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Analysis of Magsat Data of the Indian Region

PROGRESS REPORT FOR THE PERIOD 1.10.81 TO 1.2.82

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Reporting Date: March 31, 1982

Report No. 2nd and 3rd (combined)

During the period under report, the investigation team
consisted of the following members:-

1. Lt. Gen. K.L. Khosla, Col. (Dr.) M.G. Arur, Shri R.M. Gupta,
Shri P.S. Bains and Shri Jeevan Lal of Survey of India.
2. Dr. J.G. Negi and Dr. P.K. Agarwal of N.G.R.I.
3. Dr. B.N.P. Agarwal of Indian School of Mines
4. Dr. Baldev Sahai ^{of} Space Application Centre, Ahmedabad.

I. Summary

The major activities of the period were: (i) To prepare
soft ware for reading of the data tapes generated by NASA on I.B.M.
system (ii) To duplicate the data tapes for the data reduction;
(iii) To develop suitable software for the reduction of data

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2. Dr. J.G.Negi and Dr.P.K.Agarwal of N.G.R.I.
3. Dr. B.N.P.Agarwal of Indian School of Mines
4. Dr.Baldev Sahai^{of} Space Application Centre, Ahmedabad.

I. Summary

The major activities of the period were:(i) To prepare software for reading of the data tapes generated by NASA on I.B.M. system (ii) To duplicate the data tapes for the data reduction;

(iii) To develop suitable software for the reduction of data (iv) To supply data to co-investigators (e.g. N.G.R.I., I.S.R.O.) from concurrent investigations. The details of the progress are given in the following paras:-

The MAGSAT data tapes on IBM system were read by preparing a suitable programme for the IBM 370/145 Computer available at O.N.G.C. Computer Centre, Dehra Dun. A print of the data of two tapes were obtained on paper and selected required data was punched on cards for final reduction. The copies of the data tapes were supplied to other co-investigators.

Anomalies of a few satellite tracks have been computed by subtracting the modal values as given in the data for 'Z' element

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of the geomagnetic field for finally preparing an anomaly map as per procedure given in later part graph. The anomalies so obtained for 4 Tracks Crossing over the Indian Region have been brought to a common elevation with the help of a Computer Programme developed separately based on Mathematical Model suggested by Handerson and Cordell (1971). In an effort to separate out the anomalies of the crustal origin in the 'Z' element of the geomagnetic field linear regression equation was fitted after applying ring current corrections. It is seen that the resulting anomalies of these tracks over the Himalayan region are predominantly negative.

Computer programme UPCON supplied by NASA has been run on IBM 370/145 Computer, but so far this programme has not been made operational as it is found that few cards in the tape images are missing. The investigation for making the Computer programme operational are still continuing.

II. Accomplishments:- 1. The investigation 'B' data tapes have been supplied to this organisation from MAGSAT mission. These data set provided for analysis a good vector measurements of the

on IBM 370/145 Computer, but so far this programme has not been made operational as it is found that few cards in the tape images are missing. The investigation for making the Computer programme operational are still continuing.

II. Accomplishments:- 1. The investigations on 'B' data tapes have been supplied to this organisation from MAGSAT mission. These data set provided for analysis a good vector measurements of the earth magnetic field over the Indian region.

2. The investigations and preparation of anomaly maps are still in preliminary stage. Concurrently NGRI is investigating the multilevel data at different altitude to develop a model for variation of magnetic anomaly with altitude and space application centre, Ahmedabad has completed the decoding of data. Both have also carried out some preliminary studies.

III. Significant Results:-

(1) A computer programme for the reduction of anomalies to a common elevation has been developed and it has been tested on four satellite tracks over the Indian region. After subtracting a linear regression line and applying correction for ring currents, the values in adjacent

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tracks are in reasonable agreement. An anomaly map is being prepared using this programme at an elevation of 400 km from the quiet time data.

- (2) A computer programme for reading the data tapes supplied by NASA has been developed. The programme successfully works on IBM/370/145 Computer System.
- (3) The data of four satellite tracks Nos.31, 38, 39 and 231 have been reduced and the crustal anomalies obtained at an elevation of 400 km.

IV. Reports submitted earlier:

Status Report of Magsat Project by Survey of India has been sent upto 1.6.81.

This is the combined 2nd and 3rd report about progress of Magsat investigation.

V. Problems:

Some of the NASA programmes are giving some problems. An upto date listing of some running programmes pertaining to down continuation, will be appreciated.

VI. Data Quality and Delivery:-

The quality of data supplied by MAGSAT mission is quite good and the delivery is regular.

VII. Recommendation:

Nothing for the present.

VIII. Conclusions:

Magsat mission has provided a data of rare quality to the Community of Geo-physicists and space Physicists and it will open new frontiers in the description of main Geomagnetic field and preparation of magnetic anomaly maps.

REFERENCES

Henderson & Cordell

Geophysics Vol. 36, No. Oct.(1971) pp. 856-866. "Reductions of unevenly spaced Field data to a Horizontal plane by means of Finite Harmonic Series".