# The New HDF-EOS Tools and Information Center Website

Carol Boquist, NASA Goddard Space Flight Center, Carol.L.Boquist@nasa.gov H. Joe Lee, The HDF Group, hyoklee@hdfgroup.org
MuQun Yang, The HDF Group, myang6@hdfgroup.org
Brian Krupp, NASA Goddard Space Flight Center, Brian.M.Krupp@nasa.gov
Mike Folk, The HDF Group, mfolk@hdfgroup.org

The Hierarchical Data Format for the Earth Observing System (HDF-EOS) Tools and Information Center website was totally revamped over the past year. The site is comprised of a *Home Page*, *Examples*, *Software*, *Workshops*, *User Forum*, *References*, and a *Help Page*.

In addition to an introduction to HDF-EOS data, the *Home Page*—see **Figure 1**—includes a new feature called "Success Stories." The stories, excerpted from NASA websites, highlight recent research using data archived in an HDF format.

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#### HDF-EOS TOOLS AND INFORMATION CENTER

#### Join the HDF-EOS Forum to get help from the HDF-EOS community!

HDF is the prescribed format for standard data products that are derived from EOS missions. HDF-EOS (Hierarchical Data Format - Earth Observing System) is a self-describing file format for transfer of various types of data between different machines based upon HDF. HDF-EOS is a standard format to store data collected from EOS satellites: Terra, Aqua and Aura. Two versions of HDF-EOS libraries: HDF-EOS2 based on HDF4 and HDF-EOS5 based on HDF5 are developed.

This site is dedicated to information about HDF-EOS and about tools available to view or work with HDF-EOS and other NASA HDF files. Programming(C, Fortran, IDL® and MATLAB®) and tool examples to access HDF-EOS and other NASA HDF files are also available. It also hosts an archive of presentations made at an annual HDF/HDF-EOS workshop.

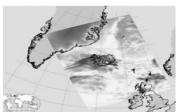
The EOS program's remote sensing technology and data products are unique NASA contributions to the scientific study of the Earth. EOS missions include those listed in the following charts (click on chart to see details):

Earth Science Mission Profile 1997-2015

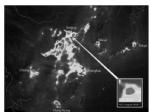
For more information about NASA's role in Earth science, see the EOS Project Science Office

For more information about HDF, see The HDF Group website.

#### **SUCCESS STORIES**



HDF-EOS Data Capture Ash Cloud from Icelandic Volcano



HDF-EOS Data Reveal Impact of Olympic

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Figure 1. The *Home Page* for the redesigned HDF-EOS site

### **NEWS**

- Call for Abstracts: the HDF/HDF-EOS
   Workshop XIV
- 2010 The HDF Group Spring Visit Briefing slides are available.
- HDF-EOS Plug-in for HDFView2.6 has been released.
- IDL and NCL examples for NASA AURA MLS swath data are available.
- 2010 The HDF Group Spring Visit Briefing PDF file is available.
- HDF-EOS to GeoTIFF Conversion Tool (HEG) version 2.10 is released.
- Programming and tool examples to access NASA HDF and HDF-EOS data are available.
- More software packages to access NASA HDF and HDF-EOS data are available.
- HDF/HDF-EOS Workshop XIII presentations are available.
- SCF Toolkit 5.2.16 & associated software have been released.

## feature articles - EOS Tools and Information Center SOFTWARE WORKSHOPS FORUM HELP Search HOME **EXAMPLES EXAMPLES** Several examples are provided to access HDF-EOS files via HDF-EOS libraries and tools. Library Main page about this section: Library Examples We provide examples on how to access HDF-EOS Grid and Swath files using programming languages such as C, Fortran, IDL and MatLab C. Special examples such as retrieving geo-location information from an HDF-EOS Grid file are also provided. A few general examples to access HDF-EOS Grid and Swath objects are listed below. • Access HDF-EOS Grid data in C and Fortran (HDF-EOS2 C, HDF-EOS5 C, HDF-EOS2 Fortran, HDF-EOS5 Fortran) . Access HDF-EOS Swath data in C and Fortran (HDF-EOS2 C, HDF-EOS5 C, HDF-EOS2 Fortran, HDF-EOS5 Fortran) · Access and Visualize HDF-EOS2 Grid and Swath data in IDL · Access and Visualize HDF-EOS2 Grid data in IDL via OPeNDAP · Access and Visualize HDF-EOS2 Grid and Swath data in Matlab Main page about this section: Tool Examples Examples are also provided on how to use some widely used tools to access HDF-EOS files. Current examples include HEG, IDV via OPeNDAP and GrADS via OPeNDAP

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Figure 2. The new Examples section of the revamped HDF-EOS website

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The HDF and HDF-EOS file formats are flexible; they were designed to accommodate differences required by NASA EOS data products.

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A major addition to the website is the *Examples* page, which is divided into "Library" and "Tool" sections—see **Figure 2**. Examples include accessing HDF-EOS Grid and Swath files using programming languages such as C, Fortran, NCL, GrADS, IDL®, and Matlab®, and retrieving geo-location information from an HDF-EOS Grid file—see **Figure 3**. There are also NCL, IDL®, and Matlab® example codes and corresponding plots available for many NASA EOS data products including the Atmospheric Infrared Sounder (AIRS), the Moderate Resolution Imaging Spectroradiometer (MODIS), the Multiangle Imaging Spectroradiometer (MISR), the Advanced Microwave Scanning Radiometer (AMSR), Clouds and the Earth's Radiant Energy System (CERES), the Tropical Rainfall Measuring Mission (TRMM), the Sea-viewing Wide Field-of-view Sensor (SeaWIFS), the Quick Scatterometer (QuikScat), etc. (These example codes were needed because not all HDF and HDF-EOS data products can be accessed with a single method.) The HDF and HDF-EOS file formats are flexible; they were designed to accommodate differences required by NASA EOS data products.

The *Software* section also is divided into "Library" and "Tool" sections. HDF staff evaluated 35 tools and libraries, added 11 widely used tools and libraries, and provided detailed descriptions for all of them. The library section not only includes references to HDF-EOS libraries but also includes widely-used third-party packages such as the Python interface (PyHDF) and the Geospatial Data Abstraction Library (GDAL). Tools include widely used visualization and analysis tools, dumper utilities, and converters. The detailed descriptions include instructions on how to use these packages to access HDF/HDF-EOS data. Installation and limitation information are also included.

Although the HDF-EOS Tools and Information Center website provides comprehensive information regarding accessing and processing HDF/HDF-EOS data, it cannot include information on everything that users may encounter in this unique and increasingly diverse information technology environment. The HDF-EOS *User Forum* was added to provide a communication channel for HDF-EOS users. The forum includes a wealth of information including an archive of all the contents from its predecessor. Although the HDF-EOS forum does not require registration for searching the forum contents, a simple registration step is required for posting messages. Tutorials are available for both the forum registration and subscription processes. Forum members include HDF/HDF-EOS software developers, data distributors, and Earth scientists.

The goal of the newly revamped website is to provide comprehensive and up-to-date information on HDF-EOS data as well as to promote the use of valuable NASA Earth Science data for scientific research, applications, and education. The HDF group will continue improving the new website to increase its utility.

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Displaying the world map with the geoshow function also requires the longitude range starting from -180 degree and ending at 180 degree. So the longitude needs to be translated from '2.5 degree to 357.5 degree to '-177.5 degree to 177.5 degree'. The latitude also needs to be translated from "north to south" (decreasing of the latitude) to "south to north" (increasing of the latitude) with the geoshow function. Accordingly, the latitude needs to be translated from '67.5 degree to -67.5 degree to '-67.5 degree'.

Also the lower left corner in Matlab is treated as the origin of the coordinate. However, as we can see from the information obtained by gridinfo, the origin is defined as the upper left corner in the file. Hence, we need to flip rrland before passing it to the contour function. The code section is listed below.

Figure 8 Adjusting the data and geo-location information

```
ts = transpose(rrland);
halfx= floor(xdimsize/2);
ts_reverse = [ts(:, (halfx+1):xdimsize) ts(:, 1:halfx)];
data = flipud(ts_reverse);

lon_offset = -180;
lon_value = lon_offset + lon_value;
lat_value = fliplr(lat_value);
```

Finally, one can use the contour function to draw a plot using data, lon and lat calculated above. Since Many options are provided for using the contour function, users may need to refer to MATLAB's detailed document for more information about this function.

Figure 9 Visualizing a data field

```
contour(lon, lat, data)
geoshow('landareas.shp', 'FaceColor', [0.4 0.4 0.4])
```

You can see the complete code from here. Figure 10 shows the result.

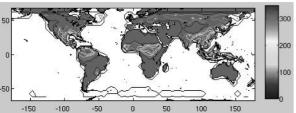


Figure 10 Contour plot for a data field, RrLandRain

**Figure 3.** The *Examples* section features *example* codes and corresponding plots from a number of different software packages to help with processing various kinds of EOS data. The example shown here is from Matlab\*.