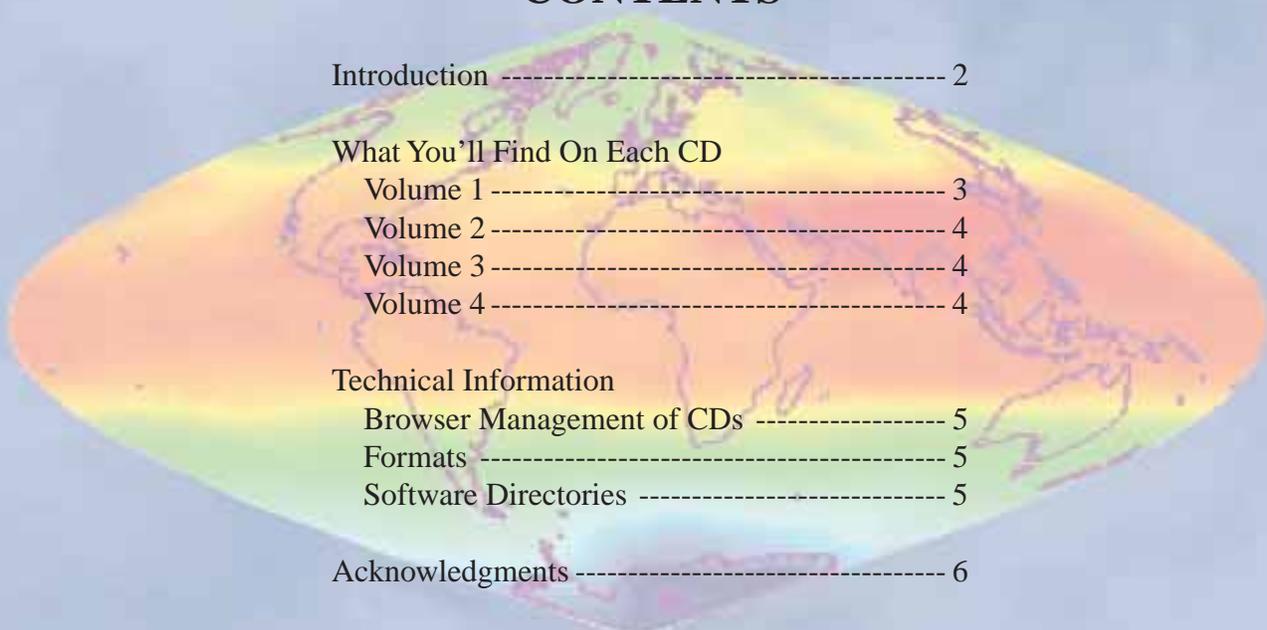


# Climatology Interdiscipline Data Collection

## Volumes 1–4 Monthly Means for Climate Studies

H. L. Kyle<sup>1</sup>  
J. M. McManus<sup>1,3</sup>, S. Ahmad<sup>1,2</sup>, P. L. Hrubyak<sup>1,2</sup>,  
M. Kafatos<sup>3</sup>, R. Yang<sup>3</sup>, Z. Li<sup>3</sup>

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1—Goddard Distributed Active Archive Center, NASA Goddard Space Flight Center

2—Raytheon-STX Corporation

3—Institute for Computational Sciences and Informatics (CSI), Center for Earth Observing and Space Research (CEOSR),  
George Mason University

## INTRODUCTION

The Goddard Distributed Active Archive Center (GDAAC) compiled the Climatology Interdisciplinary Data Collection (CIDC) to facilitate interdisciplinary studies related to climate and global change. This CD-ROM version has been produced in collaboration with the Center for Earth Observing and Space Research (CEOSR), Institute for Computational Sciences and Informatics (CSI), George Mason University. It was designed for the study of global change, seasonal to interannual climate change, and other phenomena that require from one to dozens of interacting parameters.

A few of the possible study areas are the depletion of stratospheric ozone, the weather changes associated with the periodic El Niño Southern Oscillation (ENSO) events, periodic droughts, and global warming. Short, background information scenarios are given on the CD for the Monsoon, El Niño, and global warming phenomena.

The CD set also contains read software and the Grid Analysis and Display System (GrADS, © 1988–1996 by Brian Doty). If desired, these CDs can be opened with a Web browser. A general description of the set's contents and structure is provided in this booklet, but a more detailed version is given in the AAREADME (introductory) document on each CD.

Data from scientific disciplines dealing with meteorology and atmospheric sciences, land surface, ocean, cryosphere, biosphere, the Sun, and remote sensing science have been gathered into one place and, where feasible, presented in a common format (monthly means with a  $1^\circ \times 1^\circ$  world grid, or commensurable, resolution and IEEE 32-bit floating point numbers). Over 70 physical parameters from some 25 separate data sets are represented. The Data Collection Overview document on the CDs lists alphabetically all the physical parameters along with the data set(s) in which they can be found. It also contains a separate listing of each data set, its origin, and the parameters included. Each data set is also accompanied by a detailed user's guide.

The CIDC data collection was originally set up on an Internet site in fall 1995. Since then the number of included parameters and temporal coverage of the individual data sets have grown considerably. We made this CD-ROM version in response to numerous requests. Because this is a dynamic data collection, with additional years of data added as they are prepared and new versions of particular data sets are periodically issued, be sure to refer to the Website from time to time for the most up-to-date materials. Go to

[http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/FTP\\_SITE/inter\\_disc.html](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/FTP_SITE/inter_disc.html)

alternately

<http://daac.gsfc.nasa.gov/>

and click on Interdisciplinary under DISCIPLINE SPECIFIC INFORMATION.

These CDs can be accessed directly, but they are better managed through a Web browser. Call up the browser then go to *Open File* and select the CD. In this mode you can jump directly from the CD to the Internet if the Internet connection is open. The CD HTML pages contain several Web links that include links to both K–12 and university level educational sites.

## WHAT YOU'LL FIND ON EACH CD

In addition to data, each CD has a section containing documentation, the three climate scenarios, and software. AAREADME, an introductory document, gives a brief description of the CD contents along with layout, data format, and other useful information. The documentation folder contains *Readme User's Guides* for each data set. The software folder contains decompression software, programs to read the binary data, and the GrADS analysis program. The read programs have the capability of writing the binary data out as an ASCII file. When activated, the GrADS program can be used to both view and analyze the data.

### **VOLUME 1: Biosphere, Hydrology, Surface Temperature, Ozone, Greenhouse Gases**

#### ***The Biosphere (land and ocean)***

Ocean pigment concentration (CZCS): 7.5 years (11/78–6/86) of monthly means, a 12-month mean climatology, and a 7.5 year mean climatology  
 Normalized Vegetation Index, AVHRR NDVI (7/81–9/94)  
 Land cover classification (ISLSCP) as determined for the year 1987

#### ***Measured Variable Atmospheric Constituents***

Total Ozone from the Total Ozone Mapping Spectrometer (TOMS, 11/78–5/93)  
 Greenhouse gases (1994–160,000 years b.p.) CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O

#### ***Measured Surface Temperatures and Pressures***

Sea surface temperatures, anomalies, monthly climatologies, NOAA/NCEP (11/81–7/97)  
 Temperature deviations derived by U. East Anglia (1851–1996)  
 GISS global mean temperature anomalies (1/1866–9/1997)  
 Southern oscillation index; the normalized difference in the Darwin and Tahiti surface pressures (East Anglia; 1/1866–12/1994)

#### ***Hydrological Data***

Total atmospheric precipitable water (water vapor) from SSM/I (8/87–11/91)  
 Global Precipitation Gauge Analysis (1986–6/97)  
 Global combined precipitation, satellite and gauge analysis for land and ocean (7/87–11/87, 1/88–9/97)  
 Monsoon rain data, SMMR (10/78–8/87)  
 Sea ice concentration SMMR/SMMI (10/78–12/96)  
 Soil characteristics: texture, depth, slope, and type (FAO)

#### ***Angular Radiation Distribution Models***

(from ERBE) for top of the atmosphere broad spectral band shortwave reflectance and long-wave emission.

#### ***Documentation and Software Folders***

## VOLUME 2: Atmospheric Dynamics

### ***4-D Atmospheric Dynamics Products***

from the Goddard Data Assimilation Office (3/80–11/93). A 26 parameter subset: winds, geopotential height, temperature, specific humidity (all at eight pressure levels) and total precipitation, longwave and shortwave radiation, total cloud cover, surface conditions, and more. Unlike most other data products, these are on a 2° by 2° world grid. Data have been compressed using *gzip* and need to be “unzipped” before use. However, a few sample uncompressed files are available for initial examination.

### ***Documentation and Software Folders***

## VOLUME 3: Radiation and Clouds

### ***Cloud Physical Characteristics and Fractions***

*As monitored by the International Satellite Cloud Climatology Project (ISCCP)*

*These products were produced by the NASA Goddard Institute for Space Studies (GISS)*

Clouds, ISCCP C2 products (7/83–6/91). A six-parameter subset: mean diurnal cloud fraction, cloud top pressure and temperature, mean daytime cloud optical thickness, clear sky surface reflectance and temperature.

Clouds, ISCCP D2 (new version) products (1/86–1/87, 1/89–12/93). A 36-parameter subset; the six parameters mentioned above, low, mid, and high altitude cloud fractions, nine daytime cloud types with ice and water cloud differentiation, etc. This data set was compressed using *gzip* and must be “unzipped” before use. A few sample uncompressed files are available for initial examination.

### ***Radiation***

Earth’s Radiation Budget Experiment (ERBE): longwave at the top of the atmosphere (1986–1988)

Solar irradiance: total (Nimbus–7 ERB, ACRIM I & II, ERBS), daily, and monthly means (11/78–12/97).

Surface Solar Irradiance from NASA/GISS (7/83–6/91). Downward solar irradiance at the surface.

Surface Radiation Budget from NASA Langley Research Center (7/83–6/91). Clear-sky downward SW and LW flux, all-sky downward SW and LW flux, and net SW and LW flux.

### ***Documentation and Software Folders***

## VOLUME 4: Atmospheric Soundings

### ***Goddard TOVS Pathfinder A Atmospheric Sounding Products***

This eleven-parameter subset includes surface pressure, temperature, precipitation, and mean layer temperature, precipitable water, and cloud fraction for specified pressure levels (1985–1992). The data were compressed using *gzip* and must be “unzipped” before use. Sample uncompressed files are available for initial examination.

### ***Documentation and Software Folders***

Because of the lack of space on Volume 4, the animations are not included in the El Niño and Monsoon climate scenarios and only three of the GrADS analysis software versions are included. If desired, other versions can be downloaded from one of the other volumes.

# TECHNICAL INFORMATION

## BROWSER MANAGEMENT OF CDs

These CD-ROMs can be accessed directly, but they are best managed through a Web browser such as Netscape. Call up the browser then go to *Open File* and select the CD. The CDs have links to Internet sites that can be used if the user is connected to the Internet. A Web browser is particularly useful in accessing certain CD items such as the climate scenaria. However, a browser is not required to access the data files or the text versions of the User's Guide.

## FORMATS

Most of the data are presented in floating point, IEEE 4-byte flat binary format written on a Big Endian SGI machine with a UNIX environment. This means that for Little Endian machines (PCs, VAX, and DEC Alpha) the bytes have to be swapped. This is discussed further in the section on software. Some small data sets are given as ASCII tables. Read software is supplied to read the floating point binary files. If desired, it is capable of writing the binary data out in ASCII files.

The file names are up to 32 characters long, and contain data product, parameter name, spatial and temporal resolution and coverage, year, month, and file type information. DOS can only handle file names up to eight characters in length. PC machines without Windows will truncate the file names to the first eight characters. PC Windows systems will retain all 32 characters, but treat the last 24 characters as a comment statement. Most of the data are given in the form of monthly means on a 1° x 1° global grid, but larger grid squares (2° x 2° up to 5° x 5°) are used in some data sets. This depends on the type of data and the wishes of the data producers. Each data set is accompanied by a *Readme User's Guide* that gives detailed information on the development of the data set, the individual file names, the display grid, and so forth.

## SOFTWARE DIRECTORIES

Each CIDC CD-ROM contains a software directory with subdirectories as follows:

- `aareadme` A document that describes the content of the software directory
- `decompression/` Directory that contains decompression software for different platforms. Refer to the Decompression Software AAREADME directory for further details. UNIX versions of *gunzip* have not been supplied since most UNIX operating systems already have this software. If you are running UNIX and don't have *gunzip*, you can get it at [http://www.pe.utexas.edu/Archive\\_Tools/archive.html](http://www.pe.utexas.edu/Archive_Tools/archive.html)
- `grads/` Directory that contains the Grid Analysis and Display System (GrADS) software. GrADS is an interactive desktop tool that is currently in use worldwide for the analysis and display of Earth science data. GrADS was developed by Brian Doty at the Institute of Global Environment and Society, Center for Ocean-Land-Atmosphere. On this CD set we have supplied versions for most UNIX workstations, Apple Macintosh,

Linux-based PCs, and MS DOS and Windows 95/NT PCs. GrADS is also freely available from the Web, where additional versions may be found as well as future updates to the software included here. GrADS provides an integrated environment for access, manipulation, and display of Earth science data. For UNIX and Linux systems we have supplied a point and click interface (gui) with the necessary files to read and display the data automatically. The GrADS software package enables the user to read the data, byte swap for PCs and other Little Endian machines, and then carry out many analysis steps. For x86 PCs running 32-bit MS Windows operating system (Win95 and WinNT) we supply Win32 GrADS, which is an adapted form of Brian Doty's UNIX version of GrADS. It requires an X-Window server to run. If you don't already have an X-Window server on your PC, you can use the demo package (xdemo32) supplied herein. See the AAREADME in the GrADS directory for more information. In addition links are given to the GrADS Internet home page and other useful sites.

- xwin/ Directory that contains a demonstration version of the Xwin32 X Server
- readdata/ Directory: FORTRAN, IDL, and C programs are given to read the binary data. The computer code is given for each program with instructions for use on several types of computers. Compiled (FORTRAN) executable modules are also provided for several different platforms (PCs, Macs, DEC Alpha, VAX, SGI, SUN, and HP). The executable allows the user to promptly view the binary data at selected grids or to subset the data for the specified regions of interest. It also allows the user to write the selected binary data into ASCII files. These executables will run on PCs and other platforms missing FORTRAN software. Additional information is given in the directory document.

NOTE: the GrADS directory on Vol. 4 contains only the SGI Irix-5, Sun OS 4.1, and the WIN32 for Windows 95/NT GrADS versions because of lack of space.

## **ACKNOWLEDGMENTS**

The production of this CD set was sponsored by NASA's Earth Science Enterprise. We acknowledge and thank the many scientists and science teams who produced the 25 climate data sets summarized in this collection. Each is accompanied by a README User's Guide that mentions the principle scientists involved and lists several pertinent references. We thank Brian Doty for permission to include GrADS (© 1988–1996 by Brian Doty, Center for Ocean-Land-Atmosphere Studies (COLA), Institute of Global Environment and Society, Calverton, MD). All Rights Reserved). We also thank Arlindo da Silva for GrADS modification discussions and assistance with the GrADS software we include here.