MODIS Data at NSIDC

Douglas Fowler, NSIDC MODIS Lead
MODIS Science Team Meeting
Columbia, MD
29-30 April, 2014
Outline

- NSIDC overview
- Data System Status and Plans
- MODIS Distribution Metrics
- MODIS Related Products
- Data Access & Discovery
- User Support
The National Snow and Ice Data Center…

Manages and distributes scientific data

Provides tools for data access

Researches the cryosphere and data science

Supports local and traditional knowledge

Supports data users

Educates the public about the cryosphere
Institutional Relationships

- Part of the University of Colorado
- Within the CU Cooperative Institute for Research in Environmental Sciences (CIRES) Cryospheric and Polar Processes Division
- Chartered by NOAA’s National Environmental Satellite, Data, and Information Service. Affiliated with the NOAA National Geophysical Data Center (NGDC)
- Funded by NASA, NOAA, NSF, and others at the program level
- Member of the International Council for Science (ICSU) World Data System
NSIDC’s MODIS support provided by the NASA-supplied ECS data system

**NSIDC DAAC ECS activities**

- Software Release 8.2 into Operations in Oct 2013
  - Transition from Sybase to Postgres database
  - DAAC Data Pool/HEG replaced by Data Access
- ECHO/Reverb upgrades
  - Data Access, above, is a service offered through Reverb
  - Order flow modified for ease of use

**NSIDC Search Tool**

- Improved search design using better ranking algorithms
- Simpler workflow for accessing data
- Current efforts focused on providing users with ways to
  - Filter, compare, and identify data sets
  - Faceted browse and data comparison
MODIS Distribution
MODIS Distribution Ranked by Country - 2013

- China: 37%
- United States: 34%
- Germany: 10%
- Canada: 5%
- United Kingdom: 4%
- Japan: 3%
- Belgium: 2%
- Korea, Republic of: 2%
- Chile: 2%
- France: 1%

[Map showing distribution]
<table>
<thead>
<tr>
<th></th>
<th>Terra</th>
<th></th>
<th>Aqua</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distributed</td>
<td>Archived</td>
<td>% Distributed</td>
<td>Distributed</td>
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<tr>
<td>MOD10CM</td>
<td>13,340</td>
<td>165</td>
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<td>MYD10CM</td>
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<tr>
<td>MOD10C2</td>
<td>20,326</td>
<td>647</td>
<td>3142%</td>
<td>MYD10C1</td>
</tr>
<tr>
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<td>5,109</td>
<td>2715%</td>
<td>MYD10C2</td>
</tr>
<tr>
<td>MOD10A2</td>
<td>1,322,390</td>
<td>197,577</td>
<td>669%</td>
<td>MYD10A2</td>
</tr>
<tr>
<td>MOD29E1D</td>
<td>20,033</td>
<td>5,105</td>
<td>392%</td>
<td>MYD29E1D</td>
</tr>
<tr>
<td>MOD10A1</td>
<td>5,466,021</td>
<td>1,554,728</td>
<td>352%</td>
<td>MYD10A1</td>
</tr>
<tr>
<td>MOD29P1D</td>
<td>1,684,746</td>
<td>1,034,485</td>
<td>163%</td>
<td>MYD29</td>
</tr>
<tr>
<td>MOD29</td>
<td>431,120</td>
<td>890,900</td>
<td>48%</td>
<td>MYD10_L2</td>
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<tr>
<td>MOD10_L2</td>
<td>351,955</td>
<td>805,829</td>
<td>44%</td>
<td>MYD29P1D</td>
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<tr>
<td>MOD29P1N</td>
<td>147,878</td>
<td>1,032,905</td>
<td>14%</td>
<td>MYD29P1N</td>
</tr>
</tbody>
</table>
Distinct Users by Product - 2014

Distinct Users
Terra 2782
Aqua 1467

M*D10_L2  M*D10A1  M*D10A2  M*D10C1  M*D10C2  M*D10CM  M*D29  M*D29E1D  M*D29P1D  M*D29P1N

Terra
Aqua
## Other MODIS-Based Products

<table>
<thead>
<tr>
<th>ID</th>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSIDC-0280</td>
<td>Haran, Bohlander, Scambos, Painter, Fahnestock</td>
<td>MODIS Mosaic of the Antarctic (MOA) Image Map</td>
</tr>
<tr>
<td>NSIDC-0321</td>
<td>Brodzik, Armstrong, Savoie</td>
<td>Global EASE-Grid 8-day Blended SSM/I and MODIS Snow Cover</td>
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<tr>
<td>NSIDC-0447</td>
<td>Brown, Brasnett</td>
<td>Canadian Meteorological Centre (CMC) Daily Snow Depth Analysis Data</td>
</tr>
<tr>
<td>NSIDC-0497</td>
<td>Hulbe, LeDoux</td>
<td>MOA-derived Structural Feature Map of the Ronne Ice Shelf</td>
</tr>
<tr>
<td>NSIDC-0547 (in-work)</td>
<td>Haran, Bohlander, Scambos, Painter, Fahnestock</td>
<td>MODIS Mosaic of Greenland (MOG) Image Map</td>
</tr>
</tbody>
</table>
Data Discovery & Access

Data Pool GUI (web-access) Retired
- HDF-EOS to GeoTIFF (HEG) data services now accessible in Reverb
- Data Pool FTP site remains for direct data access

REVERB  reverb.echo.nasa.gov
- FTP download
- Data services
  - Spatial & Parameter Subsetting, Reformatting to GeoTIFF, Projection Conversion

MODIS Interactive Subsetting Toolkit (MIST)
- MOD09A1, MOD10A1, MOD11A2, MCD43A1 subsets over GC-NET and IASOA stations
- On-line interactive graphics and analysis support
- Hope to increase available products and subsettable regions
**Data Discovery & Access**

NSIDC Search – Live, but still evolving

- User feedback: Challenging to find and select data which best meets needs
- Current
  - Improved search algorithms
  - Faceted browse
- Plans
  - Side-by-side data set comparison
Satellite Observation of Arctic Changes (SOAC)
To publicize NASA satellite data and research on Arctic change, in the form of maps that illustrate the changes taking place in the Arctic over time.
Discovery & Access: Worldview Imagery

Provides interactive browse and download of full-resolution imagery and access to the source data.

https://earthdata.nasa.gov/labs/worldview/
**User Support**

**User Services Knowledge Base** [support.nsidc.org/forums](http://support.nsidc.org/forums)

- Accessible by users
  - Dynamic FAQs
  - User can view tutorials for tools and data access
  - Submit questions to User Services

**The Drift** [nsidc.org/the-drift/](http://nsidc.org/the-drift/)

- Consolidated online data announcements, data highlights, tools, and tips into a blog-style Web site
- Replaces NSIDC Notes
In Closing

• Both NSIDC and the DAAC have expanded the types of science being done and what we’re supporting
  ▪ working to make data more available
  ▪ Tools to assist researchers/users

• MODIS distribution and number of users is high

• Collection 6
  ▪ Archive testing
  ▪ Distribution
  ▪ Documentation, in work
## Metrics - Distinct MODIS Users - 2008

### Terra Unique Users

- MOD29E1: D, 41
- MOD29: 40
- MOD10C: M, 65
- MOD10C2: 79
- MOD10C1: 85
- MOD10_L2: 2, 82
- MOD10A1: 290
- MOD10A2: 250

### Aqua Unique Users (2008)

- MYD29E1: D, 41
- MYD29: 39
- MYD10CM: 32
- MYD10C2: 25
- MYD10C1: 47
- MYD10_A2: 70
- MYD10A1: 78
- MYD10_L2: 42
- MYD10A1: 78

### Unique Users by Product

<table>
<thead>
<tr>
<th>Product</th>
<th>Terra</th>
<th>Aqua</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOD10_L2</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>MYD10_L2</td>
<td>42</td>
<td></td>
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<tr>
<td>MOD10A1</td>
<td>290</td>
<td></td>
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<tr>
<td>MYD10A1</td>
<td>78</td>
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</tr>
<tr>
<td>MOD10A2</td>
<td>250</td>
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<tr>
<td>MYD10A2</td>
<td>70</td>
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<tr>
<td>MOD10A2</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>MYD10A2</td>
<td>70</td>
<td></td>
</tr>
</tbody>
</table>

### User Counts

- Terra: 1437 unique MODIS users
- Aqua: 50 unique MODIS users

### Graphs

- Pie charts for Terra and Aqua unique users
- Bar graph showing unique users by product
Metrics - Distinct MODIS Users - 2009

1597 unique MODIS users

Unique Users by Product

Terra Unique Users (2009)
- MOD29P1D, 60
- MOD29E1D, 19
- MOD10CMN, 84
- MOD10C2, 96
- MOD10C1, 123
- MOD10A2, 261

Aqua Unique Users 2009
- MYD29P1D, 48
- MYD29E1D, 25
- MYD29, 53
- MYD10CMN, 25
- MYD10C2, 22
- MYD10C1, 53
- MYD10A2, 61
- MYD10A1, 121
MODIS-related Interfaces and Services

- Map-server interface to the Mosaic of Antarctica
- Atlas of the Cryosphere
  - WMS, WFS, and WCS access to underlying MOA and Blue Marble data
- WMS, WCS services for MOD10C1 re-projected to a polar projection on-the-fly, northern hemisphere
Distinct Users by Product – Terra - 2014

MODIS Status at NSIDC - D. Fowler
MODIS Science Team Meeting, April, 2014
Our Mission

To make fundamental contributions to cryospheric science and excel in managing and preserving data and disseminating information in order to advance understanding of the Earth system.

Data Management and Distribution

Outreach

International

Data Activities