Introduction

The U.S. Navy Geosat Altimeter Mission lasted for nearly 5 years, from April 1985 to January 1990. Geophysical data records (GDRs) from the final 3 years, when the satellite was performing the exact repeat mission (ERM), were produced by NOAA's National Ocean Service and have been widely distributed. The intense interest in these data is indicated by the many articles published in the March and October 1990 issues of the Journal of Geophysical Research (Oceans) dedicated to the Geosat mission. In contrast, GDRs from Geosat's first 18 months (April 1985 to September 1986), known as the Geodetic Mission (GM), are classified because of military applications related to knowledge of the marine geoid. Only the altimetric heights are considered secret, however, and unclassified subsets of these data have been released. For example, global Geosat wind speed and wave height data from the GM are available through NOAA as are the GM GDRs south of 30S.

Another unclassified data type is the crossover difference. A crossover is defined as the intersection of the satellite ground track with itself. At this location, the two crossing passes (one ascending and one descending) provide independent sea level measurements at the same place but at different times. The difference of these two sea level measurements (a crossover difference) is not considered classified because the geo-potential component of sea level is the same at the intersection of the two tracks and thus cancels. Crossover differences contain information about uncertainties in the satellite ephemeris and therefore enable correction of radial orbit error. Orbit-corrected crossover differences form the basis for studies of sea level variability, both in a statistical sense and for computation of sea level time series. Tide model studies represent another type of crossover difference application.

CD-ROM Contents

The Geosat Altimeter Crossover Difference records (XDRs) contained on this CD-ROM are documented in a NOAA handbook. Although only the 18-month GM data are classified, XDRs have been constructed for the first 2.5 years of the Geosat mission, that is, data from the GM plus the first year of the ERM. This was done to minimize the effect of the 5-week data gap (October 1 to November 8, 1986) between the two missions when the altimeter was off during orbit maneuvers. By computing crossovers for the entire 2.5-year period, continuous sea level time series can be derived. It is important to understand that sea level time series and other oceanographic information can only be derived from XDRs which have been adjusted to remove radial orbit error (approximately 1 m amplitude). The XDRs contain all information necessary to perform such adjustments, but no orbit corrections are provided. Removal of orbit error is essentially a filtering problem, and different oceanographic applications require different approaches. The National Oceanographic Data Center is responsible for disseminating Geosat data to the research community. Four introductory files are included on each disc to provide information for working with the Geosat Crossovers. Also included on

disk 8 of 8 are two global XDR sets, described in Section III of the READ_ME file found on each CD. The Geosat XDRs on each CD-ROM are stored in files, each of which covers a particular ocean region. The naming convention used for the files is: REG_# where # is the number of the region as shown by figure 6 in the XDR handbook. If the region had to be split into two parts to fit onto CDs, a or b is added. For example, REG_06a is the first part of region 6, and REG_06b is the second part of region 6. Although regions 4 and 7 are exceptions, note that in general the regions are arranged in latitude bands as follows:

Regions and Latitude Band

Regions	Latitude Bands
1, 2, 3, 4:	35N to 64N
5, 6:	6N to 35N
7, 8, 9, 10:	35S to 6N
11 - 18:	65S to 35S

(A world map showing the boundaries for each regions is available on request from the NODC)

Data in these files are in binary Hewlett-Packard (HP) form, similar to the Geosat Exact Repeat Mission "T2" GDRs distributed on CD-ROM. The format description is discussed in the XDR handbook and a tabular summary is given in file 2 of each disc. The files can be manipulated using standard MS-DOS commands, transferred over a network to a host computer, or accessed directly on the CD-ROM. The data are in "Hewlett-Packard" binary format. Each disk contains a Fortran program file to convert from HP binary to VAX binary. Records are 72 bytes in length.

How to Get More Information:

Technical questions about reading the CD-ROM, the content of the XDRs, or scientific applications should be addressed to:

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How to Order:

Copies of this CD-ROM set are available from:

National Oceanographic Data Center
User Services
NOAA/NESDIS/E/OC1
SSMC3, 4th Floor
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