CGER-D005-'94

# GRID GLOBAL DATA SETS:

# DOCUMENTATION SUMMARIES

November 1994

GRID-Tsukuba

UNEP

Global Resource Information Database
United Nations Environment Programme

Center for Global Environmental Research
National Institute for Environmental Studies
Environment Agency of Japan

CGER

## Foreword

In May 1991, GRID-Tsukuba was established at the Center for Global Environmental Research (CGER) in the National Institute for Environmental Studies (NIES) as the eighth cooperative center of United Nations Environment Programme (UNEP) / Global Resource Information Database (GRID).

Major responsibilities of GRID-Tsukuba are specified in the Memorandum of Understanding with UNEP as follows:

1) To provide a leading role in interfacing with GRID users in Japan and neighbor countries.
2) To provide data sets acquired or generated in environmental research and monitoring activities of NIES and to disseminate these to GRID users.
3) To develop GIS and remote sensing technology and to provide technical support to GRID users in these fields.
4) To promote the use of global environmental data in science and policy making.

We started to distribute GRID global data sets in April 1992 and until now we have received many orders from researchers and policy makers. Relating to the information on GRID global data sets, UNEP/GRID has developed the GRID Meta-Database(MDb) system. MDb is a database system to catalog all of GRID's data holdings and also to make GRID meta-data holdings available to the general public. On the other hand, GRID-Geneva assembles "GRID Global Data Sets: Documentation Summaries"(January, 1993) in order to illustrate the compilation of textual data which has been collected during the last few years by GRID-Geneva, and now standardized in a format for MDb.

In order to inform users on GRID global environmental data sets and to promote the use of them, we reprint this booklet. We hope that this gives you useful information for global environmental research. On the occasion of reprinting we added the summaries of two data sets which are originated by GRID-Tsukuba.

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*GRID Data Set Documentation Summaries:*

## An Explanation on the Use and Contents of this Publication

The purpose of the current booklet, which is a preliminary version of a document which could be published system-wide by UNEP/GRID, is to illustrate the compilation of textual data which has been assembled during the last few years by GRID-Geneva, and now standardized in a single format which is complementary to both the contents and form of the GRID Meta-Database (MDb). While the GRID MDb incorporates a series of entities/attributes (that is, database tables and fields) to describe GRID-held data sets, this booklet provides additional explanatory material in free-text form (with only minor repetitions of GRID MDb content) which is relevant to every data set described.

Typically, each Data Set Documentation Summary included herein consists of one to two pages, although the explanatory text is often accompanied by additional pages containing a key or legend describing the classes represented within a particular data set. The general structure of each Data Set Documentation Summary is as follows (individual entries may vary from this formula):

- Paragraph **one** is a description of the data set itself, where it was obtained from, and some brief discussion of its contents;

- Paragraph **two** elaborates on paragraph one, describing the data set in more detail, discussing the various potential uses of the data set, and also if relevant includes a brief description of GRID-Geneva's own processing of the particular data set;

- Paragraph **three** describes the technical characteristics of the data set (actually, the data files comprising the data set, which may vary from one to many), such as the geographic extent of the data set, the projection used, the size of the data file(s) etc.;

- Paragraph **four** includes a reference for the data set, which is normally a paper published in the scientific literature i.e. a reputed journal or some other form of publication, and also mentions the specific institution and/or person(s) who were GRID's source of the data set in question.

These data set Documentation Summaries are already being used in at least three ways by the developers at GRID-Geneva:

1. They serve as a means of satisfying user curiosity about GRID-held data sets; that is, an introduction for potential users making a "first inquiry", who may not yet be ready to order GRID-held digital data, but have already identified particular data sets as "interesting";

2. They accompany GRID data sets whenever they are distributed to GRID customers, and serve as an entry-level explanation of each data set;

3. They fulfill one of the NASA Global Change Master Directory's (GCMD) mandatory parameters as an explanatory paragraph(s) describing data set content, source etc., and thus can be used when GRID prepares entries for the GCMD in NASA's Directory Interchange Format (DIFs).

We hope you find this product useful as a compendium of GRID-Geneva held and distributed Global Data Sets, and look forward to any comments you may have to improve on the content and format of this preliminary version.

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*UNEP/GRID Documentation Summary for Data Set:*

# 'ETOPO-5' Elevation

The 'ETOPO-5' data set is originally from the U.S. National Geophysical Data Center (NGDC) in Boulder, Colorado (USA), and represents the "best" available digital terrain values as integrated from existing five and ten-minute digital sources. The data set has elevation values spaced at every five-minute latitude/longitude crossing on the global grid (approx. nine km.-sq. spatial resolution, or 12 x 12 pixels/degree), and a one-meter contour interval. Bathymetric values are included in this data set, starting at approximately 10,000 meters below sea level, while the elevation values extend up to heights of approximately 8,000 meters above sea level. Some original sources of the data used include the U. S. Defense Mapping Agency for the conterminous USA, Japan and Western Europe; the Australian Bureau of Mineral Resources, and the New Zealand Department of Scientific and Industrial Research.

GRID has reformatted the original NGDC data file to place the origin at 180 degrees West longitude, instead of at 0 degrees Greenwich Meridian. The 'ETOPO-5' data file has 2160 records of data with a length of 8640 bytes each: the size of the data array is 2160 lines by 4320 elements, but this is a 16-bit or two bytes per element data file. The origin of the data file is at 90 degrees North latitude and 180 West longitude, and it extends to 90 degrees South latitude and 180 degrees East longitude. The data file comprises 18.66 Megabytes. The version of this data file at GRID has been discovered to contain two records (lines) of flawed data values; that is, portions of lines 2055 and 2056, beginning at the Weddell Sea north of Antarctica and continuing eastward. GRID is currently waiting for a response from the data supplier (NGDC) before attempting any replacement of what appear to be anomalous data values.

There are two useful references for the 'ETOPO-5' data set. These are: "Edwards, Margaret Helen, 1986. Digital Image Processing of Local and Global Bathymetric Data. Master's Thesis. Department of Earth and Planetary Sciences, Washington Univ., St. Louis, Missouri, USA, 106 p." and "Haxby, W. F. et al., 1983. Digital Images of Combined Oceanic and Continental Data Sets and their Use in Tectonic Studies. EOS Trans- actions of the American Physical Union, vol. 64, no. 52, pp. 995-1004."

The following technical information will help in reading the 'ETOPO-5' data file. It is normally copied from an IBM 4381 mainframe computer using the VM/CMS command 'MOVEFILE'. In 'MOVEFILE', the blocksize and logical record length are set equivalent to the number of elements per record times the number of bytes per element. The data file contains 4320 elements per record and two bytes per

element, with the blocksize and logical record length both set to 8640. The number of records is equivalent to image rows (or lines of data), and the number of image columns (elements/pixels/samples) is equal to the number of bytes per record, divided by the number of bytes per element (e.g. 8640/2=4320).

The original data file is held on the IBM 4381 mainframe computer at GRID-Geneva. This means that if the data are transferred to a Digital (VAX) or IBM/PC-based system, the order of the bytes will have to be exchanged so that the 16-bit data values can be read properly.