P10-2	MAGLODAN PROJECT, FIRST STEP IN MERGING NATIONAL GEOMAGNETIC MAPS OF ROMANIA, UKRAINE AND REPUBLIC OF MOLDAVIA

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Introduction

There is a general trend in the Earth's sciences world to join geophysical images over the state borders in order to help in solving large-scale geological problems.

At the beginning of 1998 a joint venture between the Geological Institute of Romania, Subbotin Institute of Geophysics of the Ukrainian Academy of Sciences and the Institute of Geophysics and geology of the Moldavian Academy of Sciences was started. The main aim of the project is the joining of the national geomagnetic maps of the three neighbouring countries: Romania, participant countries. Research made within MAGLODAN (MAGnetic LOw DANube) sub-project were intended to solve basic problems of the merging operation such as:

- to compare national geomagnetic standards
- to provide a common reference level
- to remove the secular variation effect
- to overpass administrative problems
- to train scientists from various countries for a future more developed common research, etc.

Comparing The National Geomagnetic Standards

To compare the national geomagnetic standards common geomagnetic determinations were performed at the Surlari Geomagnetic Observatory (Romania) and Stepanovka-Odessa Geomagnetic Observatory (Ukraine). Republic of Moldova has no geomagnetic observatory and actually all determinations used for the geomagnetic mapping of its territory were carried out by an Ukrainian team.

A GEOMETRICS proton magnetometer and an MP-01 proton magnetometer were used to compare the reference level of the two above-mentioned observatories.

Except for small scattering within the range of the instrument accuracy no systematic difference was found.

Setting Up The Reference Level Of The Geomagnetic Map

As in any composite geomagnetic map, one of the main problem was to ensure a common reference level to data provided by surveys carried out at various epochs, with different instruments and base stations.

In order to overpass such inconveniences a common international reference network covering the area of the future pilot-map have been achieved. It consisted of 8 base stations (4 in Romania, 2 in Ukraine and 2 in Republic of Moldova). A consistent data set of ground total intensity scalar of the geoma

gnetic field, as annual mean values for the epoch 1998.0, was then obtained by referring the gathered results to the geomagnetic level of the Surlari observatory.

To compare the reference level of the geomagnetic surveys used in the construction of the composite pilot-map, micro-panels (100 meters by 100 meters) have been measured for every base station of the reference network and upward continued to flight altitude of the airborne measurements.

Construction Of The Maglodan Geomagnetic Maps
Computer database

As row data for the Ukrainian and Moldavian territories were not available (materials provided by the Ukrainian and Moldavian partners were contour ΔT_a maps only) the first step was to digitise the anomaly maps and to create a computer database with all the available information.

Gathering a common reference level

To compare and correct the various reference levels of the previously carried out surveys to the common level provided by the international geomagnetic reference network absolute values of the normal geomagnetic fields (ngf) have to be added to ΔT_a values. Consequently, numerical ngf models had to be first created starting from the graphical LO-IZMIRAN models used in the construction of the anomaly maps. Fourth order polynomials successfully approximated graphical models within the range of 2.5 nTs.

After the correction of the reference level, a consistent geomagnetic data set for the epoch 1998.0 was gathered and total intensity scalar maps could be constructed.

Checking up the joining accuracy

To check up the quality of the joining operation horizontal gradient maps have been performed. No gradient trends within the state border area have been pointed out, thus proving the high accuracy of the gathered geomagnetic maps.

Geomagnetic anomaly images

To get more intuitive images, regional trends have been removed from the total intensity scalar maps by using polynomial regression technique.

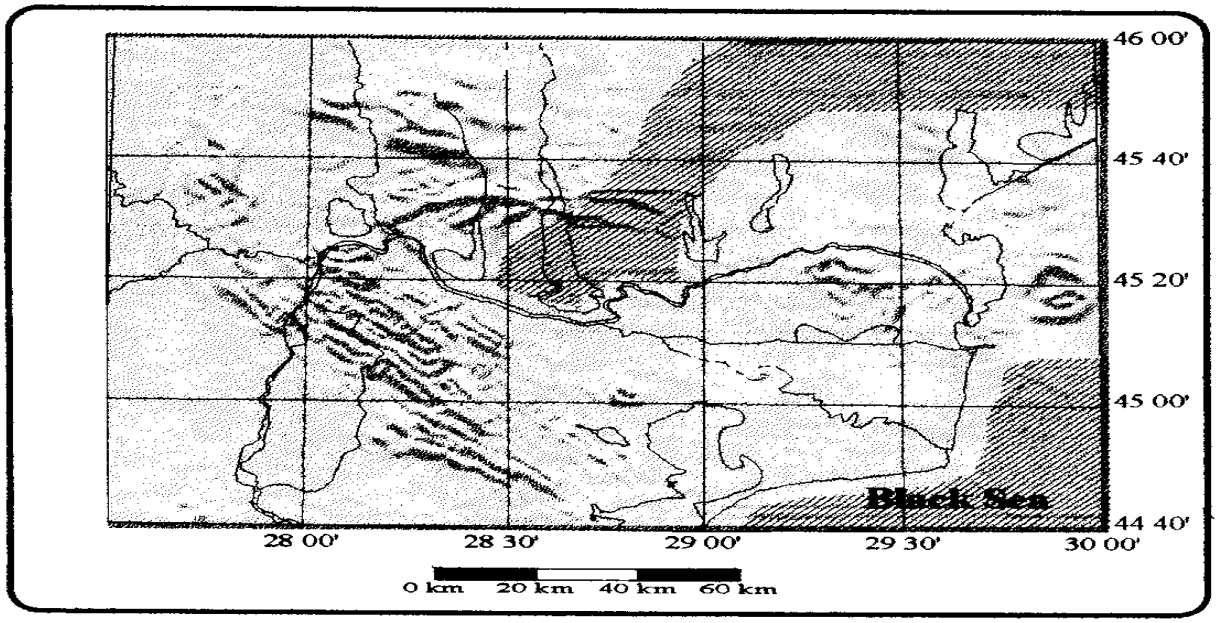

Fig. 1 Horizontal gradient of the geomagnetic anomaly within Low Danube area

Hillshaded from North under 40 degrees

missing data area

Concluding Remarks

As previously stated out MAGLODAN sub-project represents the first step in joining the national geomagnetic maps of Romania, Ukraine and Republic of Moldova. The quality of the pilot-maps is the best evidence for the correct algorithm used and a guaranty for the final success of the operation.