National Aeronautics and Space Administration Goddard Earth Science Data Information and Services Center (GES DISC)

README Document for the Ocean Biogeochemistry in the California Current System 2007-2010 L4 Monthly data set

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Revision History

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1.0 Introduction

This document provides basic information for using the Ocean Biogeochemistry in the California Current System 2007-2010 L4 Monthly (CMS_OCE_BGC_CCS) dataset.

1.1 Description of the Data Sets

A coupled physical-biogeochemical ocean model (the MITgcm with BLING biogeochemistry) is a least squares fit to all available ocean observations in the region of the California Current System. This is accomplished iteratively through the adjoint method, using the methodology developed by the Consortium for Estimating the Circulation and Climate of the Ocean (ECCO; www.ecco-group.org). The result is a physically realistic estimate of the ocean state. The model domain extends from 27N to 40N and from 129W to 114W. It has a 1/16-degree horizontal resolution (~7km) and 72 vertical levels.

1.2 Carbon Monitoring System (CMS) Description

The NASA Carbon Monitoring System (CMS) is designed to make significant contributions in characterizing, quantifying, understanding, and predicting the evolution of global carbon sources and sinks through improved monitoring of carbon stocks and fluxes. The System will use the full range of NASA satellite observations and modeling/analysis capabilities to establish the accuracy, quantitative uncertainties, and utility of products for supporting national and international policy, regulatory, and management activities. CMS will maintain a global emphasis while providing finer scale regional information, utilizing space-based and surface-based data and will rapidly initiate generation and distribution of products both for user evaluation and to inform near-term policy development and planning.

1.3 Digital Object Identifier (DOI)

The data sets may be acknowledged in publications using the following Digital Object Identifier (DOI): 10.5067/G854SWM56S7H

2.0 Data Organization

The data in all the files are organized on an equal angle (1/16 degree) grid in longitude and latitude with each file containing 48 time steps of monthly estimates of the primary sience variable contained in the file. Nine of the files have an additional dimension to indicate the 72 levels of depth.

2.1 File Naming Convention

The 12 different files that comprise this data set are named by the shortname written in lowercase letters joined to "_i186_2007to2010_monthly_" to indicate the time range and temporal resolution of the data followed by a short string that corresponds to the short_name of the primary science variable contained in the file. The twelve different files in the dataset are listed below:

1. cms_oce_bgc_ccs_i186_2007to2010_monthly_Alk.nc
2. cms_oce_bgc_ccs_i186_2007to2010_monthly_DIC.nc
3. cms_oce_bgc_ccs_i186_2007to2010_monthly_Fe.nc
4. cms_oce_bgc_ccs_i186_2007to2010_monthly_NCP.nc
5. cms_oce_bgc_ccs_i186_2007to2010_monthly_NO3.nc
6. cms_oce_bgc_ccs_i186_2007to2010_monthly_NPP.nc
7. cms_oce_bgc_ccs_i186_2007to2010_monthly_O2.nc
8. cms_oce_bgc_ccs_i186_2007to2010_monthly_pH.nc
9. cms_oce_bgc_ccs_i186_2007to2010_monthly_PO4.nc
10. cms_oce_bgc_ccs_i186_2007to2010_monthly_pCO2.nc
11. cms_oce_bgc_ccs_i186_2007to2010_monthly_surfCO2flx.nc
12. cms_oce_bgc_ccs_i186_2007to2010_monthly_surfO2flx.nc

2.2 File Format and Structure

The files are stored in NetCDF-4 format.

2.3 File Contents

Each file contains 1 science variable along with 3 or 4 coordinate variables for Time, Latitude, Longitude, and Depth. The coordinate and science variable short_names, long_names, units, and size are given in Table 1 and Table 2, respectively.

Table 1: Coordinate Variables

short_name	long_name	Units	size
time(iTIME**)**	Time	months since 2007-01-01	iTIME = 48
lat(iLAT**)**	Latitude	degrees_north	iLAT = 171
lon(iLON**)**	Longitude	degrees_east	ILON = 240
depth(iDEPTH**)**	Depth	meters	iDEPTH = 72

Table 2: Science Variables

short_name(dimensions)	long_name	Units
Alk(iTIME, iDEPTH, iLAT, iLON**)**	Total Alkalinity	mol/m3
DIC(iTIME, iDEPTH, iLAT, iLON**)**	Dissolved Inorganic Carbon Concentration	mol/m3
Fe(iTIME, iDEPTH, iLAT, iLON**)**	Iron Concentration	mol/m3
NCP(iTIME, iDEPTH, iLAT, iLON**)**	Net Community Production	mol/m3/s
NO3(iTIME, iDEPTH, iLAT, iLON**)**	Nitrate Concentration	mol/m3
NPP(iTIME, iDEPTH, iLAT, iLON**)**	Net Primary Production	mol/m3/s
O2(iTIME, iDEPTH, iLAT, iLON**)**	Oxygen Concentration	mol/m3
pH(iTIME, iDEPTH, iLAT, iLON**)**	pH	
PO4(iTIME, iDEPTH, iLAT, iLON**)**	Phosphate Concentration	mol/m3
pCO2(iTIME, iLAT, iLON**)**	Partial Pressure of CO2	atm
surfCO2flx(iTIME, iLAT, iLON**)**	Air-Sea CO2 Flux	mol/m2/s
surfO2flx(iTIME, iLAT, iLON**)**	Air-Sea Oxygen Flux	mol/m2/s

4.0 Options for Reading the Data

4.1 Programming Languages

The data can be read using major programming languages such as Fortran, C, Java, IDL, Matlab, and Python.

4.2 Command Line Utility

ncdump
The ncdump tool can be used as a simple browser for NetCDF and HDF data files, to display the dimension names and sizes; variable names, types, and shapes; attribute names and values; and optionally, the values of data for all variables or selected variables in a netCDF file. The most common use of ncdump is with the –h option, in which only the header information is displayed.

ncdump [-c|-h] [-v ...] [[-b|-f] [c|f]] [-l len] [-n name] [-d n[,n]] filename
Options/Arguments:
[-c] Coordinate variable data and header information
[-h] Header information only, no data
[-v var1[,...]] Data for variable(s) <var1>,... only data
[-f [c|f]] Full annotations for C or Fortran indices in data
[-l len] Line length maximum in data section (default 80)
[-n name] Name for netCDF (default derived from file name)
[-d n[,n]] Approximate floating-point values with less precision filename File name of input netCDF file

4.3 A tool for simple visualization

Panoply, developed at the Goddard Institute for Space Studies (GISS), is compliant with NetCDF Climate and Forecast (CF) Metadata Convention that is gaining popularity. A strength of the tool is that data can be previewed “remotely” over the network – i.e. user can preview file content of HDF files stored on a remote site, without downloading them. Panoply is available from GISS:

http://www.giss.nasa.gov/tools/panoply/

5.0 Data Services

Data services and access methods can be found on the dataset landing page:

http://disc.sci.gsfc.nasa.gov/datacollection/CMS_OCE_BGC_CCS_1.html

If you need assistance or wish to report a problem:
Email: gsfc-help-disc@lists.nasa.gov
Voice: 301-614-5224
Fax: 301-614-5268
Address:
Goddard Earth Sciences Data and Information Services Center NASA Goddard Space Flight Center Code 610.2 Greenbelt, MD 20771 USA

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