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## 1. INTRODUCTION

MODIS derived atmospheric and ocean products, raw sensor counts, calibrated radiances, and geolocated products are archived at NASA Goddard Earth Sciences Distributed Active Archive Center (GES DAAC). These data are made available to the public and the science community. The unique position of the GES DAAC as an intermediary between users and MODIS data led us to explore and develop tools that could help users access and manipulate data.

This presentation will describe methods and tools implemented or planned for the Goddard DAAC that are intended to optimize access to MODIS data for the Earth Science community.

## 2. GES DAAC TOOLS

To provide an easy access to MODIS data, the MODIS Data Support Team (MDST) at GES DAAC has developed many software and tools. Some tools are DAAC unique extensions like web-based search and order tools, on demand subsetting, data manipulation and reprojection, visualization programs. Other data access and simple visualization tools such as **select\_vNds**, **modis\_atmos**, **geoview**, and **simap** were developed as MDST work aids. Although these were developed as internal tools, they are made available to the general public. If tools developed outside the GES DAAC are found useful for data analysis, they are also identified to the user community. A list of the suggested tools is available at [http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/MODIS/software.shtml](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/MODIS/software.shtml)

The key features of some of the tools available from GES DAAC are described below:

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**Terra WHOM:** The Terra Web based Hierarchical Ordering Mechanism (WHOM) is a customized version of the larger DAAC web-based data gateway (Sikder et al. 2001). Terra WHOM offers enhanced graphic interfaces to identify temporal and spatial data coverage while searching and ordering MODIS data archived at the GES DAAC. Terra WHOM allows users to navigate through all the available MODIS data and submit orders with minimal effort. Visual inspection of the spatial data distribution for the selected region, a calendar page showing dates with available data, single point and click navigational protocols, and recursive web page generation using templates make this tool unique and attempt to address the needs of the science community (<http://daac.gsfc.nasa.gov/data/dataset/MODIS>)

**Subsetting Tools:** Calibrated radiance (Level 1B) channel subsetting is being developed as a DAAC unique extension to the EOS Core System (ECS). The front end, a graphic user interface, is added features of the Terra WHOM system. The back end is driven by the new Simple Scalable Script-Based Science Processor (S4P) that interacts with ECS for data retrieval, archiving and distribution of the subsetting data. All three resolutions of MODIS Level 1B data are available for channel subsetting.

**Visualization Tools:** The GES DAAC MDST has developed two very simple IDL-based tools dedicated to mapping MODIS swath products. The first, **geoview**, has a simple, graphic interface, while the second, **simap**, is a command line utility. While the two tools are almost identical, **simap** has the added feature of stitching multiple granules into a single map (Savtchenko, 2001).

**Browse MODIS L1B:** The purpose of browse images is to allow science data users to evaluate the Level 1B data before ordering. Browse images are produced from the 1 km Calibrated Radiances product using channels 1, 4, 3 as true color during the day, and channel 32 as false color during the night. The C code program is implemented as a part of the EOS Data Gateway (EDG) and is also freely

available to the user community (Ouzounov et al. 2000)

**Modis\_atmos:** This is an IDL based program designed to read MODIS level –2 and 3 atmospheric products. However it can also be used to read other HDF-EOS files such as MODIS Level 1B radiances, subsets, and ocean products. It also provides quick look browse images, parameter subsetting, and creates binary and ASCII files.

**HDFLook\_MODIS :** HDFLook-MODIS is a result of joint collaboration between University of Lille, France, and GES DAAC and is based on the very popular MSPHINX([http://www-loa.univ-lille1.fr/Computer\\_group.html](http://www-loa.univ-lille1.fr/Computer_group.html)) tool philosophy. Created as a flexible modular tool, it is easy to update, add new features, and is free to users obtaining it from the GES DAAC. HDFLook-MODIS helps MODIS Data Support Team significantly to visualize, validate and analyze MODIS data, and also is to be used for batch-mode local processing. Main features of HDFLook-MODIS are:

- 1) Accessing and visualization of all swath (level-1, and 2) and gridded (level-3 and 4) MODIS radiometric and geolocation, atmosphere, land, and ocean products;
- 2) Re-mapping of swath data to world map. Geo-projection conversion. Reprojection the initial projection into several pre defined selection;
- 3) Interactive and batch mode capabilities;
- 4) Subsetting features - availability of parameter, band, and spatial subsetting;
- 5) Multi-granule processing - Mosaic and stitch capabilities;
- 6) Displays ancillary/data attributes;
- 7) Data conversion- from scaled quantities to physical units. Format conversion- HDF-EOS to ASCII, Binary, JPEG, GIS (Geo Tiff shape files);
- 8) Aerosol and other ancillary data available from the ground based sun photometer measurements (AERONET data bank) for the atmospheric correction and validation of some atmospheric products.

HDFLook-MODIS is developed for XWindows computer environment and has been tested on SGI and Linux systems. Latest update and information about the product is available on [http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/MODIS/software.shtml](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/MODIS/software.shtml)

### 3. ACKNOWLEDGMENTS

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### 4. REFERENCES

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