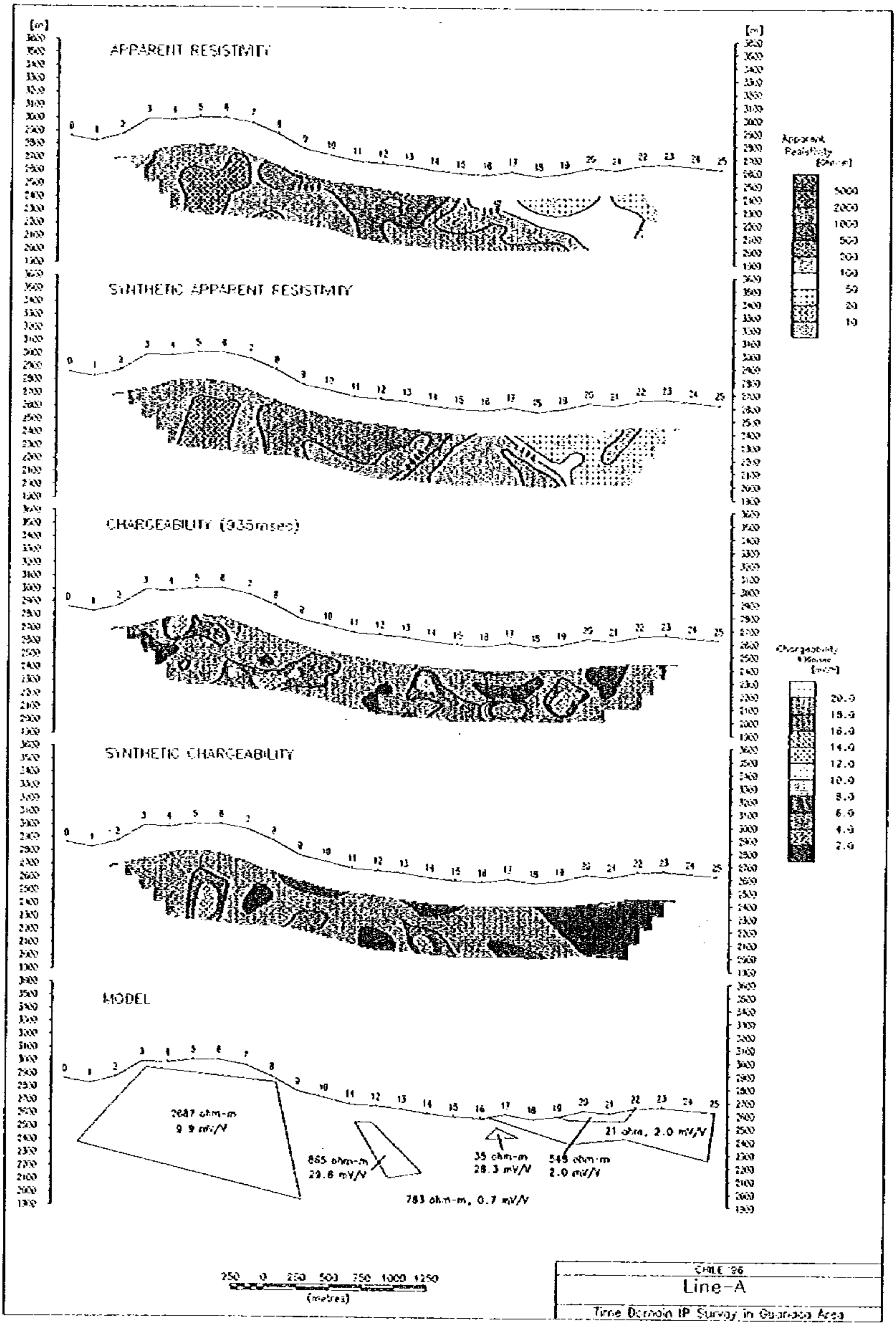

Fig.2-4-12 Section of simulated results (Line A)

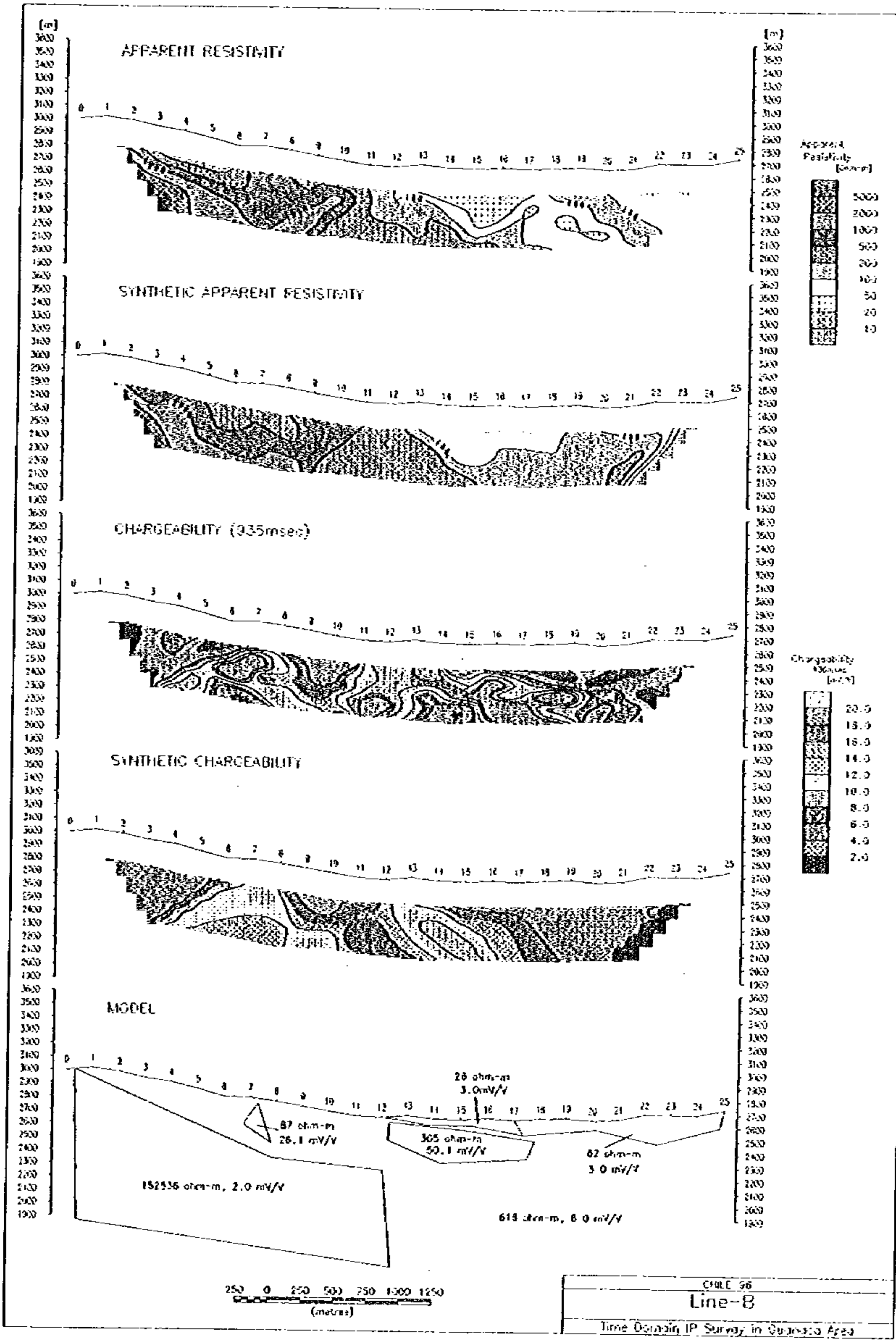

Fig.2-4-13 Section of simulated results (Line B)

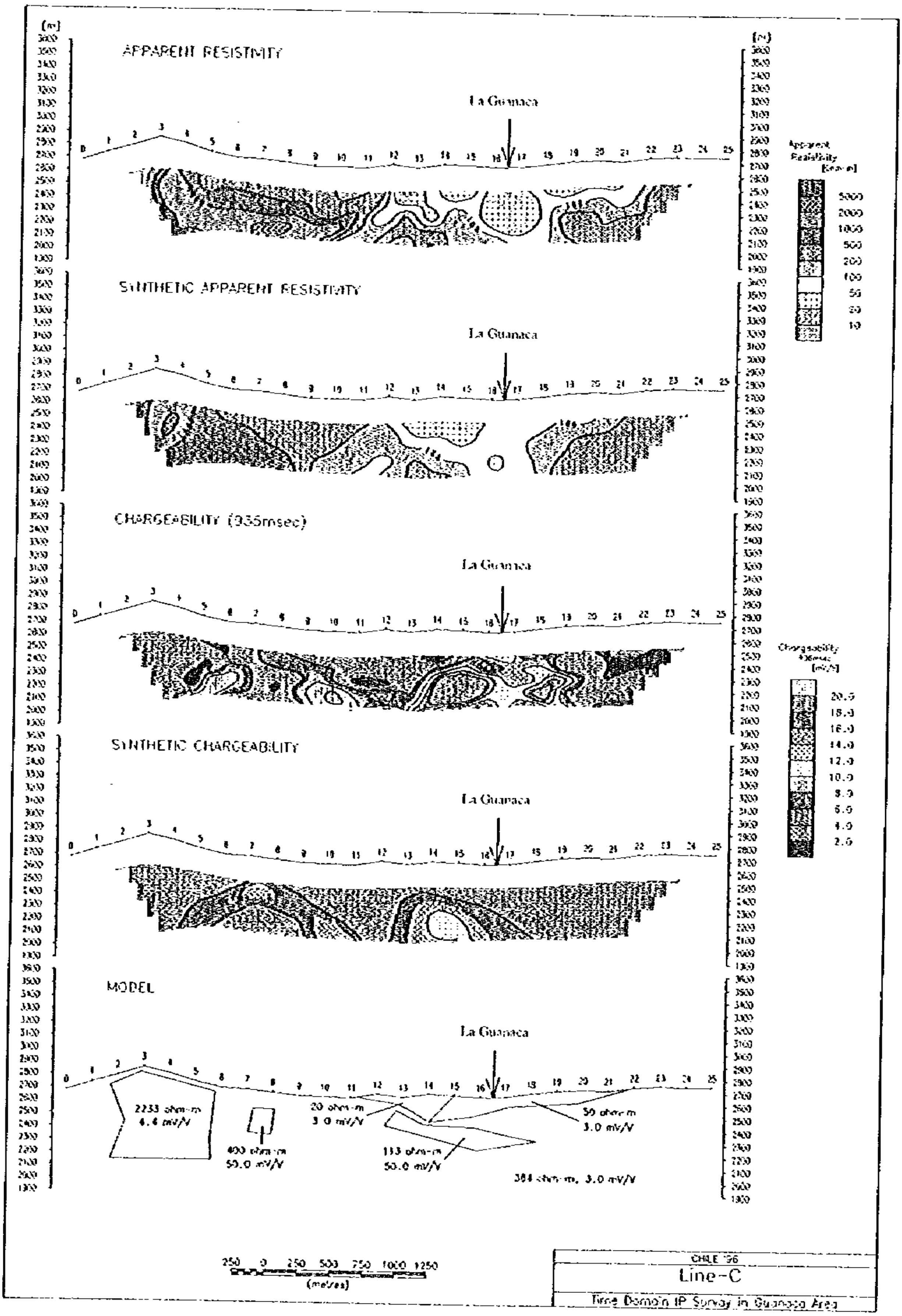

Fig.2-4-14 Section of simulated results (Line C)

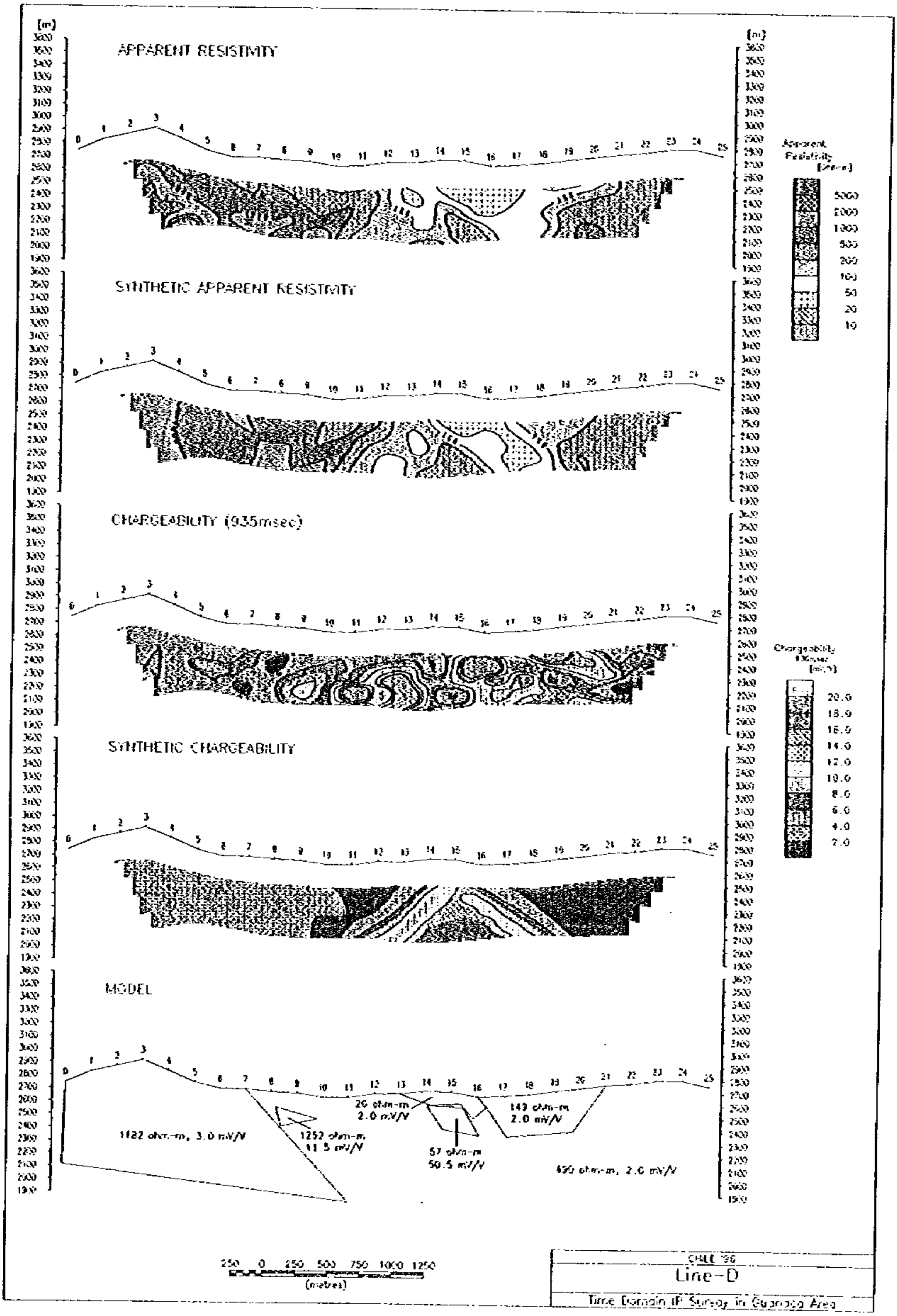

Fig.2-4-15 Section of simulated results (Line D)

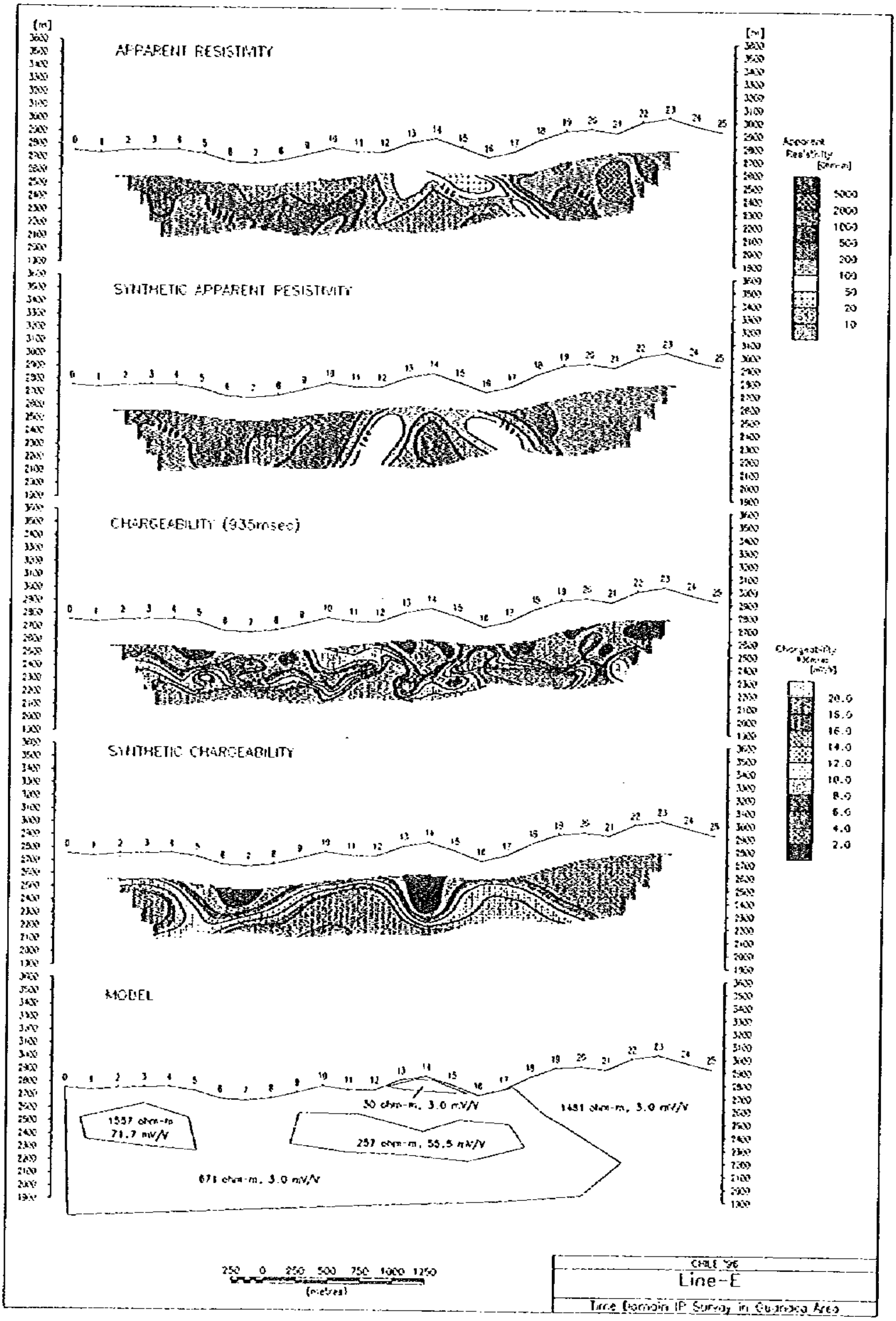

Fig.2-4-16 Section of simulated results (Line E)

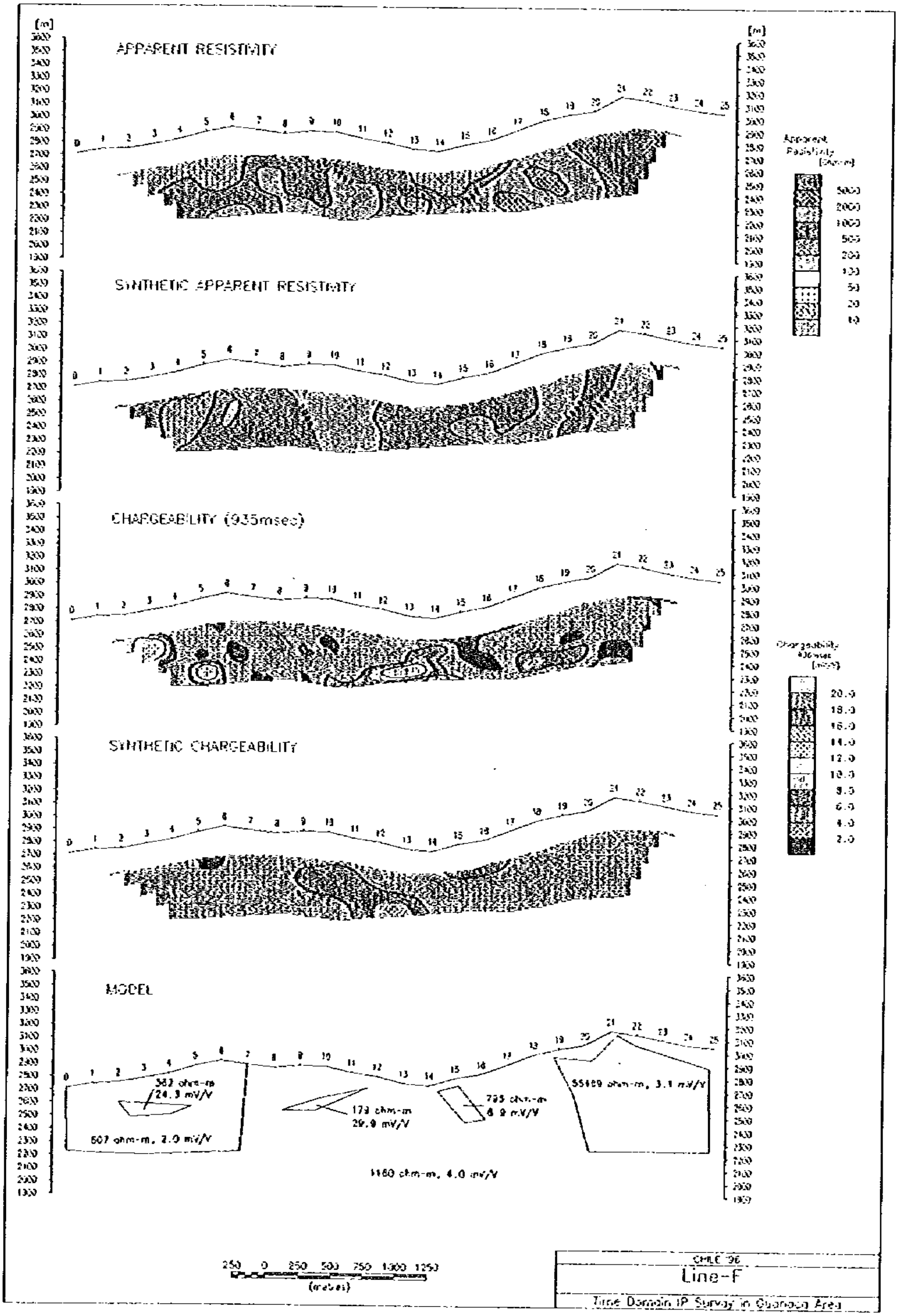

Fig.2-4-17 Section of simulated results (Line F)

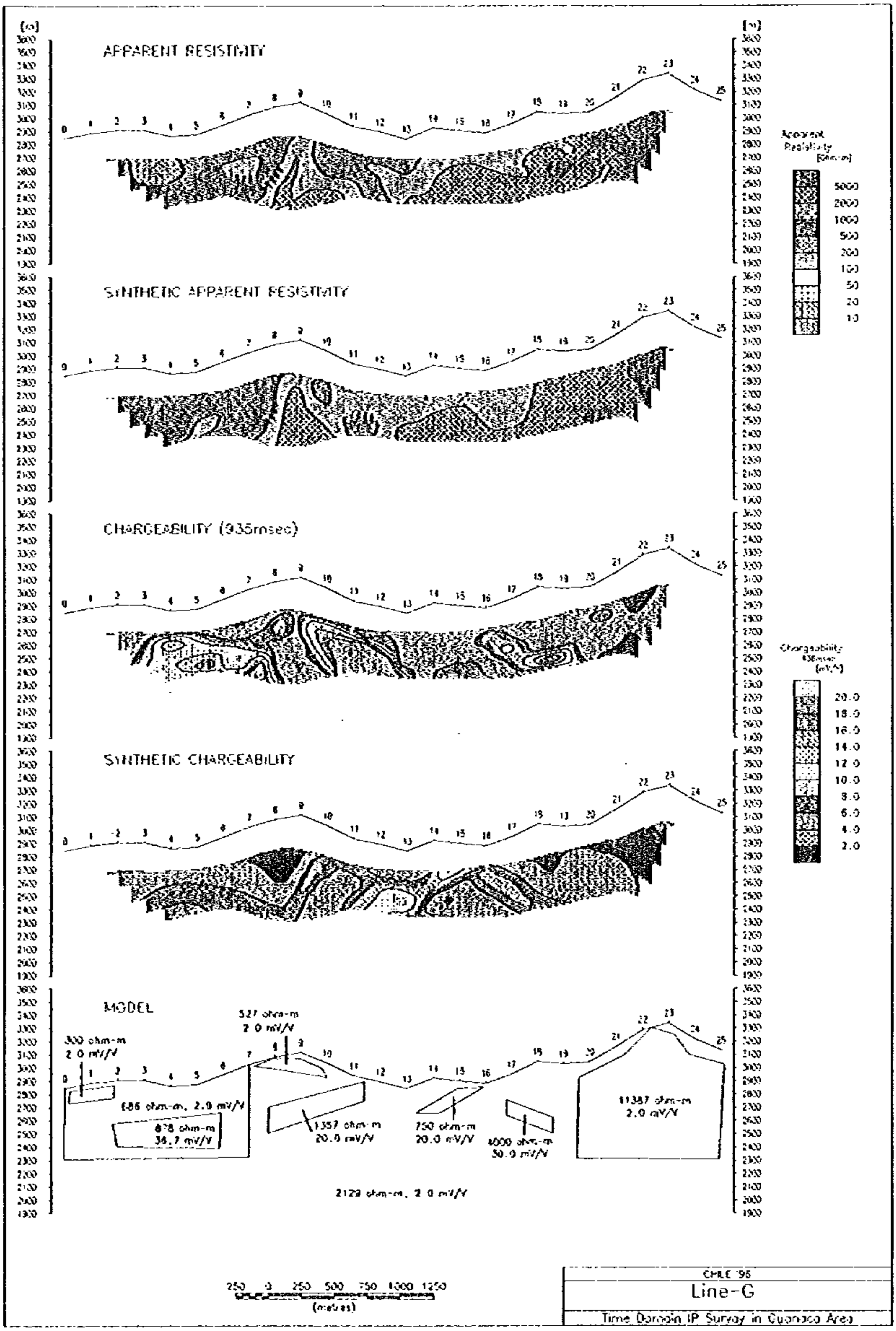

Fig.2-4-18 Section of simulated results (Line G)

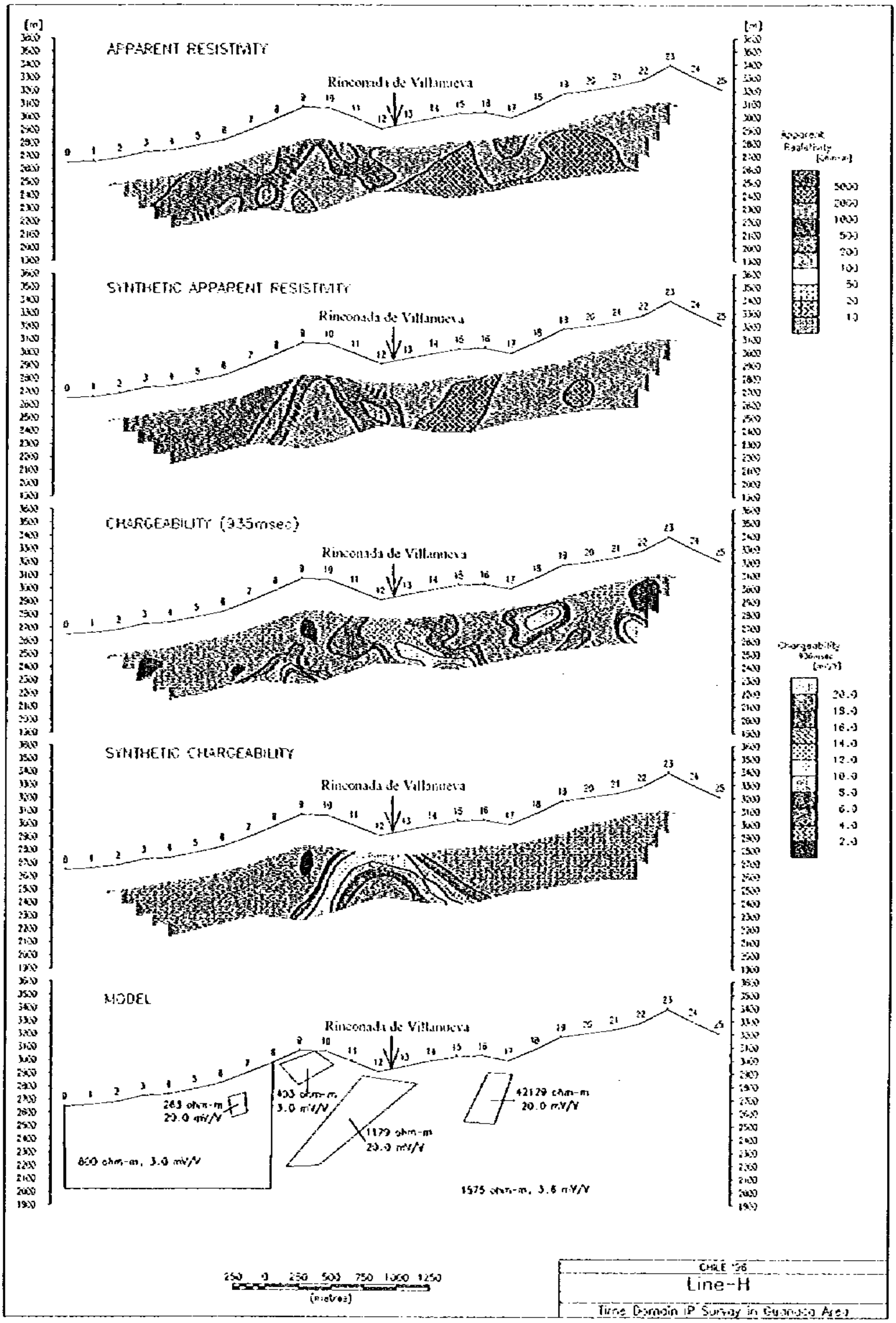

Fig.2-4-19 Section of simulated results (Line H)

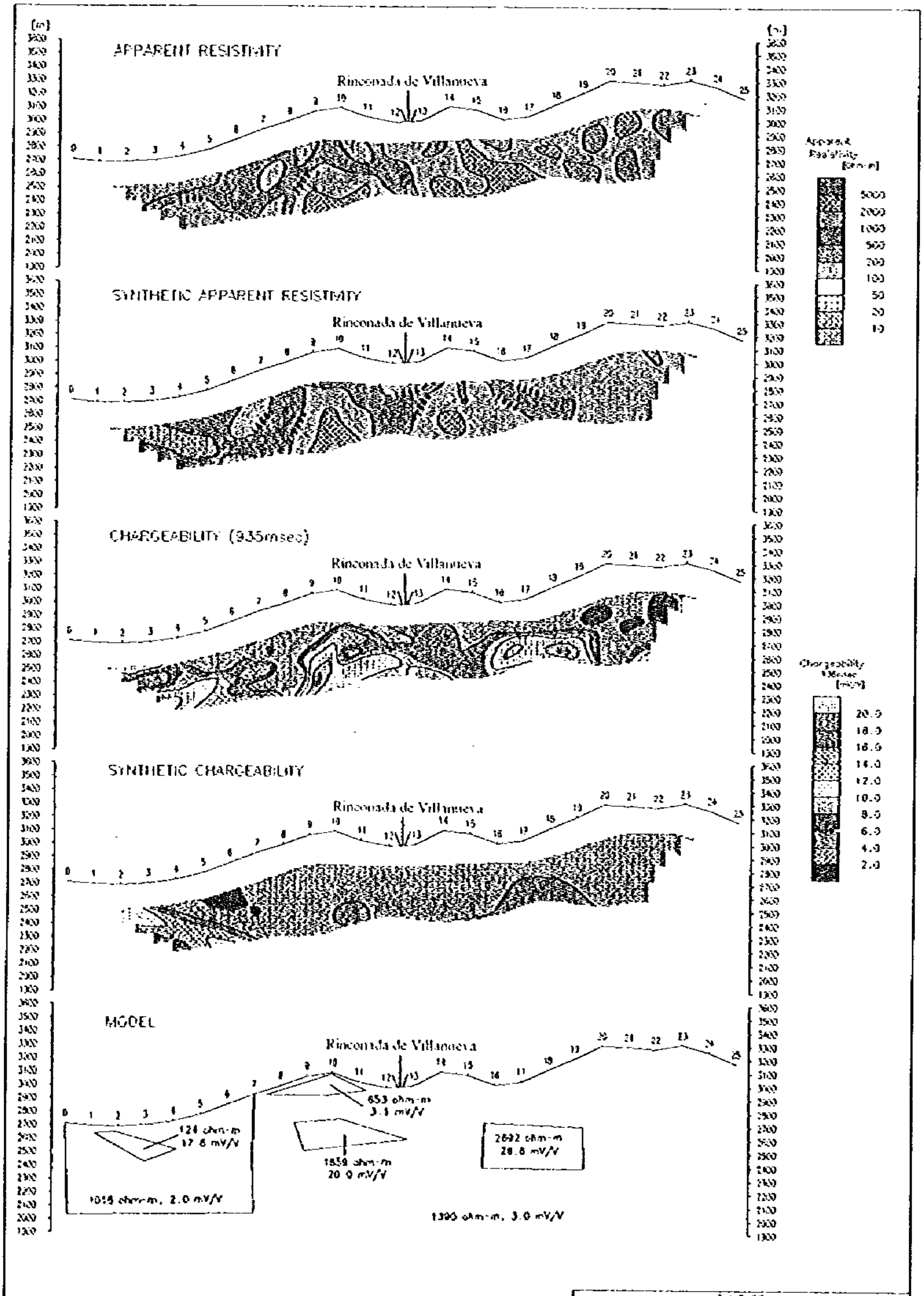

Fig.2-4-20 Section of simulated results (Line I)

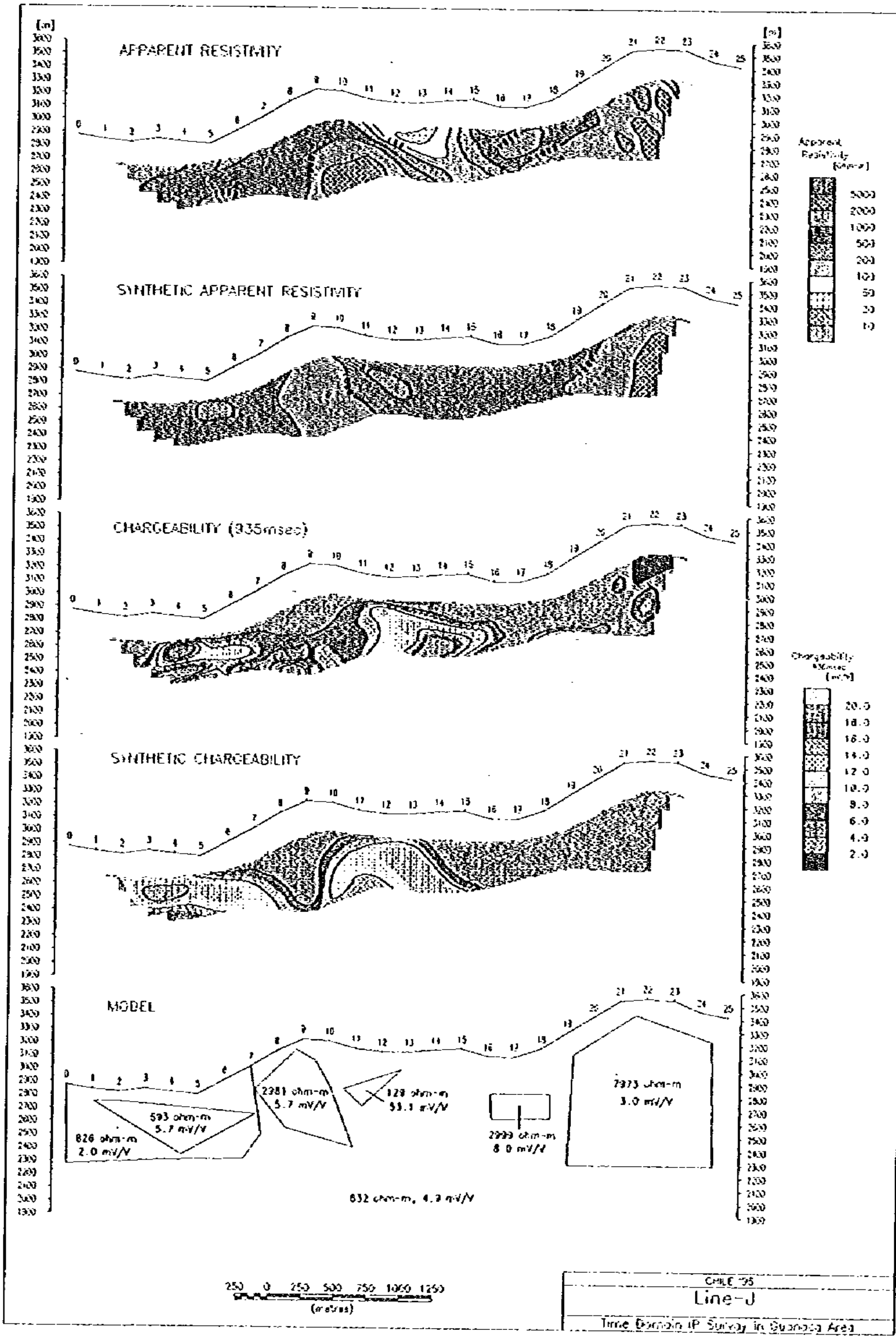

Fig.2-4-21 Section of simulated results (Line J)

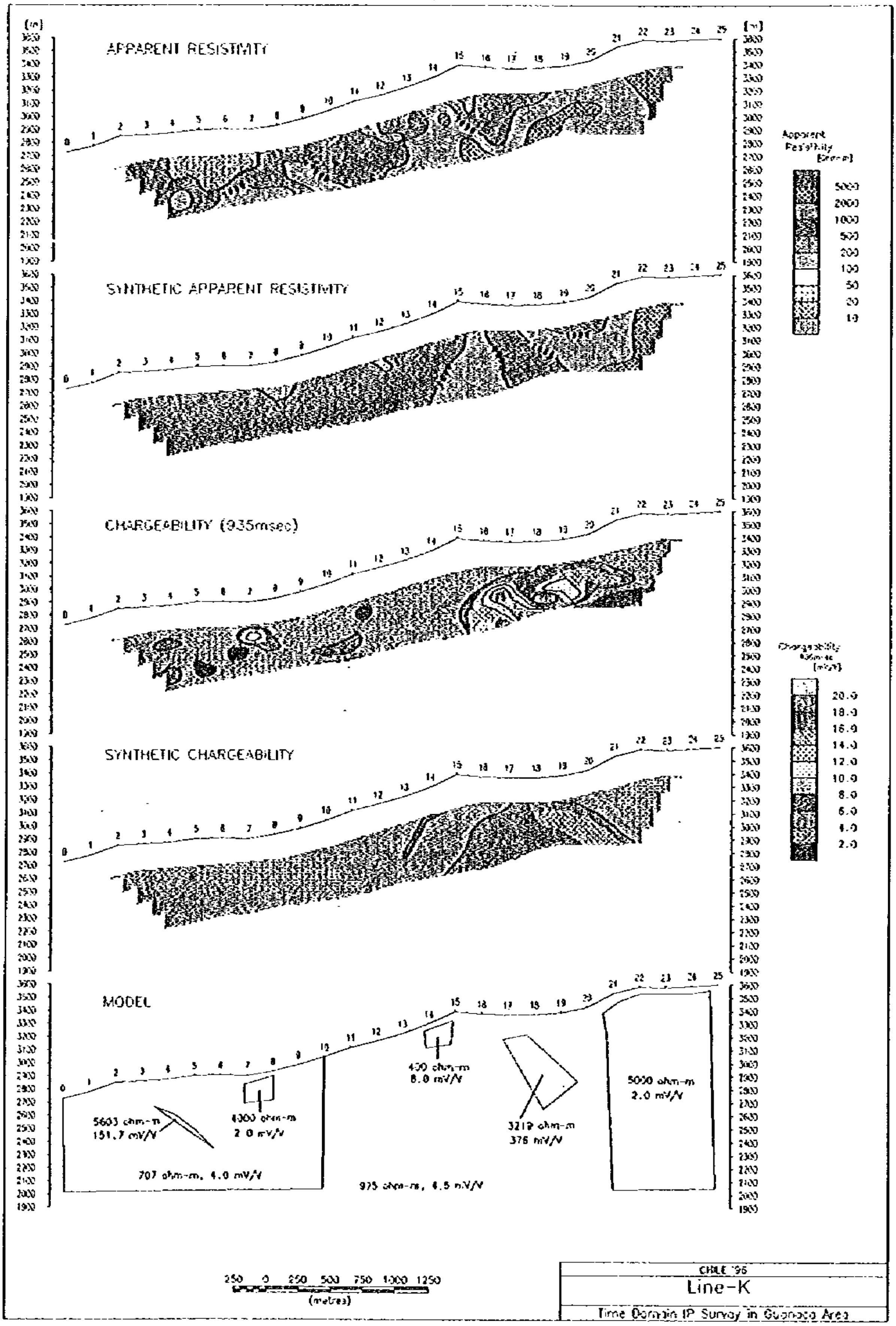

Fig.2-4-22 Section of simulated results (Line K)

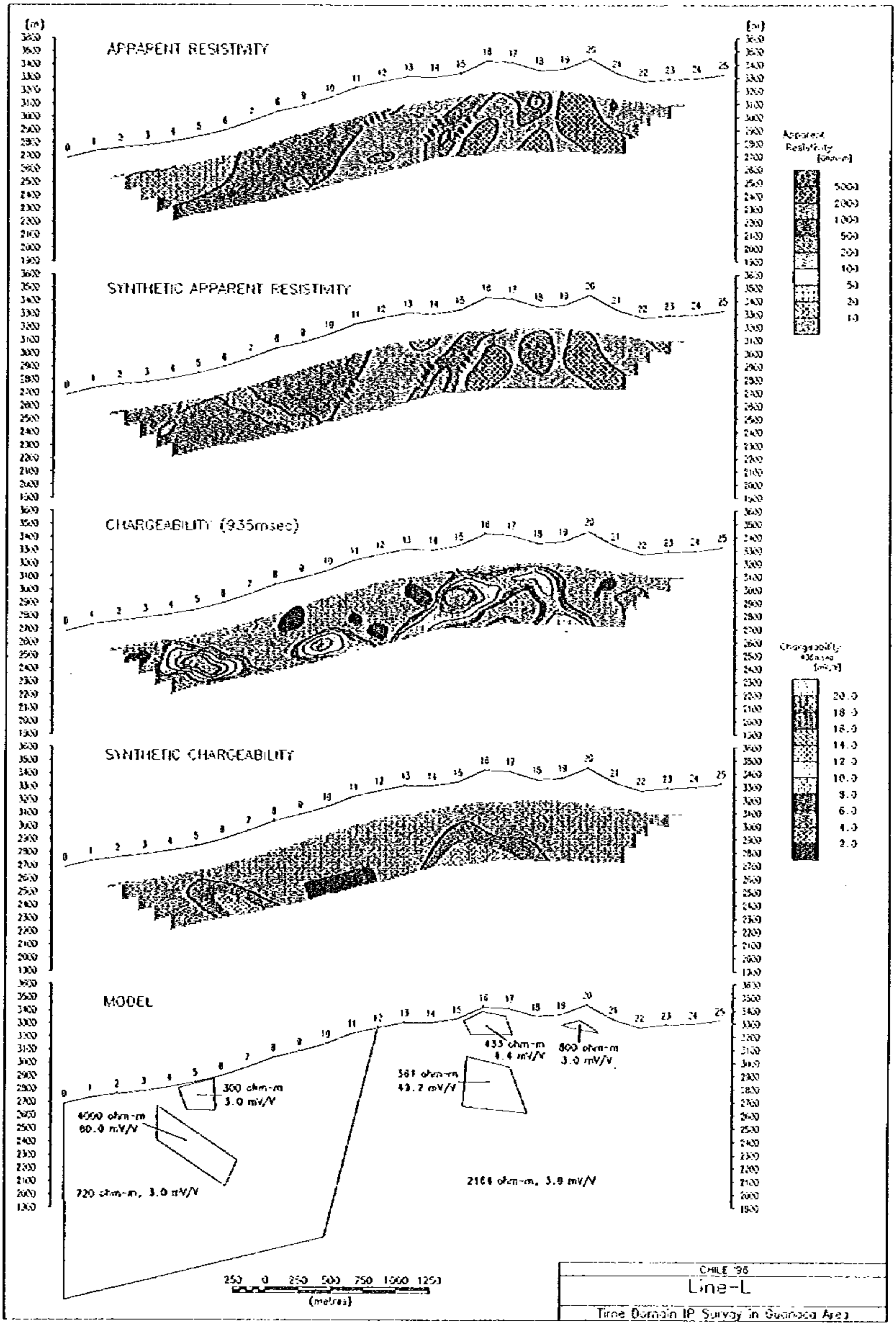

Fig.2-4-23 Section of simulated results (Line L)

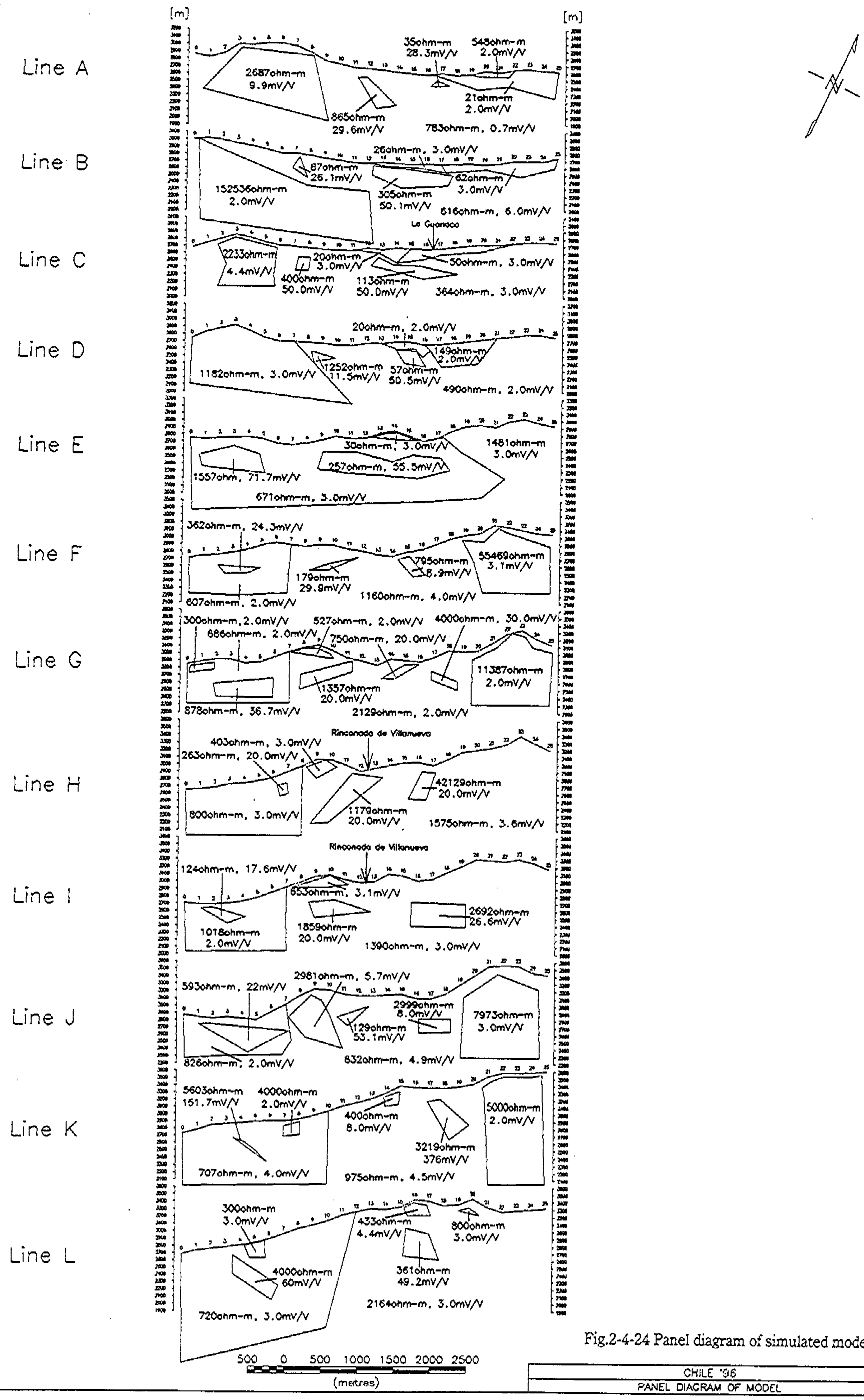

Fig.2-4-24 Panel diagram of simulated models

CHILE '96
PANEL DIAGRAM OF MODEL

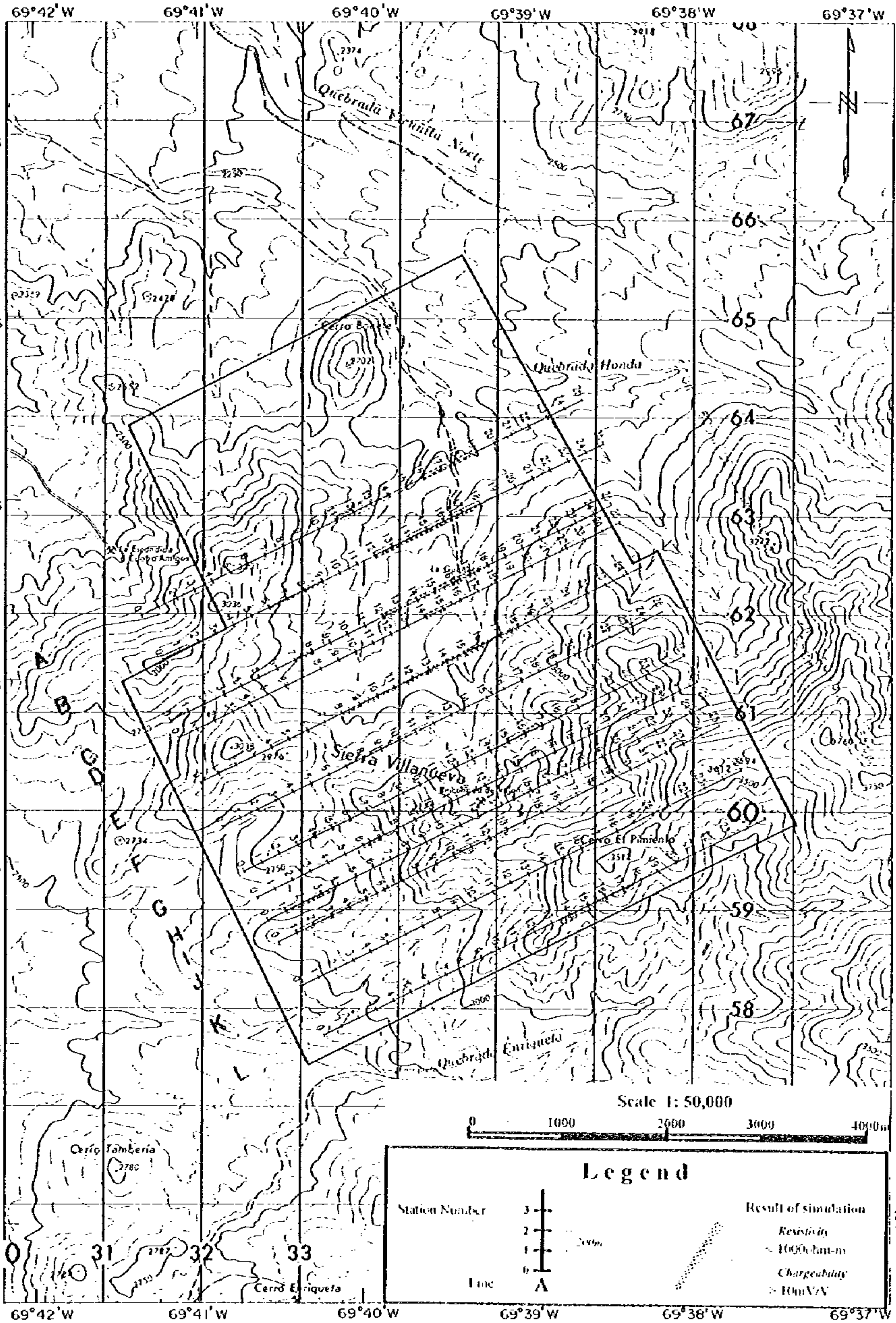

Fig.2-4-25 Comprehensive analysis of geophysical survey

4-5 Summary

The survey area shows widely high apparent resistivity from 500 to 5000 ohm-m and low apparent resistivity less than 200 ohm-m in north-eastern part underlain by Atacama conglomerate formation. While La Guanaca mineralized zone shows low apparent resistivity less than 200 ohm-m, Rinconada de Villanueva and central mineralized zone show medium apparent resistivity from 500 ohm-m to 1000 ohm-m. High chargeability anomalies were detected near these mineralized zones and other several areas.

Geophysical survey extracts two promising area as follows.

1)Between No.10 and No.13 on line J

This was modeled normally as a body of 129 ohm-m and 53.1 mV/V in the area of low apparent resistivity less than 100 ohm-m and high chargeability over than 10 mV/V and located near mineralized zone. It is possibile that sulfide ore existing near Rinconada de Villanueva mineralized zone deeply might make anomaly.

2)Between No.6 and No.8 on line B

This was modeled normally as a body of 400 ohm-m and 50 mV/V in the area of medium apparent resistivity from 200 ohm-m to 1000 ohm-m and high chargeability over than 10 mV/V and located near mineralized zone. It is a possibile that sulfide ore existing near central mineralized zone deeply might make anomaly.

Chapter 5 Discussion

5-1 Prospect Characteristics

The characteristics of the 3 main prospects are summarized in Table 1-4-1.

In the La Guanaca prospect, disseminated chalcopyrite-pyrite mineralization occurs in the small porphyry stock and is characterised by potassic alteration. Sericite alteration extends around the prospect. In terms of the geochemistry, the prospect is characterised by relatively high concentrations of copper and molybdenum.

In the Central prospect, the copper mineralization occurs within quartz veins which have developed sericitic alteration along and around the vein boundaries, which is in turn surrounded by propylitic alteration. In terms of the geochemistry, the prospect is characterised by higher gold, silver, molybdenum, lead, and zinc concentrations. The fluid inclusions from this prospect have higher homogenization temperatures and salinities than that from the Rinconada Prospect. The Rinconada prospect displays similar characteristics to the Central prospect, however the Rinconada prospect has higher gold, silver, and lead concentrations than the Central Prospect.

Though the data are insufficient at this moment to make detailed evaluations, the characteristics of each prospect suggest it is possible that they may represent parts of a zoned hydrothermal system related to porphyry copper style mineralization. The following geochemical zonation in porphyry copper style mineralized systems has been recognized. Copper and molybdenum display higher concentrations around the center of the porphyry copper mineralization, while in the peripheral zones, in addition to copper, gold, lead, and zinc tend to concentrate. The following characteristics in terms of mineralization have also been recognized. Quartz veinlet stockworks are developed in the central zone of mineralization, while in the perpheral zone, vein type mineralization is developed. (eg. Lowell and Guilbert, 1970; Lang and Eastoe, 1988; Ortiz et al., 1986; Thomson, 1993; Titley, 1993). In comparison with these characteristic features of porphyry copper systems, the following interpretation concerning each prospect can be made.

The La Guanaca Prospect displays several characteristics typical of a porphyry copper style mineralized system. However, the style of mineralization, that is dissemination, is not the typical stockwork style mineralization such as "D-veins" which characterize so many porphyry copper systems (Gustafson and Hunt, 1975). The typical stockwork mineralization however could be expected to be in the deeper parts of the prospect. The Rinconada and Central Prospects may be interpreted as reflecting the peripheral parts of a porphyry copper style system. The Central Prospect being interpreted to be closer to porphyry copper style mineralization than the Rinconada Prospect.

5-2 Exploration Model

The above interpretation for the mineralization of the Survey area lead to the exploration model as shown in Fig.2-5-1. This model does not differ substantially from the earlier model (Fig.1-3-3) developed prior to the start of this survey based on existing data. In this model (Fig.2-5-1), the Rinconada Prospect is thought to represent an area of peripheral vein type mineralization related to porphyry copper style mineralization, the later expected in the deeper parts of the nearby La Guanaca Prospect. Supposing that a vertical zonation exits around the Rinconada Prospect, porphyry copper style mineralization could exist in the deeper parts of the Rinconada Prospect as well.

The Central prospect could be placed within a porphyry copper style mineralization system that could be expected in the deeper part of near the La Guanaca prospect.

5-3 Epidote and chlorite alteration

Epidote and chlorite alteration extend over the survey area, except in the Central Granodiorite body (Gd). This epidote and chlorite alteration has been produced in the following stages.

a a regional deformation event of late Cretaceous age: low grade metamorphism such as greenschist facies.
b. contact metamorphism related to the intrusion of granitic rocks.
c alteration related to magmatic-hydrothermal activity: propylitic alteration.

It is very difficult to distinguish between these three stages.

The epidote and chlorite alteration in the Rinconada Prospect could be due to the propylitic alteration based on the following reasons. The ages of sericite in the veins from the Rinconada Prospect are 45.6±1.2 Ma and 46.0±1.2 Ma. The ages are middle Eocene. These ages correspond to the age of the host rock (the Aplitic granite (Ag)) that are also epidote and chlorite altered within the error bar. The epidote and chlorite alteration of the Aplitic granite could be related to propylitic alteration associated with magmatic-hydrothermal activity in the Survey area. On the other hand, no epidote alteration was identified in the La Guanaca Prospect. There are two possible explanation for this. One is that the rocks distributed in the prospect were not subjected to the low temperature regional metamorphism because the age of the rocks are

younger than the age of the metamorphism. The other is that the prospect is located in the inner zone of the propylitic alteration zone related to porphyry copper style mineralization.
As for the latter possibility, it is supported by the following points. The age of sericite from the La Guanaca Prospect is similar in age to the sericite from the Rinconada Prospect. Judging from these ages, the mineralization of both prospects could have occurred within the same magmatic-hydrothermal system at almost same time. Potassic alteration is observed in the La Guanca Prospect, while propylitic alteraion is obseved in the Rinconada Prospect. Sericitic alteration is obsereved in both prospects. The distribution of alteration assemblages are the same as the alteration zoning pattern in a porphyry copper style mineralized system.

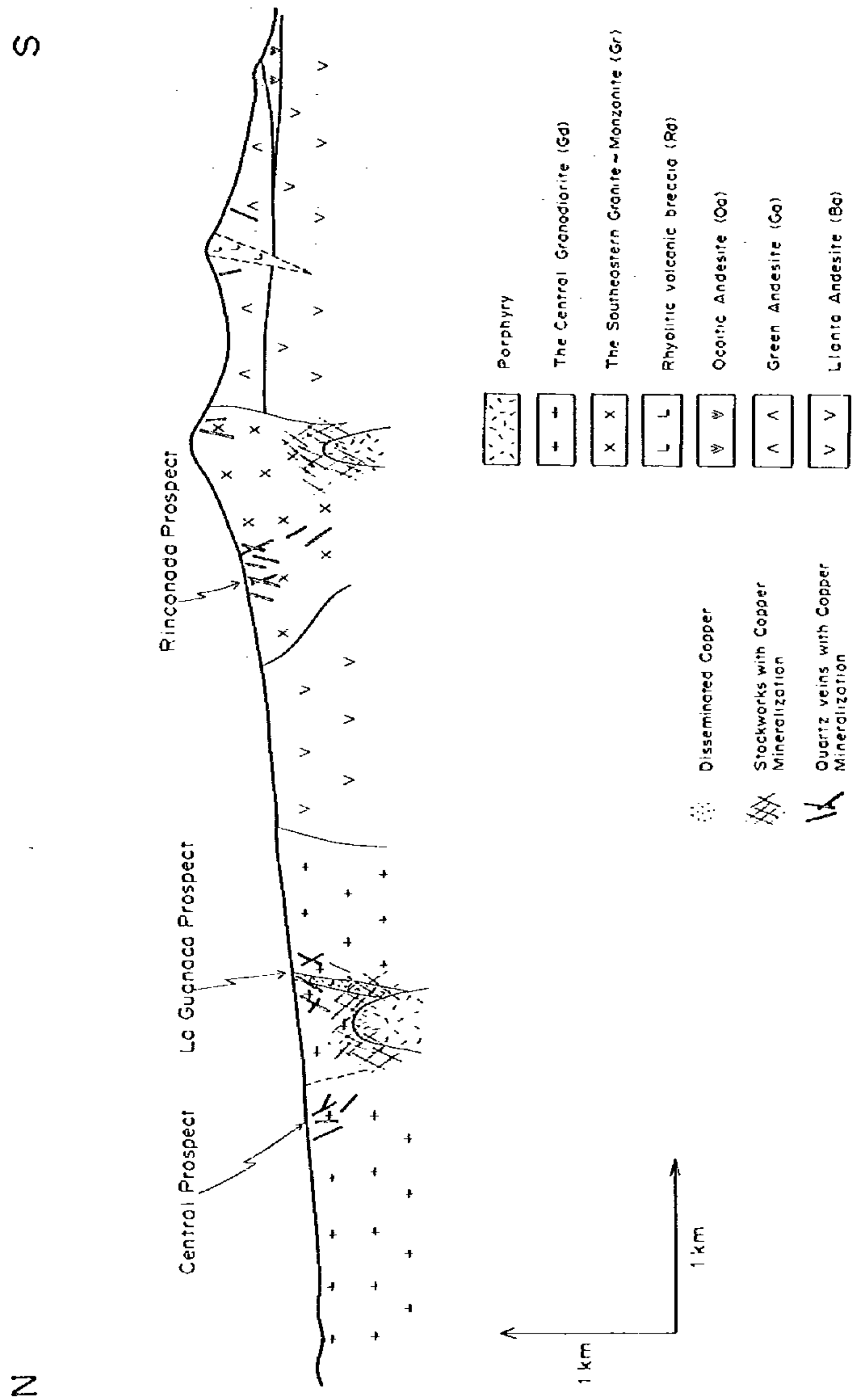

Fig. 2-5-1 Exploration model following the phase II survey in the Guanaca Area.