DATA SET CATALOG # 113

OGO-5 Fluxgate Magnetometer
6 tapes

68-014A-14B
68-014A-14E
68-014A-14F
60 second Avg.

68-014A-14B

OGO-5

FLUXGATE MAGNETOMETER

60 SECOND AVERAGES

This data set consists of 6, 800 BPI, Binary tapes produced on the IBM/360, where the 'D' tapes are 9 track and the 'C' tapes are 7 track.

These six tapes are known as the Spacecraft Coordinate tapes. They are blocked 128 logical records per physical record.

Each tape has 15 files on it, 5 main files and a header and trailer file for each main file.

D#	C#	START	STOP
D-06008	C-04928	3/05/68	3/17/68
D-06009	C-04929	3/17/68	3/30/68
D-06165	C-05114	3/30/68	4/12/68
D-06166	C-05115	4/12/68	4/25/68
D-06372	C-05198	5/26/68	6/12/68
D-06373	C-05199	5/13/68	5/26/68

ATTACHED LETTER SENT TO:

Mr. Bruno Aparicio

Mr. Michel Aubry

Mr. J. N. Barfield

Dr. J. R. Burrows

Dr. Jih-Kwin Chao

Dr. V. P. Golovkov

Mr. Paul Lane

Dr. J. Munch

Mr. Alfredo Navato

Dr. Chris T. Russell

Dr. V. A. Troitskaya

Dr. Johannes Wilhjelm

Dr. Bruce Boller

Dr. Keith Ogilvie

Dr. Vithalbai L. Patel

Dr. Willard P. Olson

Dr. Lothar Rossberg

Dr. Ferdinand F. Cap

Mrs. Marcia M. Neugebauer

Dr. Harry L. West, Jr.

Dr. A. Nishida

Dr. James L. Burch

Dr. Raymond G. D'Arcy, Jr.

Dr. Frederick L. Scarf

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

NATIONAL SPACE SCIENCE DATA CENTER
CODE 601

TELEPHONE
301-982-6095

March 28, 1973

Dear Colleague:

The National Space Science Data Center (NSSDC) has just received the attached letter from the Coleman group at UCLA informing us of a possible offset problem in some of the early OGO 5 magnetometer data. We are forwarding it to you in this manner so that you may be informed of possible problems relating to certain potential uses of the data.

NSSDC will transmit further information regarding these data as soon as it becomes available. We suggest that, at this stage of our understanding of the potential problem, if you plan to use the early OGO 5 data, you contact me at (301-982-5783) or Dr. Christopher T. Russell at UCLA (213-825-3188).

Sincerely,

Donald J. Hei, Jr.
Acquisition and Analysis Branch

DH:fh

Attachment:
UCLA Letter

Memo

To: Users of UCLA OGO-5 fluxgate magnetometer data

From: C.T. Russell

Subject: Absolute accuracy of data on NSSDC tapes

Date: March 21, 1973

The purpose of this memo is to interject a note of caution in the use of the UCLA OGO-5 fluxgate magnetometer data as an absolute instrument in very low fields. The fluxgate magnetometer flown by the UCLA group has a dynamic range of ±64,000γ and a precision of ±1/16γ. This precision should not be confused with accuracy. The OGO-5 spacecraft has a set of magnetometers provided by GSFC which are designed for high accuracy. This set includes a rubidium vapor magnetometer with biasing coils and a fluxgate magnetometer with limited dynamic range. It was decided prelaunch to devote the major effort with magnetic cleanliness procedures on this set of magnetometers and intercalibrate the OGO-5 and GSFC data inflight. For this purpose, we were supplied with short stretches of GSFC data (5 minutes) once per orbit for orbits 1-52 and orbit 138 and above.

The initial data were consistent with an offset which changed moderately rapidly just after turn on but which asymptotically settled down by about orbit 25. The data above orbit 138 showed a rather constant offset but these offsets exhibited some temperature dependence. This temperature dependence was then used to determine offsets for orbits 53-138. Then one offset was chosen to represent the offset during the entire orbit and offsets were assumed to change at perigee when the instrument was exposed to a large field and thus exercised its various ladder-adder circuits. The instrument temperatures were not available until after the data were processed and assumptions were frequently made on the expected temperatures from data obtained on nearby orbits and from data obtained one year earlier or one year later.

In March 1971 when we wrote our data processing memo "Production Processing of the Data Obtained by the UCLA OGO-5 Fluxgate Magnetometer", we stated we expected an accuracy of from 1 to 2 gammas per component. All indications were from our experience to that date that such was the case. As processing continued into the second and third year of OGO-5, however, temperatures began to drop and during April-May and October-November 1969 and 1970 we would expect that the offset variations within a particular orbit might exceed 2γ per

component. Furthermore, during spin up periods the temperatures dropped markedly causing offset problems.

Last but not least, Marcia Neugebauer and Don Hei have found stretches of OGO-5 data during March and April 1968 which they suspect have offsets exceeding the guidelines. This could be caused by several factors: first, clerical error (at least one case of this has been found); two, temperature variations larger than suspected; three, changes in the long term drift of the offset during the orbit and not just at perigee. Thus, at the present time I urge caution in the use of the OGO-5 UCLA fluxgate magnetometer data for absolute measurements in low fields. Until we can do further tests, I suggest that if accurate field values in low fields are essential to a particular study the GSFC magnetometer be used or that the accuracy of the OGO-5 data be verified by comparison with other spacecraft, or by one or another of the several techniques available for measuring spacecraft offsets from in-flight data, (Belcher, 1973; Hedgecock, 1973).

We are very interested in checking the offsets using these techniques ourselves, and plan to do this in the near future. As is true for all experimental groups these days, our budget for such studies is limited. Thus, we do not forsee a study of the OGO-5 offsets for the full three year period. However, we plan to attempt to determine enough offsets that an accurate data base is available for magnetospheric studies and that the degree of variability of the offsets is precisely determined. When this study is complete we will write another memo.

References

Belcher, J.W., A variation of the Davis-Smith method for inflight determination of spacecraft magnetic fields, submitted to J. Geophys. Res., 1973.

Hedgecock, P.C., An alternative mathematical technique for the determination of spacecraft magnetometer zero levels, submitted to Journal of Scientific Instruments, 1973.

CTR:pr

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