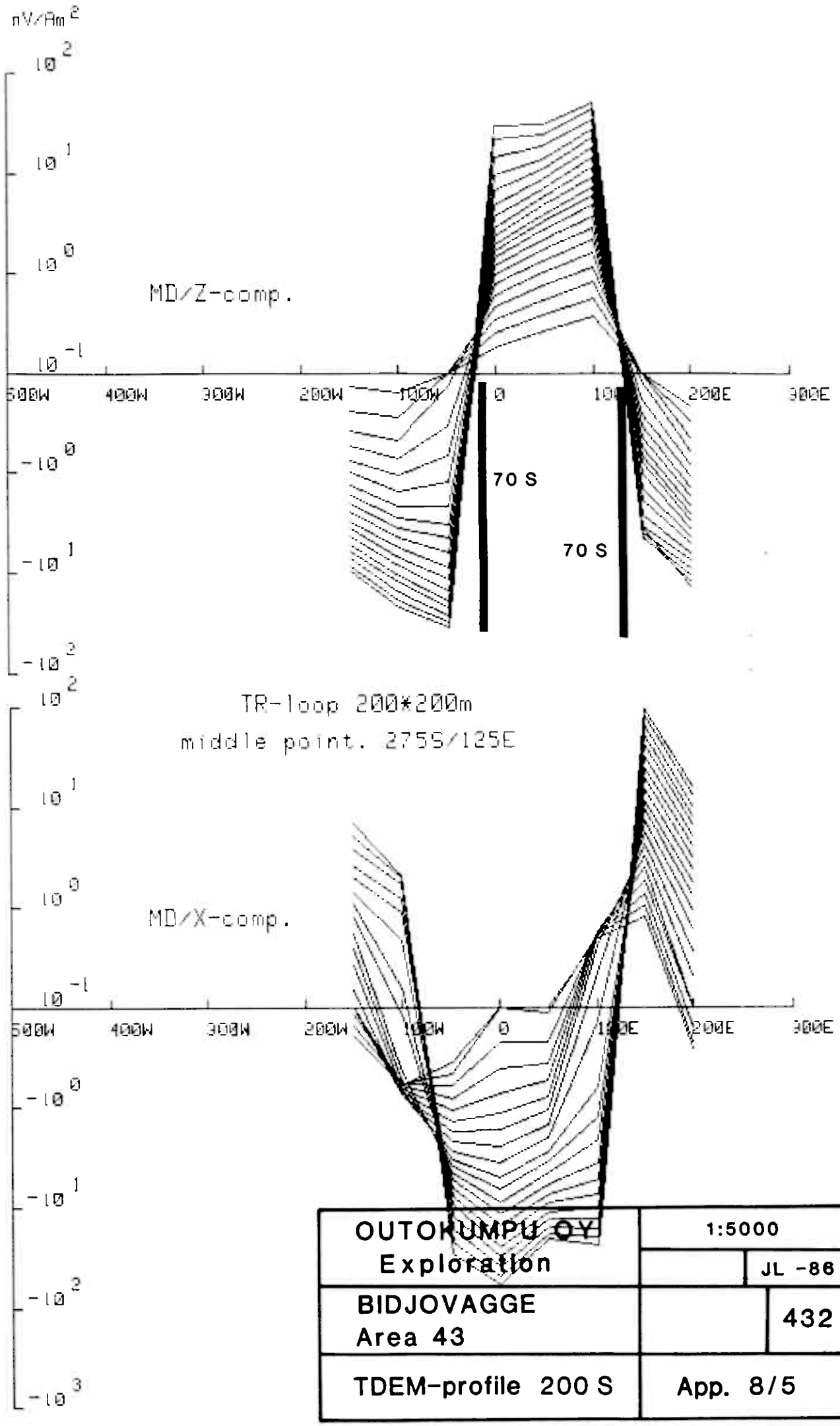
OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 300 S	App. 8/3



TR-loop 200*200m
middle point. 275S/125E



OUTOKUMPU OY Exploration	1:5000 JL -86
BIDJOVAGGE Area 43	432
TDEM-profile 250 S	App. 8/4

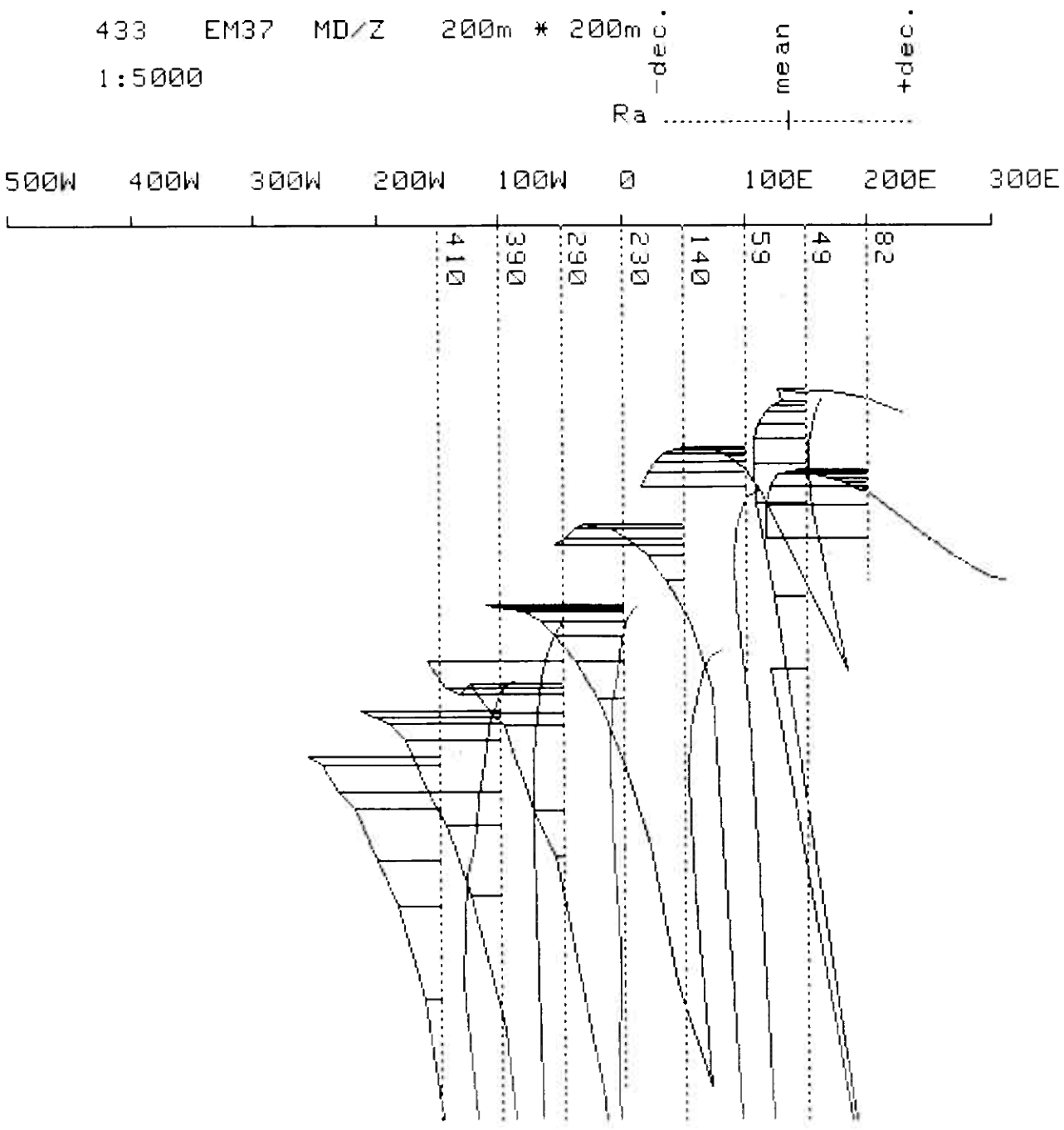


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
TDEM-profile 200 S	App. 8/5	

Area 43 MIKKUJAURE 7 Prof.400S

433 EM37 MD/Z 200m * 200m

1:5000

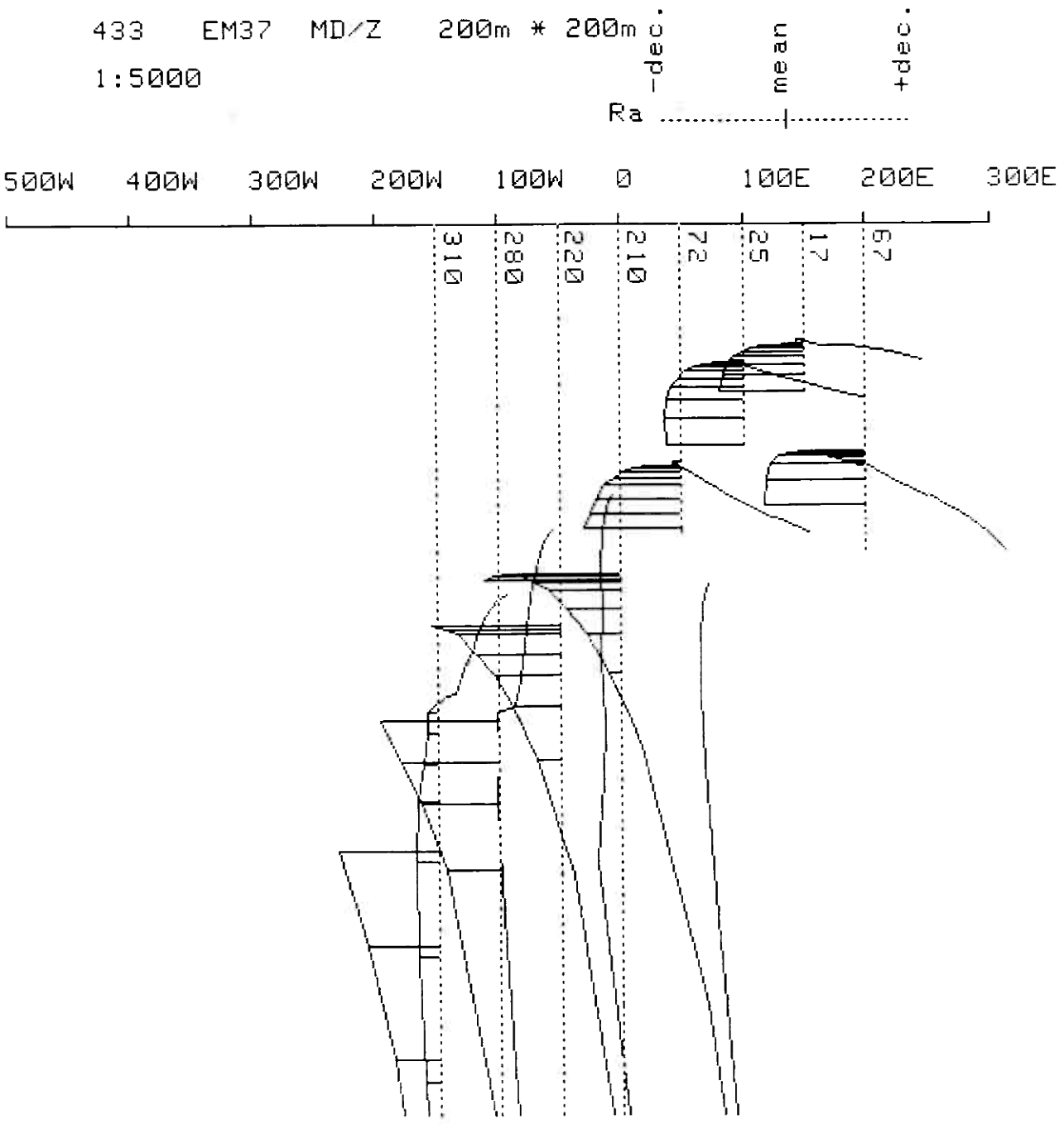


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 8/10	

Area 43 MIKKUJAURE 7 Prof.350S

433 EM37 MD/Z 200m * 200m

1:5000

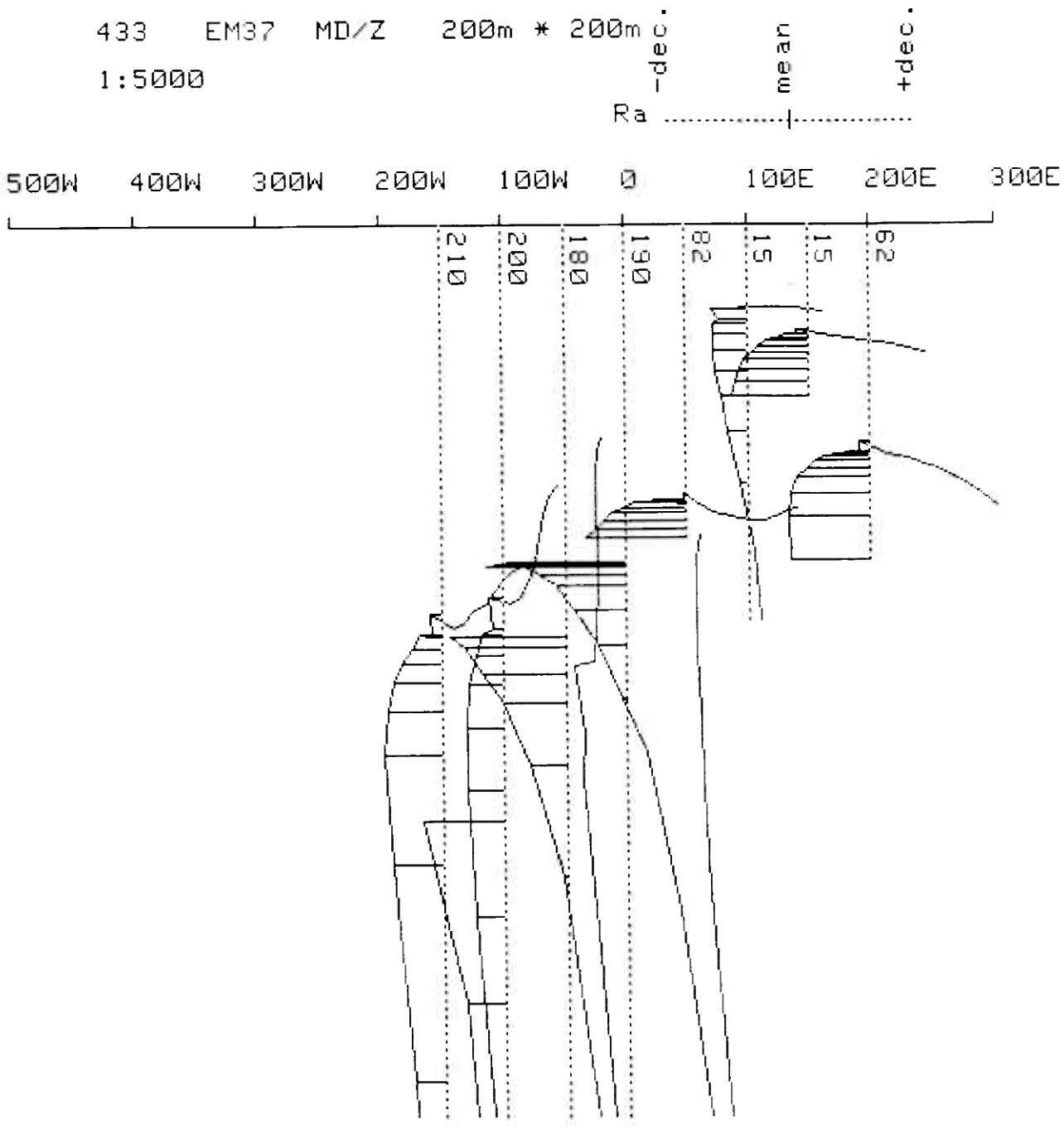


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 8/9	

Area 43 MIKKUJAURE 7 Prof.300S

433 EM37 MD/Z 200m * 200m

1:5000

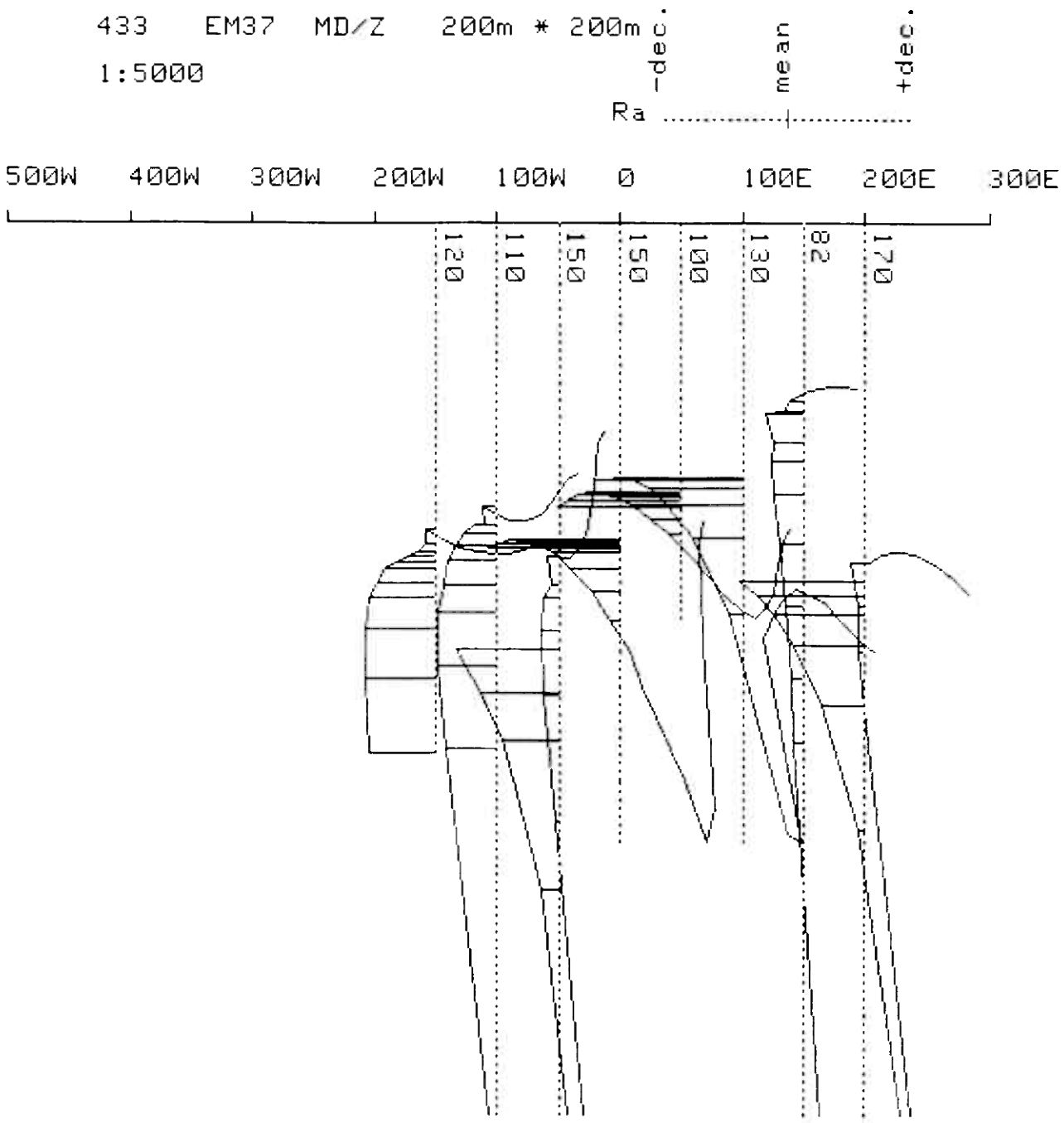


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 8/8	

Area 43 MIKKUJAURE 7 Prof.250S

433 EM37 MD/Z 200m * 200m

1:5000

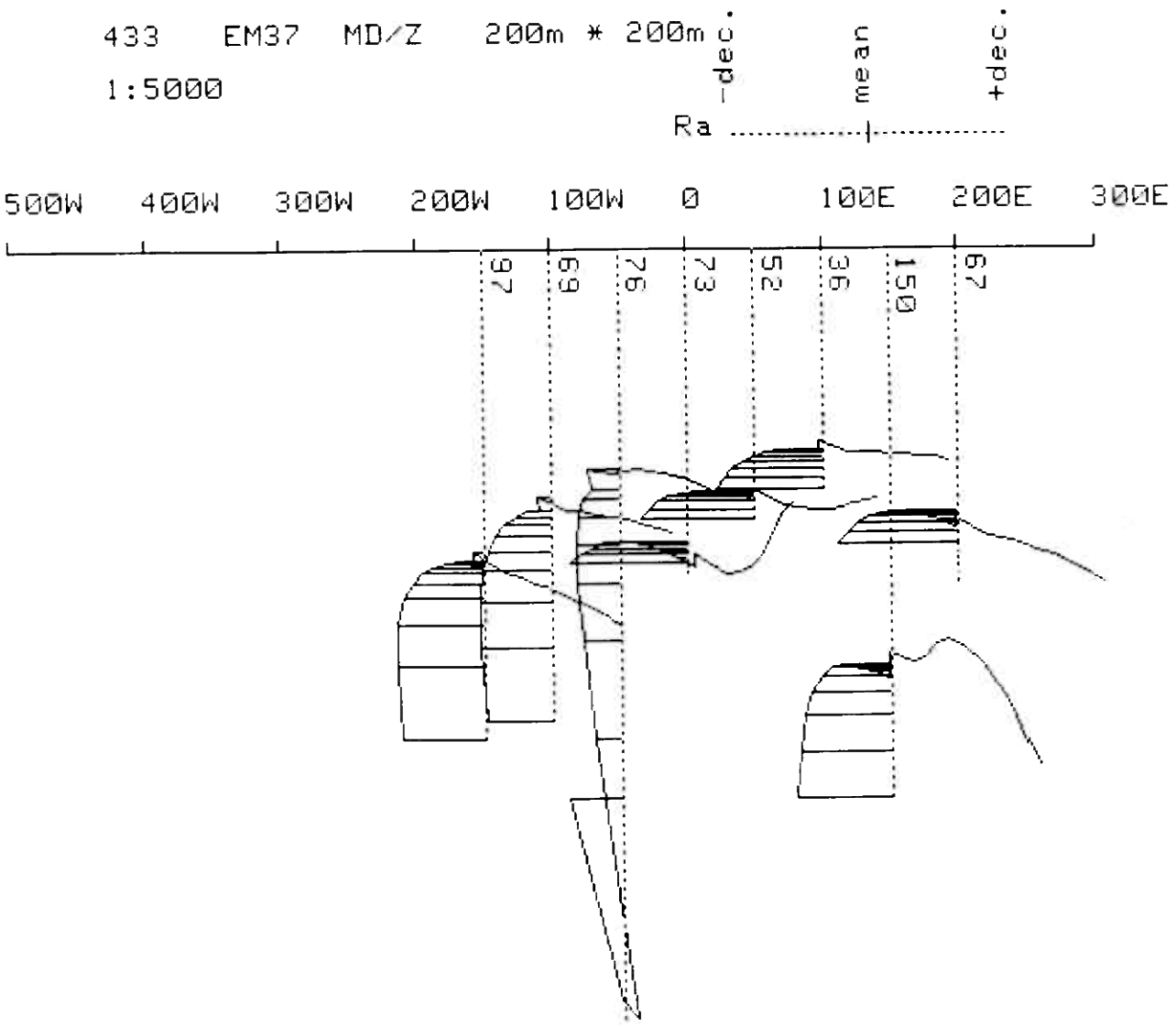


OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 8/7	

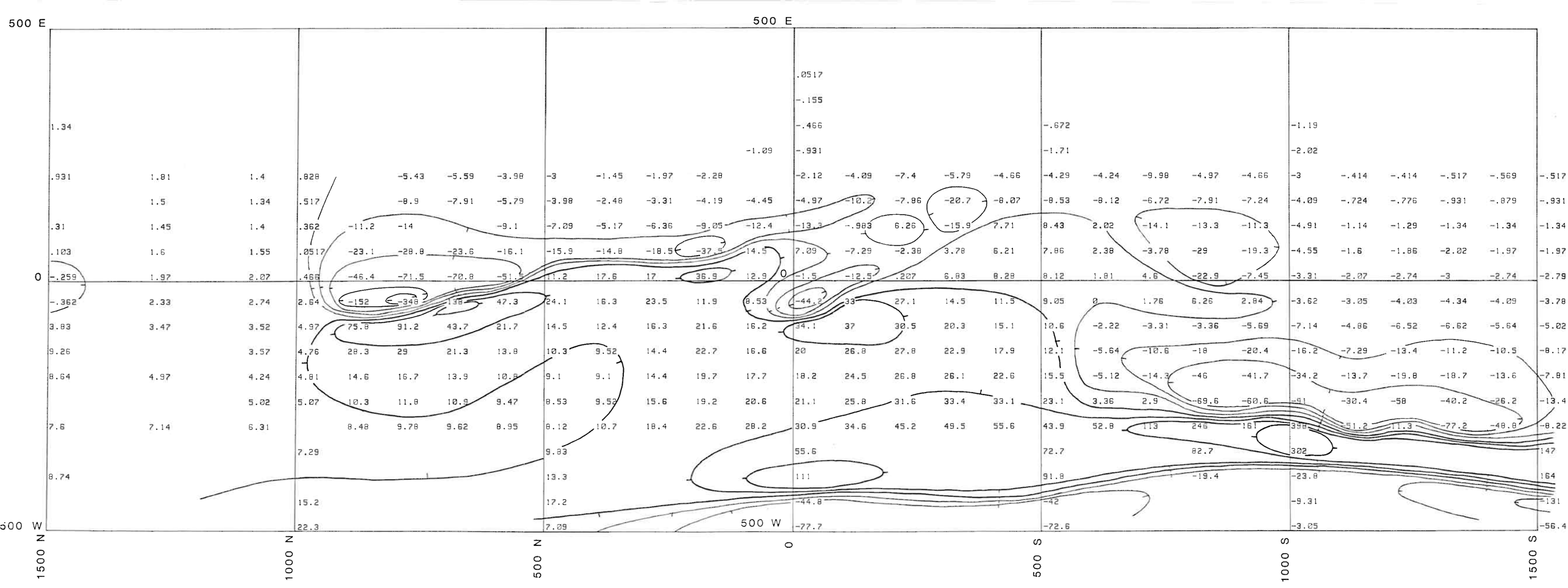
Area 43 MIKKUJAURE 7 Prof.200S

433 EM37 MD/Z 200m * 200m

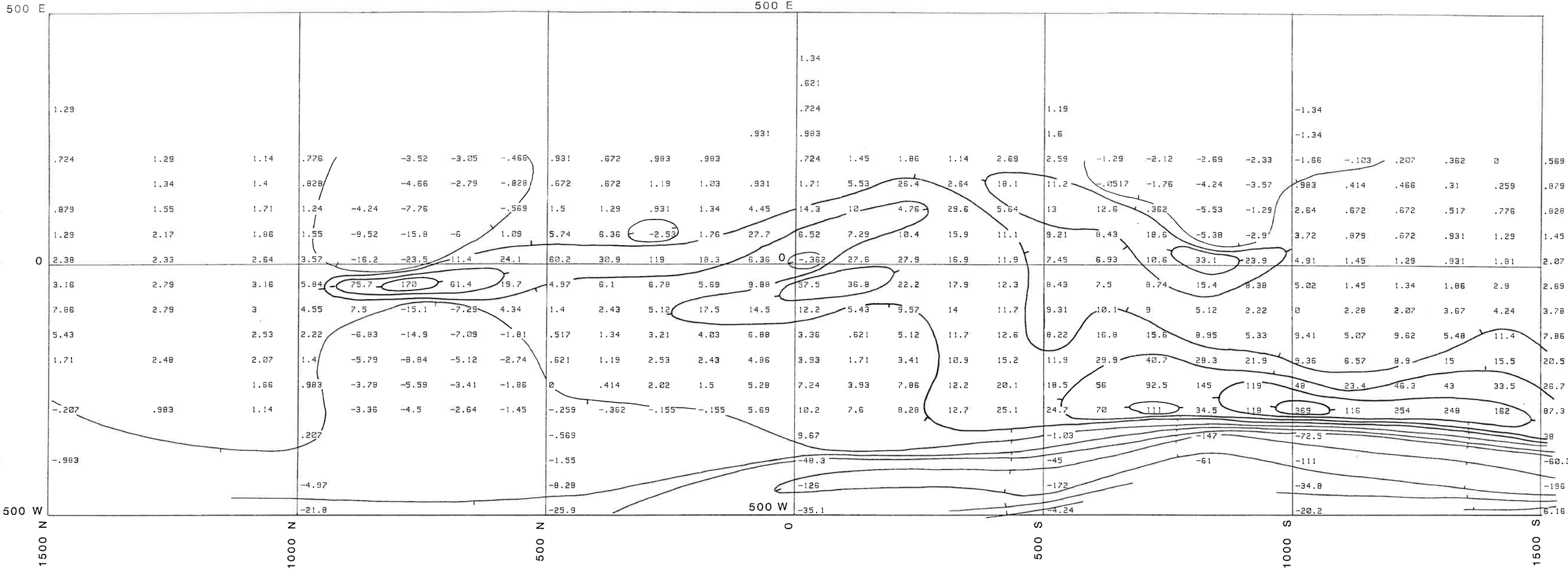
1:5000



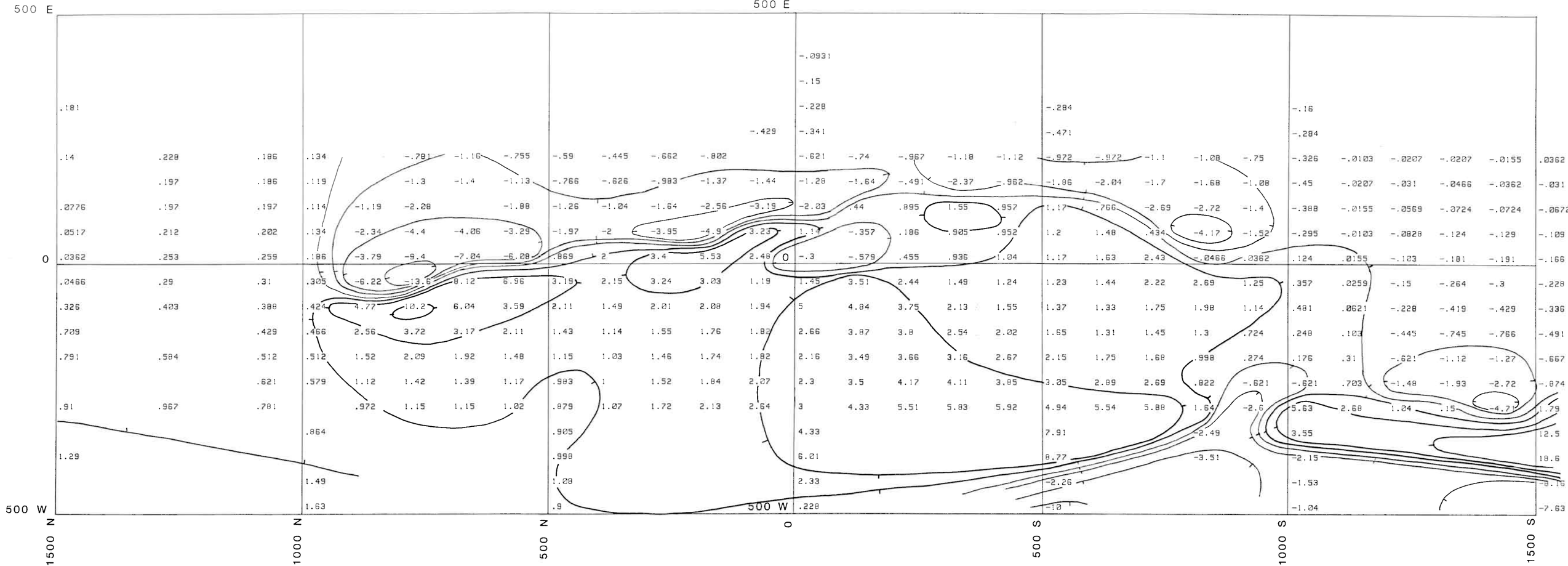
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		433
DIT-plot	App. 8/6	



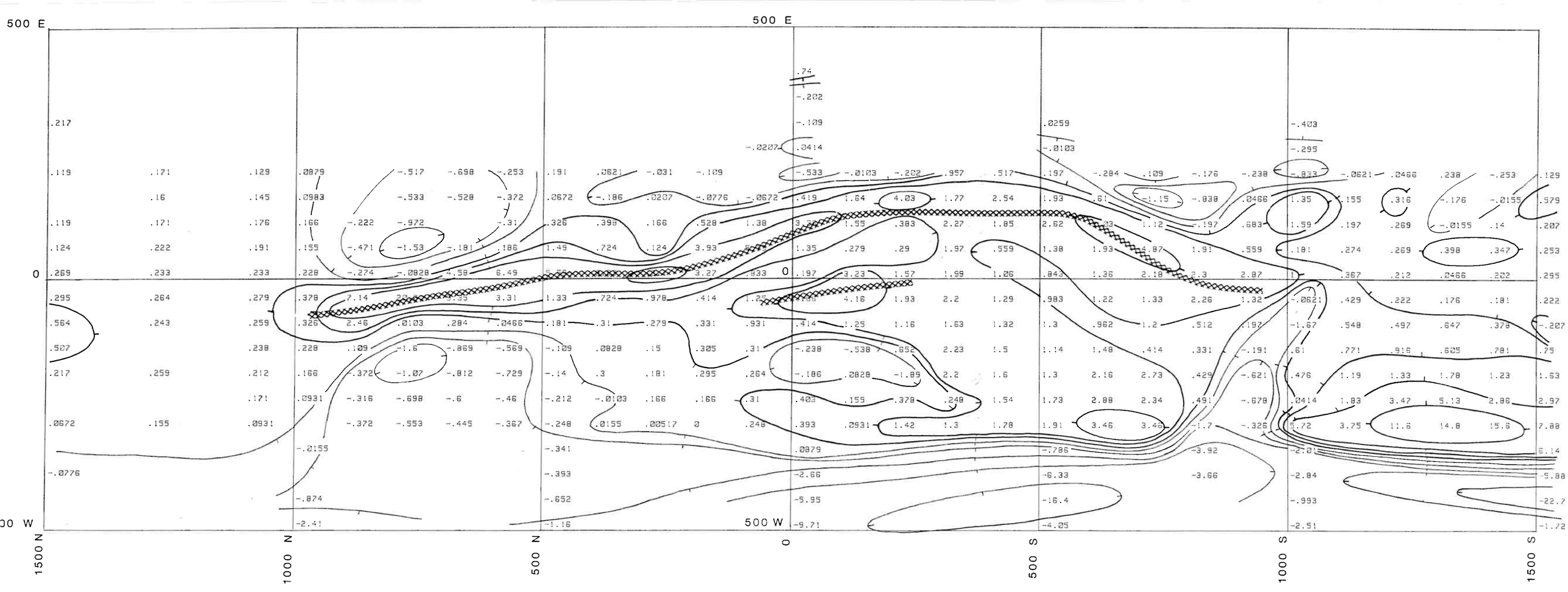
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
contoured map TDEM/Z-comp. channel no. 5 (0.88ms)	App. 9/1	



OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
contoured map TDEM/X-comp. channel no.5 (0.88ms)	App. 9/2	



OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
contoured map TDEM/Z-comp. channel no. 15 (8.88ms)	App. 9/3	



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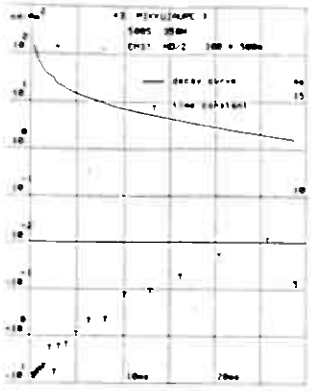
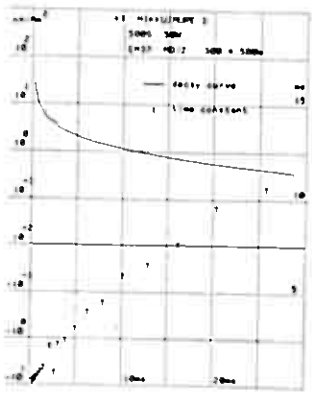
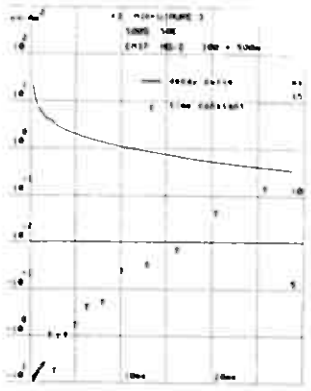
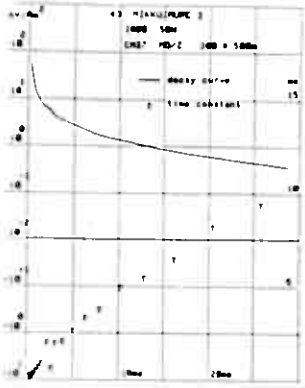
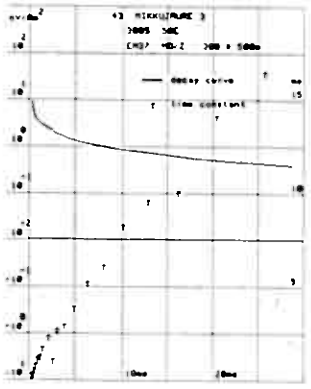
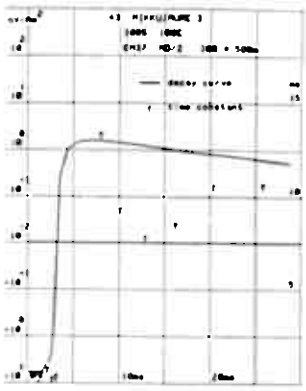
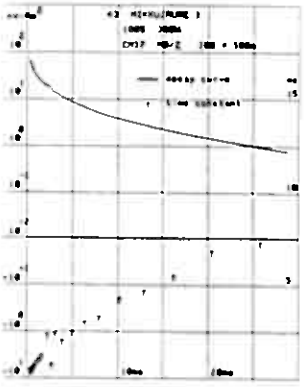
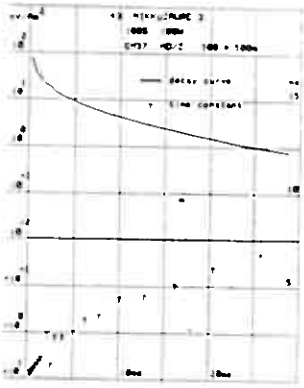
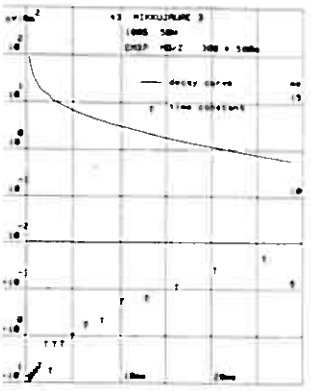
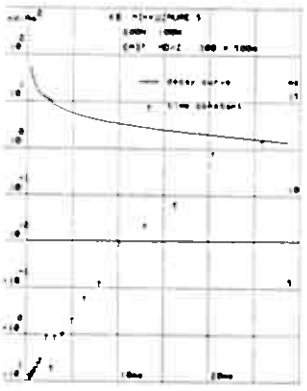
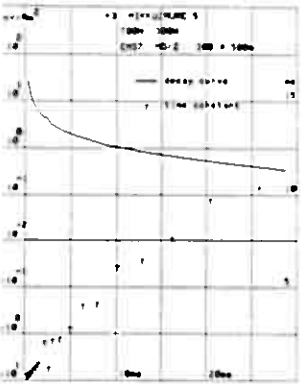
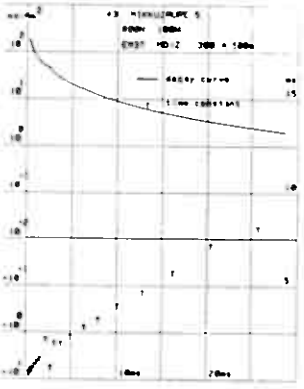
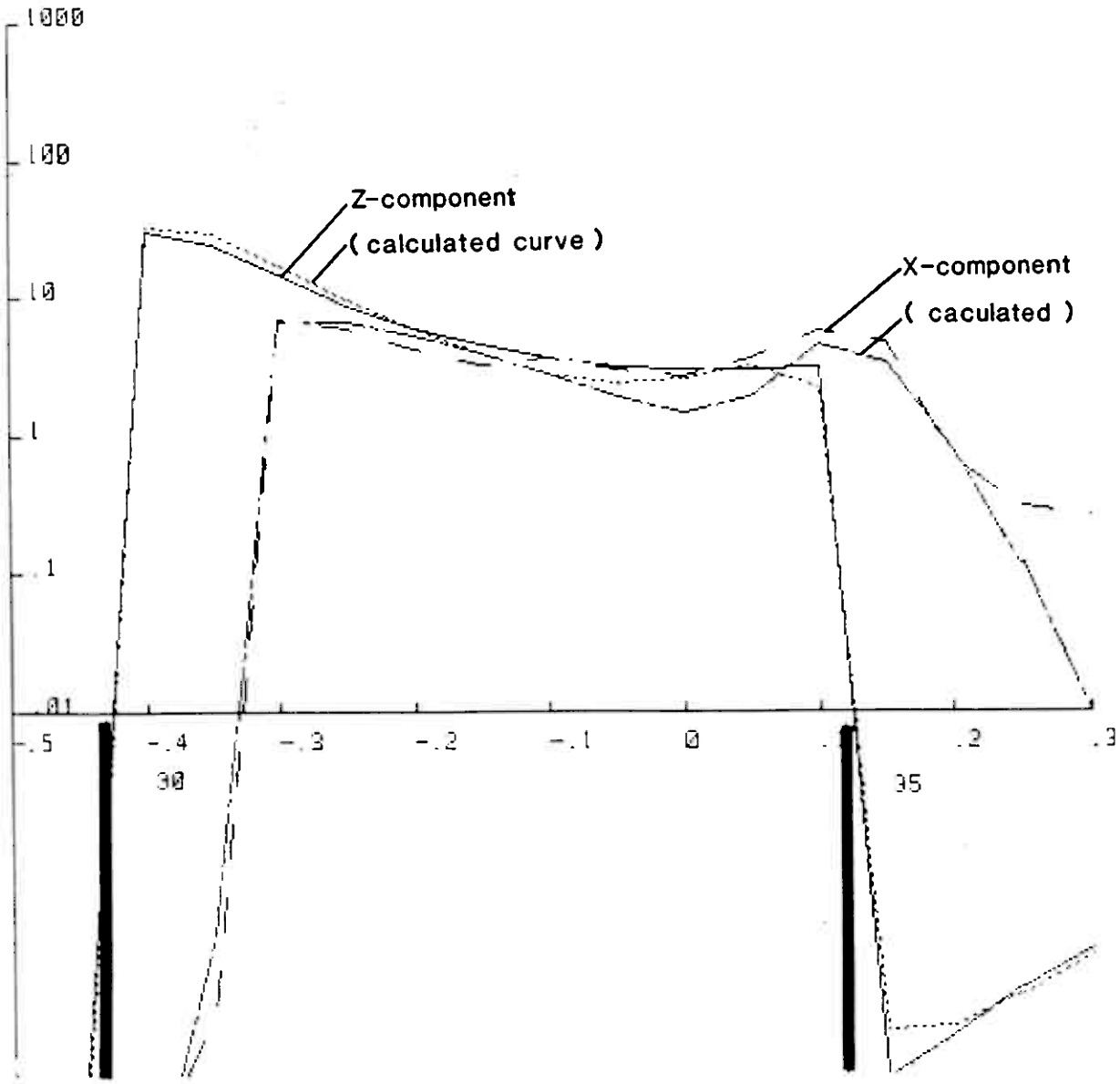
OUTOKUMPU OY Exploration	1:5000	
		JL -86
BIDJOVAGGE Area 43		432
contoured map TDEM/X-comp. channel no. 15 (8.88ms)	App. 9/4	

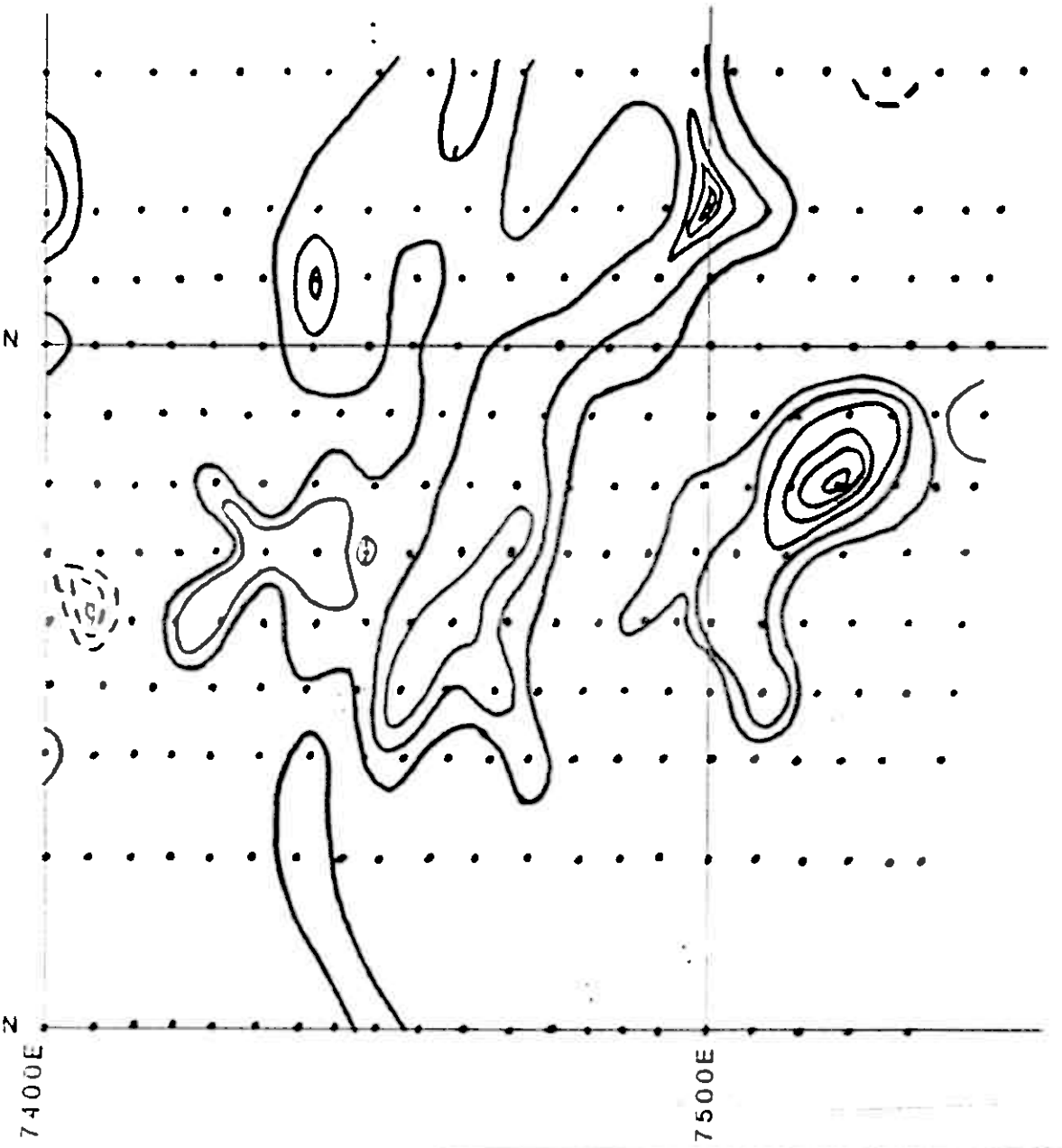
OUTOKUMPU OY Exploration		1:5000
		JL -86
BIDJOVAGGE Area 43		432
TDEM	decay curves time constants	App. 10/1

43/MIKKUJAURE 3/Prof A=-.5 -Komp.

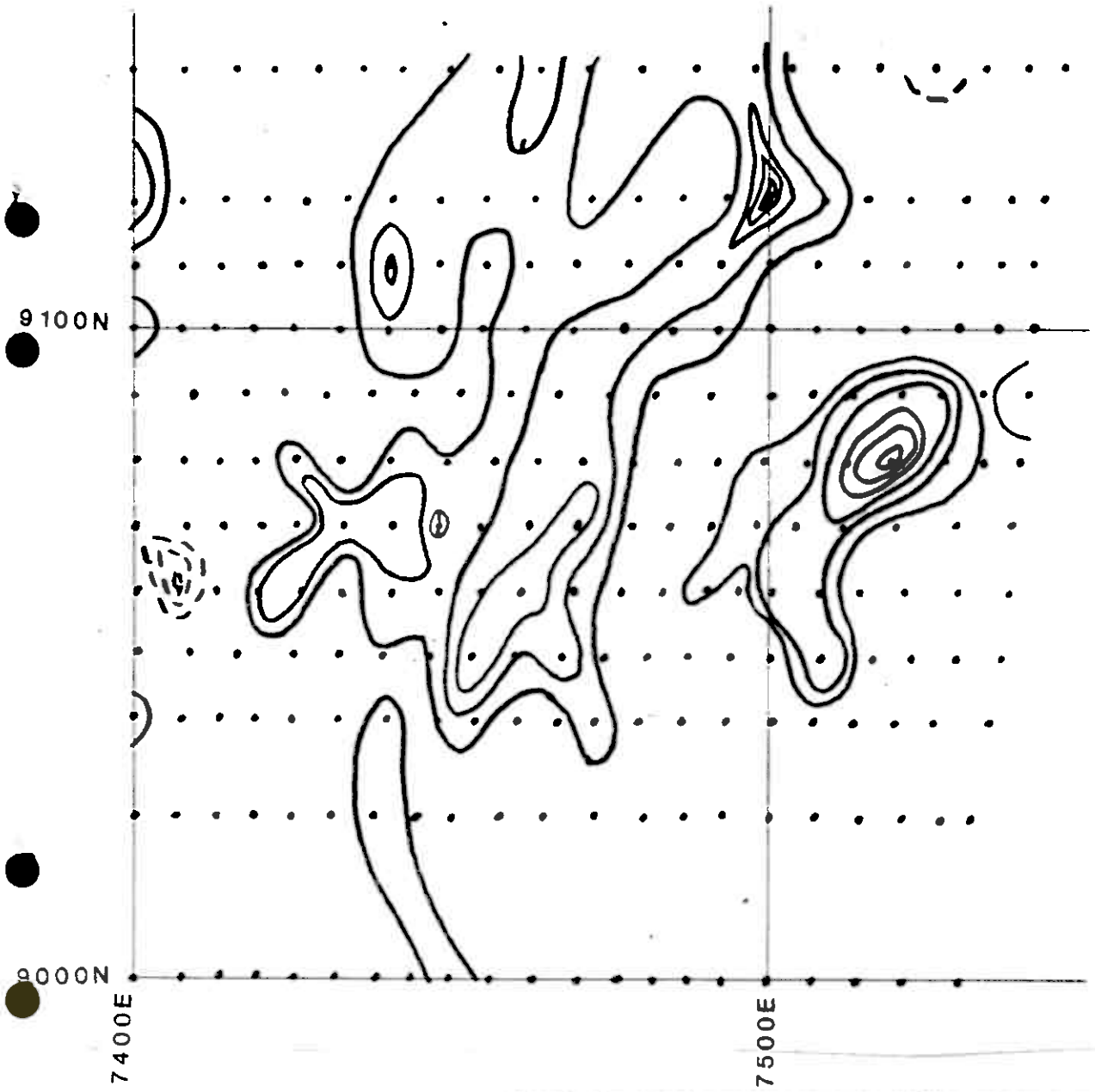
415/432 1:5000 Pvm nV/Am^2



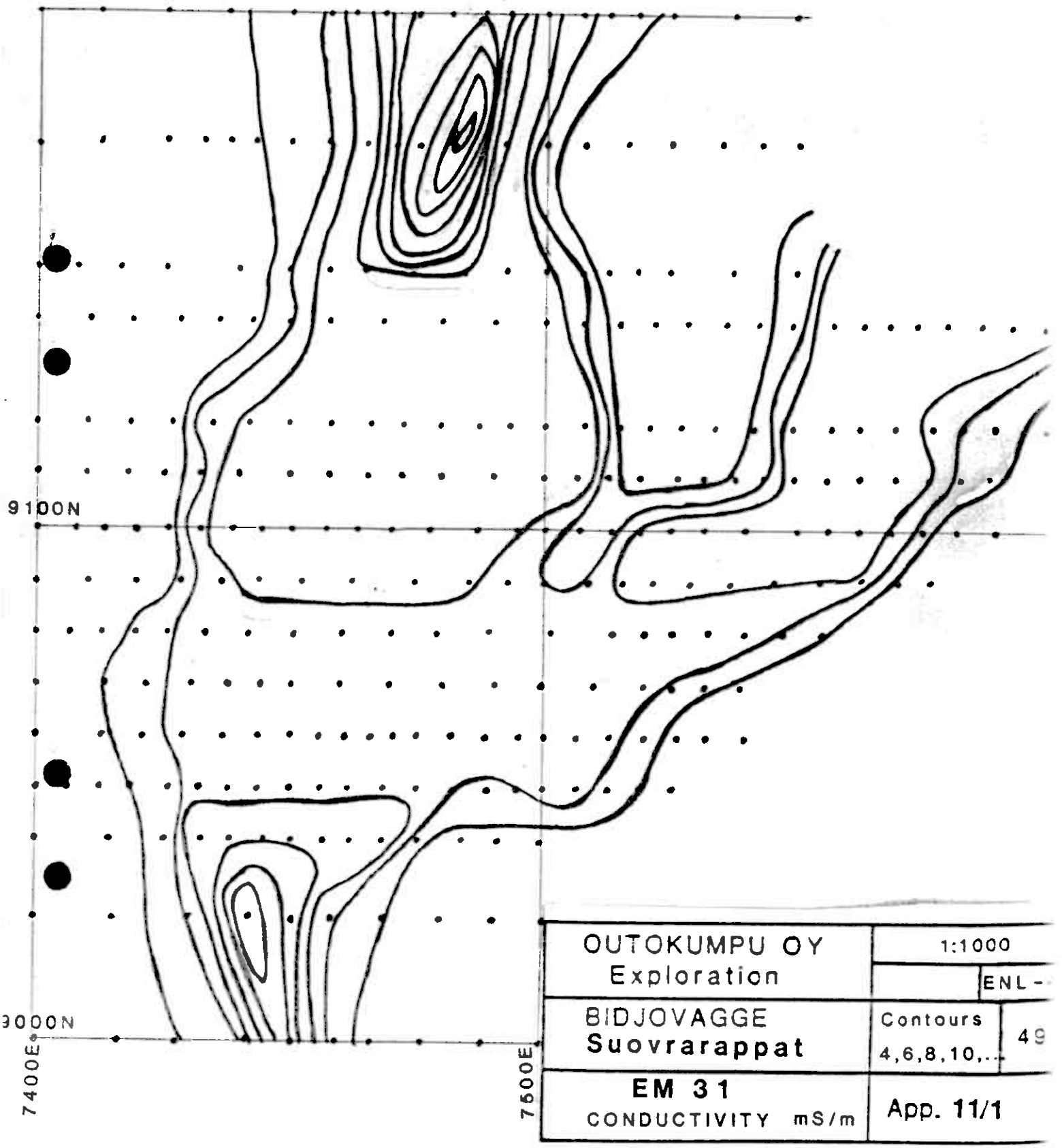
OUTOKUMPU OY Exploration	1:5000	JL -86
BIDJOVAGGE Area 43		
TDEM interpretation	App. 10/2	



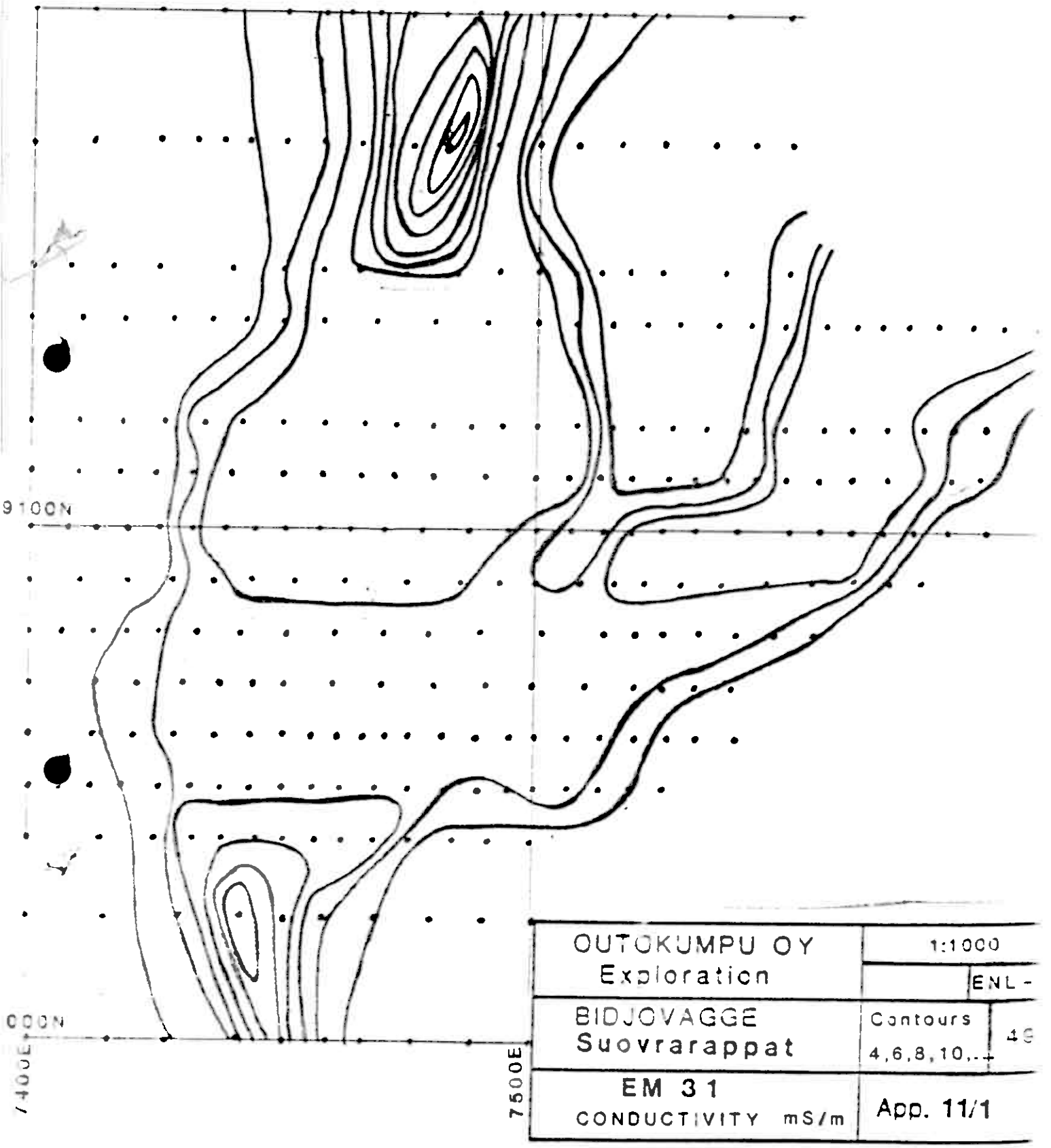
OUTOKUMPU OY Exploration	1:1000	
		ENL -86
BIDJOVAGGE **Suovrarappat**	Contours ±20,40,60,...	499
Gefinex 200 IN-PHASE %	App. **11/2**	



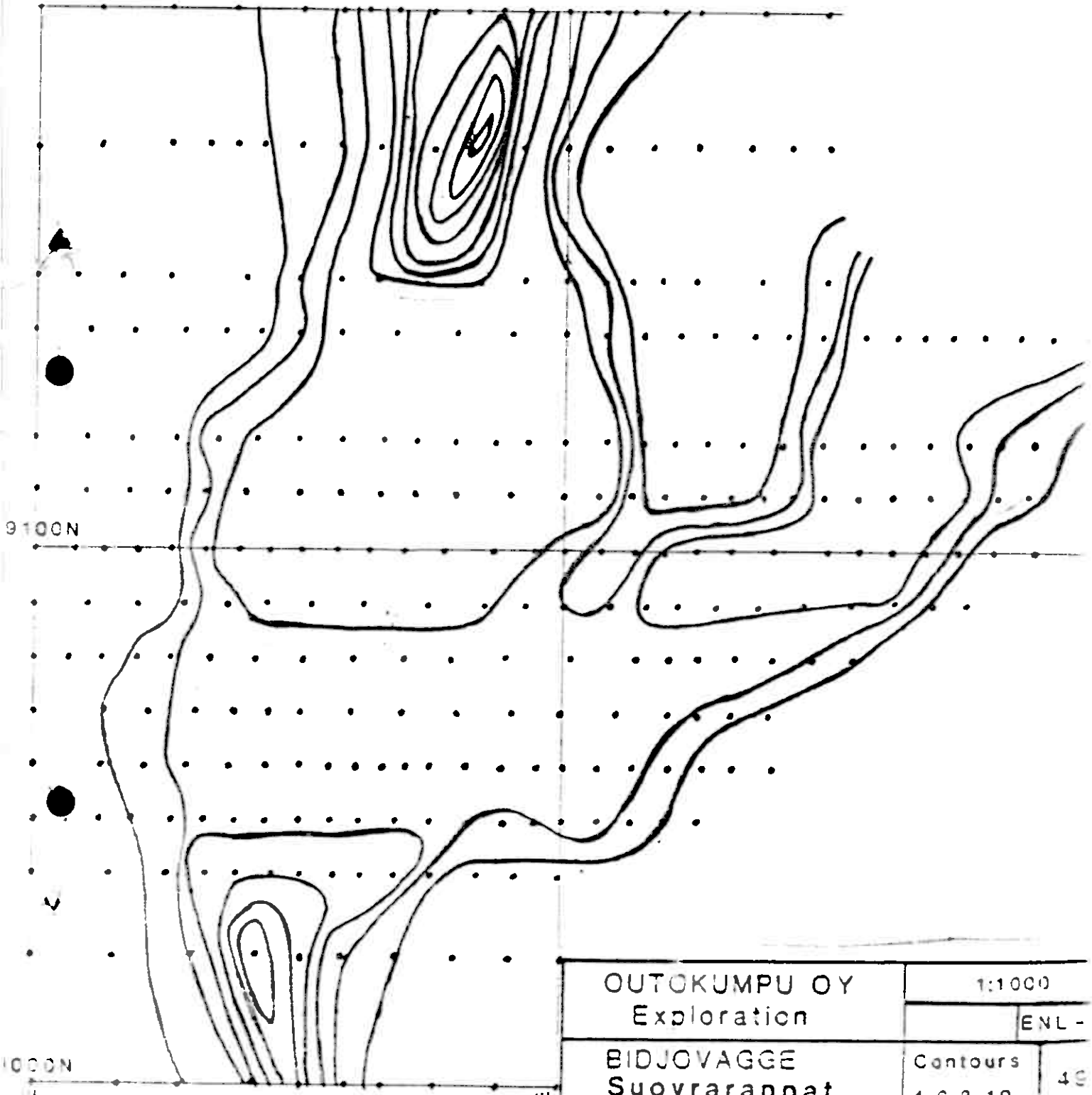
OUTOKUMPU OY Exploration	1:1000	
		ENL -86
BIDJOVAGGE **Suovrarappat**	Contours ±20,40,60,...	499
Gefinex 200 IN-PHASE %	App. **11/2**	



OUTOKUMPU OY Exploration	1:1000	
	ENL -	
BIDJOVAGGE **Suovrarappat**	Contours 4,6,8,10,...	49
EM 31 CONDUCTIVITY mS/m	App. **11/1**	



OUTOKUMPU OY Exploration	1:1000	
		ENL -
BIDJOVAGGE Suovrarappat	Contours 4,6,8,10,..	46
EM 31 CONDUCTIVITY mS/m	App. 11/1	



OUTOKUMPU OY Exploration	1:1000 ENL -
BIDJOVAGGE Suovrarappat	Contours 4,6,8,10,..+
EM 31 CONDUCTIVITY mS/m	App. 11/1