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TITLE OF INVESTIGATION: Crustal structures under the active volcanic areas of central and eastern Mediterranean (M-44)

PRINCIPAL INVESTIGATOR: Paolo Gasparini

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1. INTRODUCTION.

The following computer tapes have been received up to date:

- MAGSAT TEST TAPE received in December 1980;
- MAGSAT MAGNETIC ANALYSIS PROGRAMS (Dupe of D-41557) received in December 1980;
- MAGSAT ORBIT RET SUBROUTINES (Dupe of D-38184) received in December 1980;
- INVESTIGATOR-B TEST TAPE 30-48° N, 0-35° E received in February 1981;
- MAGSAT SELECTED INVESTIGATOR-B 11.2.79-12.22.79 received in March 1981;
- MAGSAT SELECTED INVESTIGATOR-B DATA 11.2.79-1.18.80 (OF8025) received in September 1981;
- MAGSAT SELECTED INVESTIGATOR-B QUIET TIME 11.3.79-1.18.80 (OF8023) received in September 1981.

The real receiving times of the above mentioned tapes are quite delayed in respect of shipping times because of the time-consuming procedures to clear some of then out of customs.

2. TECHNIQUES.

a) Preliminary operations: as a first step, we have started to adapt some of the programs contained in the dupes of D-41557 and D-38184 tapes to our UNIVAC-1000 computer. Furthermore we have started to check and to compare with similar software developped by us the programs which are expected to be of immediate utilization in the processing of MAGSAT data (f.i., power spectra and filter programs, inversion on a sphere, upward and downward continuation of the field, equivalent dipole sources, etc.). Moreover we are completing the collection of all the available data about crustal thickness as and geophysical characteristics of the area under investigation. The complete reference list will be ready in a short time and it

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will be made soon available to MAGSAT investigators.

Magnetic characteristic of some rock formation with a mineralogical compositions stable to intermediate or lower continental crust and to upper mantle conditions have been determined. They include amphibolite and granulitic facies rocks from Brazil and Southern Italy and a collection of ultramafic xenoliths contained in alkali-basaltic lavas erupted in the Afar region, Ethiopia.

The determined magnetic properties include: magnetization intensity, susceptibility, Koeningsberger ratio, NRM stability against alternated fields and temperature, Curie temperatures.

These data will be presented and discussed in a paper in preparation.

b) Analysis of MAGSAT data: processing of MAGSAT data started during June, 1981. Preliminary operations included precise location of orbits, check of scalar in respect of vector data and visual inspection of the main anomalies. It was soon evident that scalar data could not be reliably used, as most of profiles needed large interpolations and scalar data were often inconsistent with vector data. It was then attempted to residuate crustal anomalies from one selected profile passing through western Mediterranean using the commonly used procedures at NASA (R. Langel, pers. comm.). The uncertainities in the adoption of correct coefficients in the expression accounting for the effect of equatorial ring currents and the empiric approach used for the other corrections led to various results of dubious quality. After exchange of ideas with Dr. R. Langel, it was considered worthwhile to residuate crustal anomalies by applying filtering procedures to each profile. As the cut-off wavelength should be of the order of 2000-3000 km, we need data collected on whole orbits. Therefore we have required investigator-B tapes relative to the whole planet. As yet we have not received this tape so that filtering operations have been delayed.

In the meantime, we have started to extract standard profiles

from the Magsat Selected quiet days we received in september. Up to now we have started to locate main anomalies and to check the consistancy of close orbits. We have identified a number of anomalies for which the consistancy is very good, and we are trying to identify the corresponding geological structures.

c) Partecipation to MAGSAT investigators meetings: P. Gasparini has visited Goddard Spaceflight Center in late november 1981. Due to the catastrophic earthquake occurred close to Napoli, he had to hurry back to Italy so that he could not attend the Magsat investigators meeting.

P. Gasparini and M.S. Mantovani attented the MAGSAT investigators meeting during the IAGA conference in Edinburgh.

d) Cooperation with other MAGSAT investigators groups: Our group is actively cooperating with the group of Sao Paulo University both by exchanging the available software and trying to unify the approach of data processing.

e) Presentation of MAGSAT data: P. Gasparini was invited by the Società Italiana di Fisica (SIF) to give a lecture on the preliminary results obtained on the Mediterranean area.

It is hoped that a preliminary report suitable for publication can be ready by november 2 for the GRL Magsat issue.

f) Requirements: to expedite our work it is necessary to have as soon as possible the complete investigator-B data 11.2.79-1.18.80. Furthermore, low altitude data will be very useful to check our preliminary results and to try to resolve shorter wavelength anomalies. We recommend that they will be made available as soon as possible.

MAGSAT data processing is being carried out by the following co-investigators:

Dr. Marta S.M. Mantovani

Dr. Francesco Monaco

Dr. Donatella Pierattini

Mr. Maurizio Fedi