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=      DEEP SEA DRILLING PROJECT       =
=   LONG-CORE SPINNER MAGNETOMETER     =
=  SEDIMENT PALEOMAGNETICS DATA BASE   =
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# I. INTRODUCTION

## A. BACKGROUND AND METHODS

The Deep Sea Drilling Project (DSDP) long-core spinner magnetometer file contains shipboard data taken by the Digico long-core spinner magnetometer. This instrument measures the direction (declination) and intensity of the horizontal component of magnetization of the sediment in unsplit 1.5 meter core sections. The measurements were made immediately after the cores were brought aboard.

Leg 47A measurements are from rotary drilled sediment cores. The remaining measurements are from sediments recovered by the hydraulic piston corer.

Listings of the computer-processed magnetometer data were usually included with the Hole Summary Book paleomagnetics report. On Legs 70 and 71 the paleomagnetists transcribed the data from the computer listings to data forms.

To insure compatibility with DSDP plotting routines, records containing all null data fields were discarded. For example, on Legs 68 and 70, measurements at a few levels yielded no recorded values, but under sedimentolgical notes "range" meaning "saturated" was printed. These records were discarded.

All records are in the same format. Each record is 81 characters long and represents a single long-core spinner magnetometer record.

## B. LEGS IN DATA SET

The data base contains data from Legs: 47A, 68, 70, 71, 72, 75 and 90.

## C. BIBLIOGRAPHY

Ryan, W. B. F. and U. von Rad, 1976. Hole Summary Book for Leg 47A. Paleomagnetist: N. Hamilton.

Montadert, L., and D. G. Roberts, 1976. Hole Summary Book for Leg 48. Paleomagnetist: E. A. Hailwood.

Gardner, J. V. and W. L. Prell, 1979. Hole Summary Book for Leg 68. Paleomagnetists: D. Kent and D. Spariosu.

Honnorez, J. and R. P. Von Herzen, 1979. Hole Summary Book for Leg 70. Paleomagnetist: S. Levi.

Ludwig, W. J. and V. Krasheninnikov, 1980. Hole Summary Book for Leg 71. Paleomagnetists: J. Salloway and J. Bloemendal.

Barker, P. F. and R. L. Carlson, 1980. Hole Summary Book for Leg 72. Paleomagnetists: N. Hamilton and A. Suzyumov.

Hay, W. W. and J. C. Sibuet, 1980. Hole Summary Book for Leg 75. Paleomagnetist: B. Keating.

Kennett, J. R. and C. C. von der Borch, 1983. Hole Summary Book for Leg 90. Paleomagnetist: C. E. Barton.

## D. DATA RELIABILITY

The user should refer to the Hole Summary Books for complete discussions of the results and their reliability.

### Leg 47A

Site 397A: The paleomagnetist experimented with using the long- core spinning unit for Site 397A rotary-drilled cores. Two suitable 1.5 meter core sections were spun on separate occasions. The system worked according to specifications. It was concluded that major lithological changes could easily be recognized by intensity values and by swings in relative declination, which then could be used as a guide to sampling.

### Leg 48

Sites 401 and 402: A total of seven 1.5 meter rotary-drilled core sections were measured. Measurements were usually taken at 1 cm intervals with triplicate measurements at each 10 cm point. The data were included in

the Hole Summary Book paleomagnetics section. The data were described as mostly unreliable with inconsistent repeat readings most likely due to slippage of the core-section within the plastic liner during rotation. The results were not included in the data base.

Leg 68

Site 502: Shipboard personnel attempted to maintain relative orientation between successive cores, but the paleomagnetist reports they may have been only partially successful. They did maintain relative orientation between the sections cut from each 4.4 meter core. Cores were measured immediately after being brought aboard ship. "Very high values of remanent intensity often occur in the disturbed parts of the core and may be caused by magnetic grain alignment [due to] sediment shearing, by realignment of magnetic grains in a relatively strong magnetic field, perhaps associated with the steel drill string (or possibly we are detecting the shear pins that fall into the hole after each core)."

Site 503: Rust scale from the drill string was a serious problem. Dark flecks were concentrated at the top of virtually every core and the core was smeared inside the liner to several meters, even in undisturbed portions of the core. Rust scale, of course, is highly magnetic. This was a serious problem in Hole 503A, but less so in Hole 503B. Long-core magnetic data from the topmost 1.5 meters of most cores could not be used because of the rust contamination. Modification to the corer between Sites 502 and 503 greatly improved core to core orientation and at Site 503 greater attention was paid to handling the cores on deck.

In August, 1981, the Leg 68 co-chief scientists forwarded a list of orientation angles (phi) that go with each core for Sites 502 and 503. Phi is the rotation angle measured from the orientation ring for each core. The rotation angles have been entered in the remarks field of Leg 68 sediment paleomagnetics records.

Leg 70

Site 506: The paleomagnetist, S. Levi, states (personal communication) that he would not have confidence in Leg 70 long-core spinner magnetometer data (especially Site 506) because of rust contamination and physical disturbance of the sediment. However, the data might show trends and gross differences. Data for declination and intensity are usually good beyond the first section, sometimes beyond the top 50

cm of the first section.

Site 507: Very similar to Site 506.



Site 509: Hole 509 is composed of foram-nanno ooze. The results are similar to those at the previous sites. The manganese-oxide fragments show weak magnetization intensity. Hole 509B was composed of layers of $MnO_2$ fragments, "hydrothermal clays", and foram-nanno oozes.

Leg 71

Site 512: In most cases an approximate orientation was preserved between cores. However, orientation was lost on Cores 2, 12, and 13. Large quantities of gravel occurred in the upper parts of many cores. The gravel probably fell down the hole from above. It produced the relatively high intensities (often over 1000 microgauss) and the scattered declinations visible in Section 1 of many of the cores.

Site 514: Pipe-rust occurred frequently in the cores, particularly in Section 1, but also in variable quantities in the lower sections of the cores. "This problem constitutes a severe limitation on the use of the long-core spinner to measure weakly magnetized sediments."

Leg 72

Hole 515A: "Invariably the upper 50 cm or so of Section 1 from each core gives anomalous declination and intensity results. This appears to correlate with evidence of visible disturbance and is often reflected in the G.R.A.P.E. determination." Wildly fluctuating values for a single reading can occur below the first 50 cm of the first section. Rust was probably not a factor in the anomalous readings, as the drill pipe was used for rotary coring at Hole 515.

Site 517: Quality of the long-core data at Site 517 is inferior to that produced for the more cohesive sediments from Site 515. Anomalous changes in declination and intensity were most common in the upper part of a section of each core.

Results measured on Cores 1 and 2 cannot be directly compared with the discrete samples because the sections changed length when rotated. Sedimentologists in the core lab tried to reduce the sections to their original length.

Site 518: The sediments recovered here were generally firmer than at Site 517. Cores were carefully inspected for evidence of voids, soupy disturbance and excessive water between liner and sediment surface before selection for spinning.



Leg 75

Hole 530B: Paleomagnetic studies were unsuccessful except for Core 530B-8, Sections 2 and 3, which did give stable paleomagnetic directions. There were three reasons for the failure:

1) Much of the sediment consisted of debris flows and turbidites.

2) The sediments were weakly magnetized and in many cases the noise level of the magnetometer exceeded or was equal to sample magnetization. For these reasons no NRM intensity values are available for Site 530B.

3) There was considerable contamination of sediments with rust from the drill string.

Leg 90

The objective of the onboard studies was to obtain a detailed magnetic stratigraphy by making closely spaced long-core measurements of the horizontal component of NRM for all HPC cores. It was not always possible to achieve this objective and the cores were sampled for subsequent laboratory studies. Fluid sections and sections containing air pockets were not measured.

Hole 587: Contamination by rust was not a serious problem. High intensity spikes were attributed to grease spots/rust particles, although contamination was not always visible in the section. Measurements were discontinued after core 7 because of the poor quality of the results.

Site 588: All well-preserved cores from Holes 588, 588A and 588B were measured with the exception of Hole 588B, cores 10-19. The Digico magnetometer was noisy and much of the sediment failed to give a signal significantly higher than the noise level of the instrument (about 0.1 microgauss at 2**6 spins). Absolute orientations were obtained on most cores using the Kuster device. Declination plots for all the cores measured were presented in an appendix to the Hole Summary Book magnetics section.

The Site 588 results were summarized on Summary Paleomagnetic Measurements forms, copies of which are kept on microfilm in the DSDP Data Archives. Measurements were made at 10 cm steps (2**6 spins). Below core 588B- 20, intervals of 20 cm were used. The Summary Paleomagnetic Measurements tabulation lists the mean NRM intensity value with standard deviation of the measurements taken in each section. The standard deviations are rather large because



of the presence of a small number of high values in the section. Thus, the means are much higher than typical values. This data file lists the mean value for each section, but not the standard deviation.

Hole 589: Paleomagnetic properties are similar to those of Site 588. The better consolidated sections were measured at 20 cm intervals. The material in core 1 is more strongly magnetized than the lower cores. The scattered declinations of the lower cores are attributed to contamination and the effect of core liners rather than to instrument noise.

## II. FORMAT AND FIELD DESCRIPTIONS

### A. DATA FORMAT

Record length = 81 characters
(originally 85, blank fields removed by NGDC)

| COLUMN | FIELD | FORMAT |
|---|---|---|
| 1-2 | LEG | A2 |
| 3-5 | SITE | A3 |
| 6 | HOLE | A1 |
| 7-9 | CORE | A3 |
| 10-11 | SECTION | A2 |
| 12-15 | TOP INTERVAL DEPTH (cm) (implied decimal pt) | F4.1 |
| 16-23 | TOP OF CORE DEPTH (meters) | F8.2 |
| 24-31 | SAMPLE DEPTH IN HOLE (meters) | F8.2 |
| 32 | REPEAT COLUMN | I1 |
| 33-57 | SEDIMENTOLOGICAL NOTES | A25 |
| 58-67 | NRM INTENSITY (gauss x 10-6) | F10.0 |
| 68-74 | NRM DECLINATION, ANGLES UNCORRECTED (degrees) | F7.0 |
| 75-81 | NRM DECLINATION, ANGLES CORRECTED (degrees) | F7.0 |

### B. FIELD DESCRIPTIONS

The definition of leg, site, hole, core and section may be found in the explanatory notes. In addition, the special core designations, as well as the methods of sample labeling and calculating absolute sample depths are discussed.

INTERVAL DEPTH:
Refers to the depth in centimeters within the section at which the top or bottom of a measurement was taken. Values

are encoded with an implicit decimal point. No bottom interval depths are given for the measurements in this file.

Measurements are usally made at 10 cm intervals; however, measurements may be more closely spaced, at 2 cm or 5 cm intervals, for example.

CORE DEPTH:
The subbottom depth in meters to the top of the core.

SAMPLE DEPTH:
The subbottom depth in meters to the level at which the measurement was made.



REPEAT COLUMN:
The paleomagnetist often returned to make measurements at higher levels in the section or to repeat measurements following the usual sequence. A field has been reserved for recording repeat measurements. "0" is entered in the field if there is only one measurement for an interval. There is a "1" for the first repeat measurement, a "2" for the next repeat and so on. Records of a section with the same number in the repeat column are from a single measurement sequence.

SEDIMENTOLOGICAL NOTES:
Only 25 columns were available for the sedimentological notes. In encoding, the notes were abbreviated when necessary. A note may be continued from the sedimentological notes field of one record to the same field on the next record.

NATURAL REMANENT MAGNETISM(NRM) INTENSITY:
NRM intensity is encoded in gauss (c.g.s. units). Every value in the NRM intensity field should be multiplied by 10-6 to arrive at the NRM intensity value.

NRM DECLINATION, ANGLES UNCORRECTED:
The horizontal angle in any given location between true north and magnetic north. Values range from 0 to 360 and are always positive. The paleomagnetists tried to maintain relative orientation between successive cores. Attention was paid to handling the cores on deck to preserve relative orientation.

NRM DECLINATION, ANGLES CORRECTED:
    This field was used only when the paleomagnetist noted
    corrected values.