

## Estimation of regional movements in the Southern and Central Italian Region and adjacent seas from aeromagnetic data

Maurizio FEDI and Antonio RAPOLLA

Dipartimento di Geofisica e Vulcanologia, Largo S. Marcellino 10, 80138 Napoli (Italia)

Magnetic and palaeomagnetic data gave, during last decades, major contributions to the comprehension of the dynamics of many regions of the Earth.

As what regards palaeomagnetic data, the determination of the magnetic properties of sampled rocks together with age estimates, produced important results as far as the presence of rotational movements of tectonic plates or micro-plates are concerned (Tarling, 1971).

In oceanic areas, the observation of parallel bands of magnetic anomalies alternatively Northward and Southward directed, gave one of the main keys for understanding and evaluating the crustal spreadings (Vine and Matthews, 1943).

Moreover, also a shape analysis of magnetic anomalies caused by buried bodies, can be performed, in this context, for searching the direction (i.e. declination and inclination) of the total magnetization vector. In fact, if such direction is not corresponding to a N-S or S-N one, the abnormal shape of the anomaly can be directly related to rotational movements.

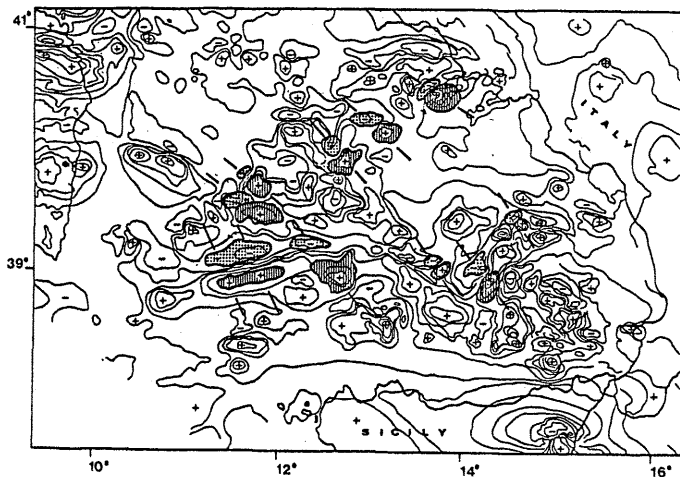


Fig. 1 : Aeromagnetic field of the Tyrrhenian Sea (Southern Italy), simplified from aeromagnetic data, AGIP, 1981. Magnetic anomalies with an abnormal direction of the total magnetization vector are drawn with a shaded area, for the maxima, and with points for the minima. For each anomaly is also indicated (by an axis) the estimated direction of the total magnetization vector (from Fedi and Rapolla, 1988)

A number of such anomalies were pointed out in the Southern-Tyrrhenian Sea (Fedi and Rapolla, 1988) analysing the aeromagnetic field measured by A.G.I.P. (1981). They were interpreted as due to an anticlockwise rotation of the region, of about 30-50° (Fig. 1). Enlarging the study to the available aeromagnetic data covering the remanent part of the Southern and Central Italian Region and adjacent seas, we were able to detect other abnormal direction anomalies, with angles of about -40° and 40°. This should furnish a valuable lecture key of the geodynamics of the region.

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## Messinian vegetation and climate

H.-J. GREGOR\* and E. VELITZELOS\*\*

\* Grözenbell (Federal Republic of Germany)  
\*\* Athens (Greece)

Neogene Floras in the Mediterranean and their macrofloristic compositions and palaeoclimatic implications put forward doubts on the Messinian salinity crisis. The typical uppermost Miocene floras like for example from Carbonara Scrivia (Italy), Pikermi (Greece), Paghí (Kerkira) and Ankara-Beynam (Turkey) etc. are composed of deciduous or evergreen plant taxa of humid character (laurel, Acer, Glyptostrobus, Platanus, Quercus, Ulmus, Salix etc.) and give no idea of any xerophytic or early Mediterranean element (perhaps except Cupressus). A similar picture we find in the new Messinian seed-flora of the Stirone river (Fidenza), where we find for example "Toddalia", a special humid plant from SE-Asia today. A look on the abundant pra- or post-Messinian floras (especially with fruits and seeds) show the same picture and thus the salinity crisis from the palaeobotanical point of view was no "crisis" or catastrophe in the real sense. Now the question arises how to explain many geological phenomena in the Mediterranean with a warm-temperate (subtropical) humid climate, which is confirmed by the fossil laurel-, evergreen and mixed-mesophytic-forests from the upper Oligocene to the lower Pleistocene (Santerniano).

There are some ideas about a "shift" from the Neogene Cfa-climate (sensu KÖPPEN) to a Cw-climate, which means a coming up of a winterdryness. We find plants in our fossil floras which occur nowadays in the winterdry Chinese Cw-climate and thus we can dare to compare our fossil climate with the Recent one - the same aspect is found in W-Germany. In such a climate the desiccation in the wintertime (up to 3 months) is higher than the precipitation and allows to build up gypsum- and salt-deposits etc.

These macrofloras, showing us the autochthonous vegetation in the Mediterranean, are quite distinct from the microfloras, which seem to have a certain amount of xerophytic plants (Gramineae etc.), but from far away (allochthonous). This is due to windborn pollen grains or those transported by water.

In respect of these palynological records we have to reconstruct perhaps really "arid" conditions in Central-Asia or anywhere else, from where the pollen grains have come. There is also influence of the African continent, but this does not attack my research.

Some of the current literature is brought here and in the run of a project in Munich we try to solve all questions concerning Neogene fruit- and seed-floras, but also leaf-floras and especially the problem of the vegetation in Messinian times in the Mediterranean.

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- I. The Iberian Peninsula
- II. France
- III. Italy
- IV. Greece
- V. Balkanese and Turkey