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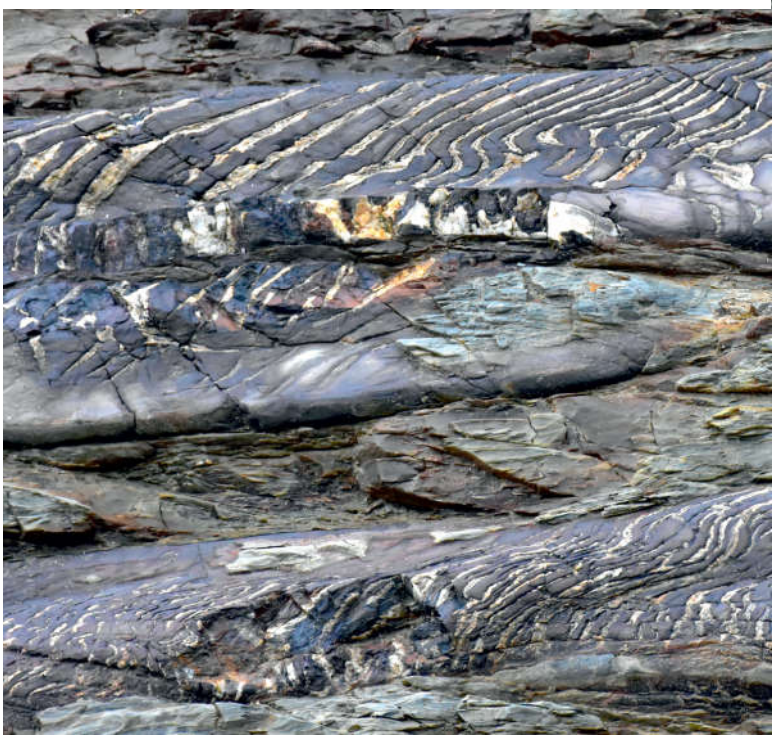
EXPLORING AND PROTECTING OUR LIVING PLANET EARTH



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A new improved version of the Aeromagnetic Map of Greece

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Introduction

Chailas et al. (2010) presented a unified and homogenized aeromagnetic map of the Greek mainland. In the frame of HELPOS a new enriched, re-interpreted and homogenized, aeromagnetic map of Greece is being compiled. In the new version new areas were added to the previous map, and the data were re-assessed prior to the final compilation in order to both use incorporate the definite IGRF model and, diminish the effect of topography. As it will be shown here the improvement of the resulted map is of the order of some tens of nT.

Data Sources

The compilation of the unified and homogeneous aeromagnetic map of Greece is based on the 1:50,000 map series of IGME, produced by ABEM AB and Hunting Geology and Geophysics Ltd.

The ABEM maps (ABEM, 1967), were produced with measurements at a nominal constant ground clearance (GC) of 275±75m above ground level (AGL) i.e. in constant ground clearance mode. The direction of the flight lines (tracks) was NE-SW and the mean distance between them was about 1km. Connection (tie) lines for crossover adjustment of the data were also flown at NE-SW direction, with a mean distance of 10km.

Hunting Geology and Geophysics Ltd. has generally used a magnetic field measurement spacing of 200–250m and has flown on a NE-SW direction, but at different GC's and track densities depending on the topography. The data collection schemes are as follows (also see Fig. 1):

- Areas A1 and A2: Nominal GC 150m AGL at a nominal distance of 400m between tracks.
- Area B: Nominal GC l 150m above mean sea level (AMSL) at a nominal distance of 400m.
- Areas C1, C2a and C3: Nominal GC 300m AGL at a nominal distance of 800m.
- Exception is the area of Mt. Olympus, (area C2b) where the flight level was 3000m AMSL with the same nominal distance between lines.
- Areas D1 and D2: Nominal flight level was 2300m AMSL and 2100m AMSL respectively at a distance of 1000m between tracks.

In all cases, connection lines were flown at a NE-SW direction and a spacing of 10km. The IGRF correction was based on the IGRF model for the epoch 1977.3. A constant value of 150nT was added to the magnetic anomaly values prior to plotting the contour maps.

Additional Data Non Aeromagnetic Data

In order to complete the area coverage for large scale maps, an additional dataset is going to be incorporated (Pavlakis et al., 1993). It consists of digitized marine magnetic anomalies, covering the Aegean Sea area.

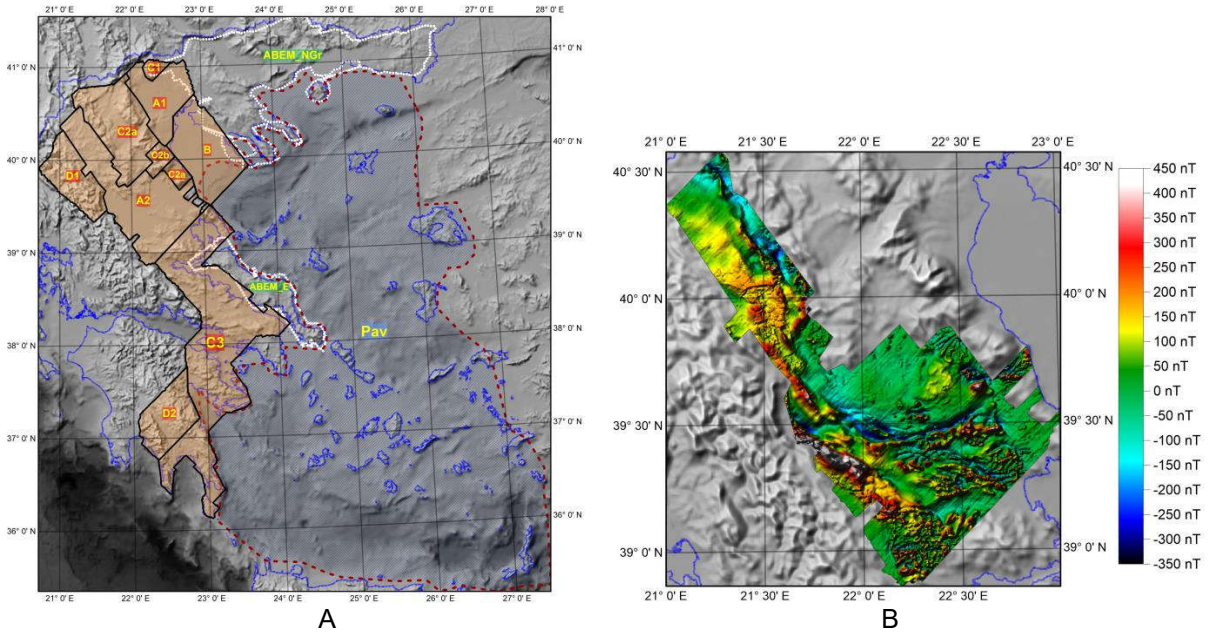

Figure 1: A. Map showing the area coverage of the aeromagnetic data. B. Map showing the reproduced map based on the digitized values of the original aeromagnetic maps for area A2.

Aeromagnetic Anomalies Data re-processing

In the present attempt and, prior to the homogenization, the digitized aeromagnetic anomalies subjected to an additional correction procedure:

- For the Hunting maps (as an example, the map of the area A2 is given in Fig. 1B), the 150 nT value which had originally been added was now subtracted from the grids.
- The IGRF model for the epoch 1977.3 for the Hunting Maps and for the epoch 1966.5 for the ABEM maps was recalculated for the entire area and for 0 m elevation and then was added to the grids. Thus we attempted to reproduce, as close as possible, the original Total Magnetic Intensity maps.

The next step was to recalculate the Magnetic Anomaly maps using this time the definite IGRF for the corresponding epochs and for the flying elevations in each area. As a DEM we used the SRTM model of 3 seconds after re-gridding it from its original ~90m interval to the 250m of our own grids. So we,

- computed the definite IGRF model at the flying elevation, for each area (the resulted map for the area A2 is given in Figure 2A) and for its nominal epoch of surveying.
- the definite IGRF was then subtracted from the reproduced Total Magnetic Intensity maps (the resulted map for the area A2 is given in Fig. 2B).

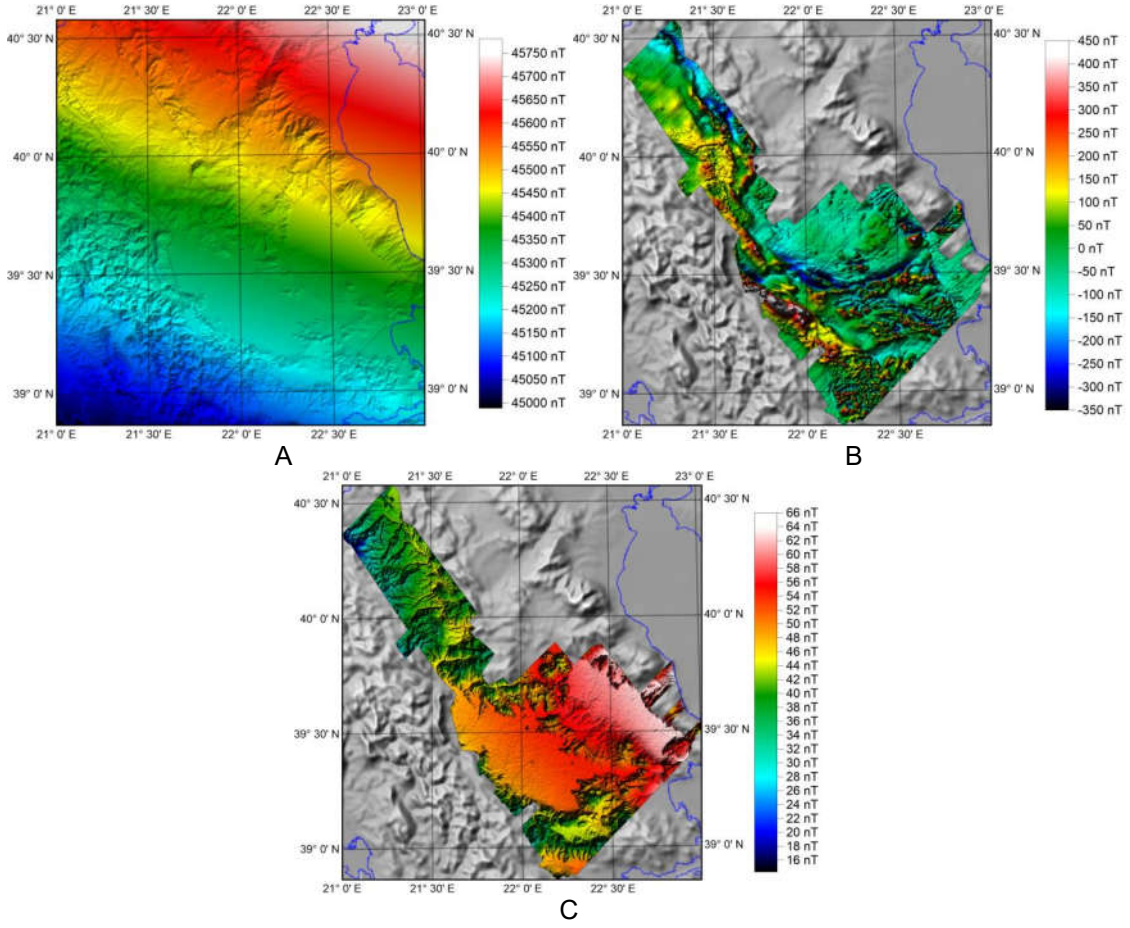

Figure 2: A. Map showing the calculated dGRF values on the flying height for the area A2. B. The final dIGRF corrected map for area A2. C. Map resulted by the subtraction of the final dIGRF corrected map from the original for area A2.

The improvement of our new data, compared to the original ones (Chailas et al., 2010) becomes obvious in Fig. 2C. The original maps, at least for the lower elevations, seem to give magnetic anomaly values overestimated by some tens of nT.

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