



## Ground magnetic anomaly images of Ustica Island

G. Currenti, C. Del Negro, R. Napoli and A. Sicali

Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, Italy

(napoli@ct.ingv.it / Fax: +39 095-435801 / Phone : +39 095-7165800)

Located at about 60 km north of the Sicilian coast, the volcanic island of Ustica rises 240 m above sea level, but represents the emergent part of a submarine volcanic complex over 2000 m high. It lies on the transitional zone between the extensional domain of the Tyrrhenian Sea, and the collisional belt of the Apennine thrust system. In this area, the island is the only site showing subaerial evidence of tectonics related to the opening of the Thyrrhenian basin and of intraplate magmatism. To date the relationships between local and regional structures have not been entirely elucidated. To fill this lack, a high resolution magnetic survey was carried out over the whole island covering an area of about 9 km<sup>2</sup>. We have acquired about 18,000 data by a GSM19 Overhauser effect magnetometer with 0.01 nT sensitivity. Simultaneously, GPS data were also collected to geo-reference magnetic measurements. Digital data were acquired with a sampling step of about 3 m along lines describing an irregular grid with sides close to 500 m. The total-intensity anomaly field, obtained after data reduction process, reveals in the NE area of the island a wide magnetic anomaly, striking with NS direction, which seems to continue offshore, and two intense anomalies of irregular shape respectively in the middle and in the southwestern part of the island. To recover 3-D subsurface magnetization distribution responsible for the detected magnetic anomalies, the surface magnetic data were inverted using an iterative linear inversion method. The island was represented as a crustal block, 4x3 km<sup>2</sup> in area and about 1.0 km in thickness and was discretized into a set of rectangular prisms (0.25 x 0.25 x 0.15 km), having a constant magnetization. Solutions are obtained by minimizing a global objective function composed of the model objective function and data misfit. The results obtained are well correlated with the surface geology, and show tectonic and volcanic features that define some fundamental aspects of the structural framework of the island.