Chapter 3

Obtaining Ocean Data

Introduction

As mentioned, the OBPG is the designated NASA team responsible for the distribution of ocean color and SST data acquired from the MODIS/Aqua, MODIS/Terra, SeaWiFS, OCTS, and CZCS sensors (this role had been previously shared by the NASA Goddard DAAC). The OBPG offers complete historical archives for each sensor, as well as near real-time (NRT) data for active missions. The access point for all OBPG data sets is the main OBPG webpage, the Ocean Color Web (http://oceancolor.gsfc.nasa.gov/).

Goal

This chapter outlines the various data access methods available via the Ocean Color Web. Each method for data access will be briefly discussed:

- Historical Data Access
  - SeaWiFS Data Access
  - The Level 1 and 2 Browser
  - The Level 3 Browser
  - Data by FTP
- Near Real-Time Data Access
  - Data Subscriptions for NRT Data
  - NRT Extracts and Maps
  - Data by FTP
- Citing Data Products Obtained from the Ocean Color Web

3.1 Historical Data Access

Complete historical data archives for all sensors are available for immediate download from the OBPG servers, with the exception of certain SeaWiFS data restrictions (see below). Data from active missions are made available as soon as the processing system can ingest and process it (MODIS/Aqua and MODIS/Terra data is normally available within 2-5 hours of capture).

3.1.1 SeaWiFS Data Access

The only OBPG-distributed sensor data with access restrictions is SeaWiFS data, which is currently under a two week embargo from date of collection (per the contractual agreement with GeoEye). Therefore SeaWiFS files less than two weeks old are unavailable.

All SeaWiFS data greater than five years old is publicly available, but data less than five years old is not available to the general public unless they become a SeaWiFS Authorized User. To become an authorized user one must make a (brief) request to the OBGP specifying the scientific rationale for the request along with some other information (see http://oceancolor.gsfc.nasa.gov/cgi/apply.pl?page=du). Authorized users can then use the 'SeaWiFS User Login' button in the data browser to gain access to all the SeaWiFS data.

On December 24, 2004, the SeaWiFS project stopped receiving global data from HRPT stations (from which the MLAC data are produced). Since that time the OBPG contract with OrbIMAGE (now GeoEYE) is only for the global GAC dataset, and a new agreement has also provided the OBGP with the coastal U.S. 1km dataset. A request for recorded LAC data can also be made to the OBPG for cruise support, but NRT MODIS 1km data is now the preferred source. For non-coastal U.S. 1km data after Dec 24, 2004, data can be purchased directly from GeoEYE.

3.1.2 The Level 1 and 2 Browser

The 'Level 1 and 2 Browser' link on the Ocean Color Web homepage accesses the main browser interface for selecting, downloading, and ordering Level-1 and -2 data files (as well as MODIS L0 files). From this top-level interface, search criteria can be set and then searches launched for the matching Level-1 and -2 scenes (using the 'Find swaths' button or by clicking on the map).

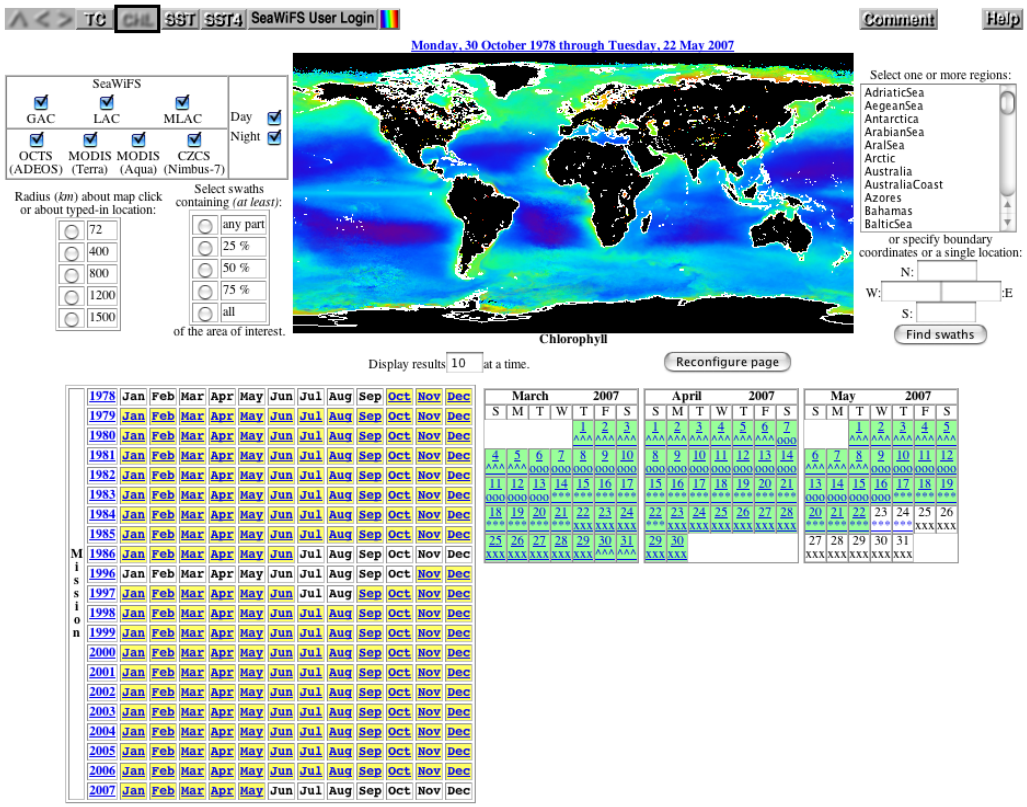

Figure 3.1: The Level 1 and 2 Browser

Search criteria of the data browser include:

- Sensor(s)
- Day and/or night scenes
- Geographic location defined by:
  - A predefined area of interest
  - User-specified area of interest (lat/lon box)
  - Scenes directly under mouse click on global map
  - Radius about mouse click on global map
  - Radius about specified lat/lon
  - Minimum percent of swath falling within area of interest
  - Date range (contiguous or non-contiguous)

When using the data browser, a 'Help' button is available in the upper-righthand corner of each different type of browser page to provide help topics for all the functionalities on that page. Since this help feature details all of the minute functions of the browser, these details will not be discussed here.

After a search has been launched using the 'Find swaths' button or by clicking a location on the global map, the search results will be displayed on a new browser page. If only one swath was found, then that swath's files will be listed as hyperlinks for immediate download along with thumbnail browse images of the data.

If more than one swath matches the search criteria, the results page will display multiple matching swath filenames and thumbnails (10 per page by default). An individual swath can be selected by clicking on its filename link, or a swath can be added to a user's 'shopping cart' by clicking the asterisks link ("****"). At any time clicking the 'ORDER DATA' button will take the user to the Scene Order Form page.

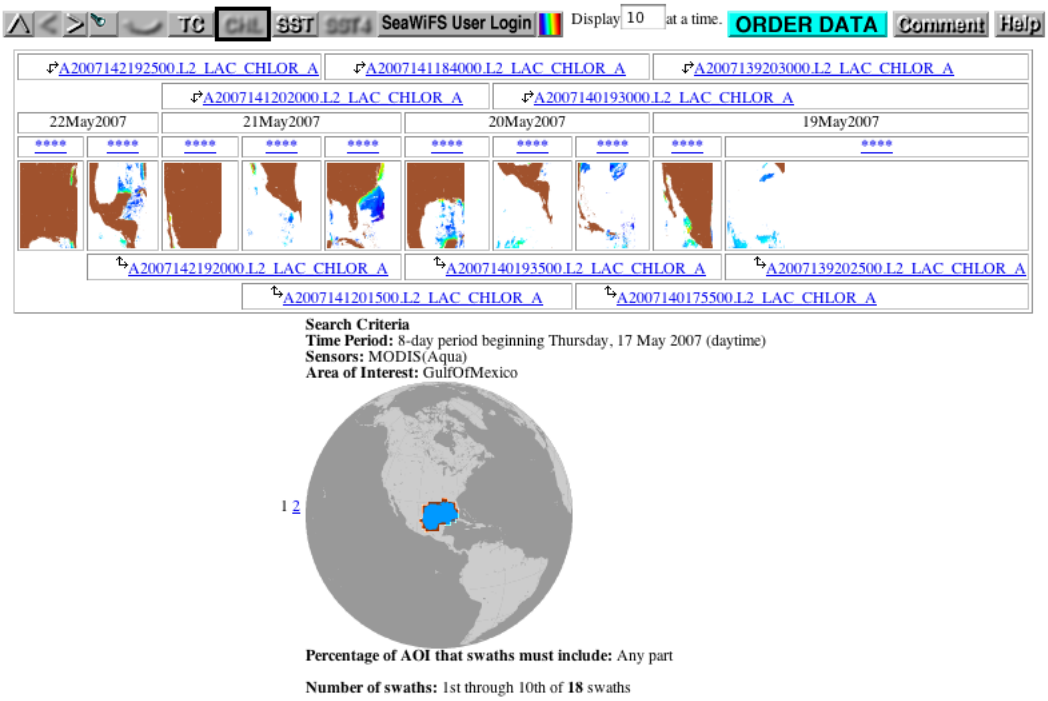

Figure 3.2: Level 1 and 2 Browser Search Results

On the Scene Order Form page the order can be viewed and the user must specify:

- An email address
- Whether or not to extract a specific region from the data files
- Data levels desired
- Level-2 Data products desired

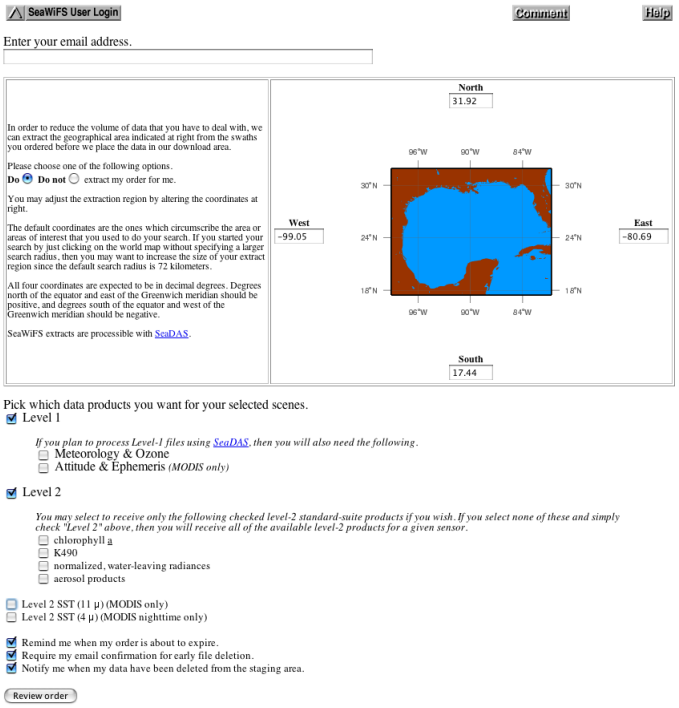

Figure 3.3: Level 1 and 2 Browser Order Form

Next, the 'Review order' button is clicked to continue to the Order Review page that will list all files to be staged. If the order looks correct, the user can then click the 'Submit Order' button to complete the Order.

Once an order is submitted the OBPG server will begin staging the requested files and send an email notification when the files are available for download. The entire ordering and staging process is completely automated so many orders will be available within minutes of submission.

3.1.3 The Level 3 Browser

The 'Level 3 Browser' link on the Ocean Color Web homepage accesses the interface for selecting and downloading the entire Level-3 global ocean color data set for many parameters and time periods. The Level-3 files in this browser have been converted from Level-3 Binned data files to Standard Mapped Images stored both as digital data in HDF formatted files and as PNG images. Both 4km and 9km data are available.

A variety of standard and evaluation products can be selected, and clicking on the timeline will set a start date for products to be displayed. Below the timeline is a table of thumbnail images depicting global projections of the selected product type during various time periods. Next to the thumbnails are hyperlinks to the 4km (4320x2160) and 9km (8640x4320) HDF and PNG files. Each column in the table is associated with time periods of a fixed length such as a year, a season, a month, or an eight-day 'weekly' period. Clicking on the

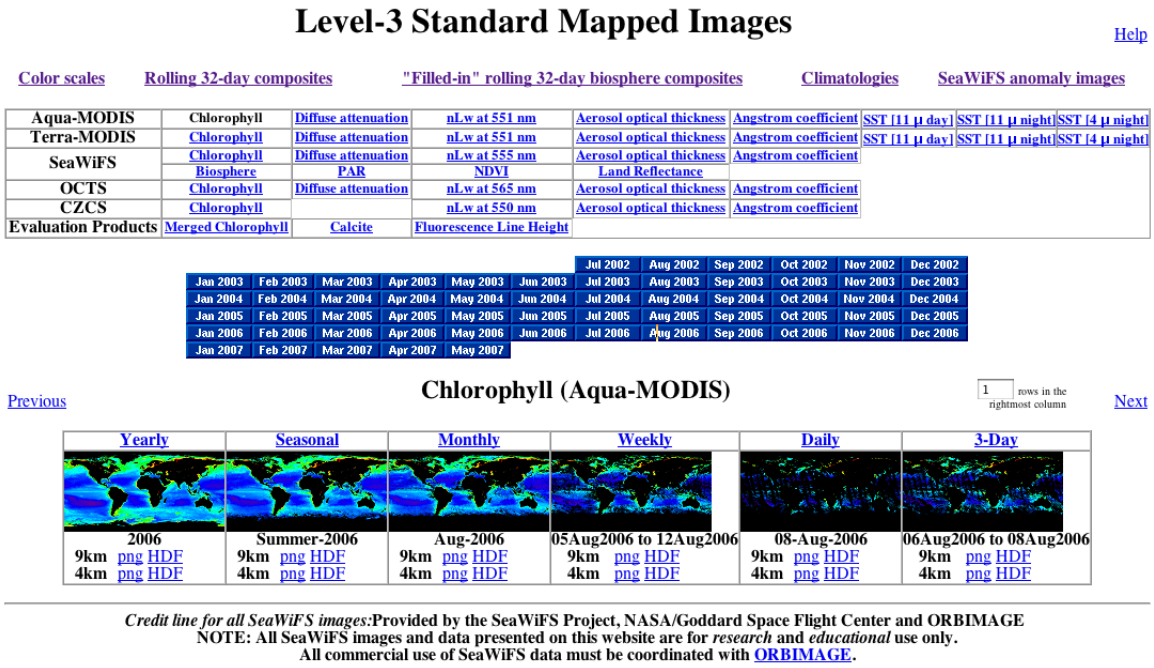

Figure 3.4: Level 3 Browser

heading of a column will toggle back and forth between displaying and not displaying the images in that column. The 'Help' link in the upper-righthand corner of the browser gives more detailed help instructions.

TIP The timeline is implemented as a client-side image map so as the pointer is moved along the timeline, changing dates can be viewed in the status line of a web browser.

3.1.4 Data by FTP

Along with web browser (html) access, the OBPG also hosts an anonymous ftp server, **oceans.gsfc.nasa.gov**. This ftp site contains the most popular data products including:

- A 60-day rolling archive of recent MODIS Aqua and Terra data (L0, L1, GEO, L2)
- The complete Level-3 Binned data archive for all sensors
- The complete Level-3 Standard Mapped Image archive for all sensors
- A merged Aqua/SeaWiFS 9km chlorophyll product
- Ancillary products (e.g. METOZ, OISST, ATTEPH, etc.)

3.2 Near Real-Time Data Access

As opposed to historical data access, the OBPG also offers services for data users interested in receiving NRT data from active missions. Currently, the primary NRT data source is from the MODIS Aqua and Terra sensors. Typical latency for MODIS data is 2-5 hours following satellite observation. **This minimal latency allows the OBPG servers to be used as a global MODIS virtual ground station.**

As mentioned, it is also possible to make a request for small amounts of NRT SeaWiFS recorded LAC data for cruise support.

3.2.1 Data Subscriptions for NRT Data

Data subscriptions can be used to automatically stage new Level-1 and Level-2 data products to user-specific ftp directories. Subscriptions are simple to create and consist of a defined region for which data are made available as they are processed. This option is intended for investigators who wish to receive all future data for a region. The subscription does not provide archived (historical) data to the user; for archived data the Level 1 and 2 Browser should be used. Data subscriptions can be created for limited geographic regions, allowing users to receive L1A, L1B, and L2 data extracts for their area(s) of interest within 2-5 hours of satellite observation. Once a subscription is set up along with automated downloads, this service can mimic an actual global ground station for each user.

Data types available through the subscription service are:

- Aqua Level-1 and Level-2
- Terra Level-1 and Level-2 (SST only)
- SeaWiFS Level-1 and Level-2
- Associated ancillary data (MET, OZONE, attitude and ephemeris files)

There is also an option to waiting until the refined processing has occurred (i.e. waiting until the data are processed with the optimal ancillary data), or receiving data in near real-time. Typically, refined processing occurs 3-5 days after the data are received. The status of an existing subscriptions can be checked via a web interface as well. If both refined and NRT data is desired, users can simply make two separate subscription requests. The same can be done to obtain both daytime and nighttime granules.

An end date can be entered for the subscription if your research interests are limited temporally (i.e. for the duration of a cruise). If no end date is specified, the subscription will continue for the life of the mission. Also, if a subscription has expired, it can be restarted again by simply entering an email address and clicking the 'Renew Subscription' button. This will retrieve a listing of all previous subscriptions made under the email address, and allowing selection of those to renew.

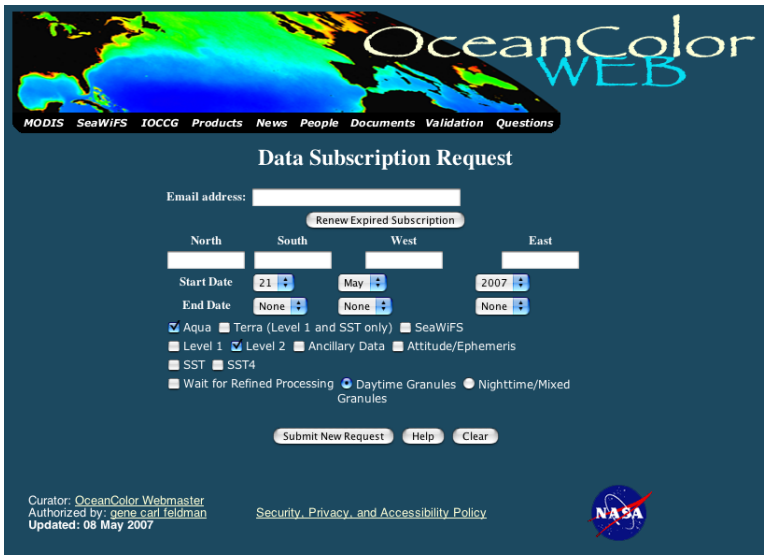

Figure 3.5: Data Subscription Form

3.2.2 NRT Extracts and Maps

The NRT map and extraction utility (see Figure 3.6) allows users to directly access the NRT image support system in order to create regions and requests for both maps (PNG and/or JPG formatted mapped products) and data extraction (HDF extracts).

The first step in the map and extraction process is to select a region. Users may either choose from a pre-defined list of regions, or define a new region. Pre-defined regions are fixed, and cannot be edited by users and user-defined regions are only usable/editable by the user who created them.

Once a region is selected, a request for maps and/or data extraction must be defined. At this stage, the user chooses maps (PNG and/or JPG formatted mapped images) and/or L1/2 HDF data extracts.

The following options may be defined for each map request:

- Image Width
- Add a coastline
- Add a graticule frame
- Add lat/lon gridlines
- Add a colorbar
- Add a label to the image containing the parent filename
- Threshold for minimum percent of valid pixels (ocean retrievals)
- Product selection

Users may opt to have JPEG/PNG images, and/or digital data (HDF) extracts of Level-1 and Level-2 files created. Images can be sent to the user via email or placed on the OBPG anonymous FTP site for download. All HDF data will be place on the anonymous FTP site for download.

NRT images from SeaWiFS are available only to authorized SeaWiFS data users who have received permission to receive real-time image support.

3.2.3 Data by FTP

As mentioned earlier in this chapter NRT data is available from the OBPG ftp server **oceans.gsfc.nasa.gov**.

3.3 Citing Data Products Obtained from the Ocean Color Web

Data products retrieved from the OBPG should be cited as follows:

Feldman, G. C., C. R. McClain, Ocean Color Web, <SENSOR> Reprocessing <reprocessing #>, NASA Goddard Space Flight Center. Eds. Kuring, N., Bailey, S. W. <Access DATE>. http://oceancolor.gsfc.nasa.gov/

- replace <reprocessing #> with the appropriate reprocessing version (e.g. 5)
- replace <Access DATE> with the date of access
- replace <SENSOR> with the appropriate sensor (e.g. SeaWiFS)

Figure 3.6: NRT Extracts and Mapping Form