MODIS Data at NSIDC

MODIS Collection 5/Long Term Data Record Workshop

Molly McAllister & Terry Haran
January 17-18 2007
NSIDC Overview:
Institutional Relationships

- University of Colorado (CU)

- Within 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

- Part of the World Data Center system
Major Contributors

NASA Distributed Active Archive Center

NOAA at NSIDC and WDC for Glaciology, Boulder

NSF Arctic System Science Data Coordination Center

NSF U.S. Antarctic Data Coordination Center and Antarctic Glaciological Data Center

IARC Frozen Ground Data Center
Our Mission

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

Data Management and Distribution

Outreach

International Data Activities

Research
## MODIS Snow & Sea Ice Products

<table>
<thead>
<tr>
<th>Short Name</th>
<th>Snow Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>MYD10L2</td>
<td>MODIS/Aqua Snow Cover 5-Min L2 Swath 500m</td>
</tr>
<tr>
<td>MOD10L2</td>
<td>MODIS/Terra Snow Cover 5-Min L2 Swath 500m</td>
</tr>
<tr>
<td>MYD10A1</td>
<td>MODIS/Aqua Snow Cover Daily L3 Global 500m Grid</td>
</tr>
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<td>MOD10A1</td>
<td>MODIS/Terra Snow Cover Daily L3 Global 500m Grid</td>
</tr>
<tr>
<td>MYD10A2</td>
<td>MODIS/Aqua Snow Cover 8-Day L3 Global 500m Grid</td>
</tr>
<tr>
<td>MOD10A2</td>
<td>MODIS/Terra Snow Cover 8-Day L3 Global 500m Grid</td>
</tr>
<tr>
<td>MYD10C1</td>
<td>MODIS/Aqua Snow Cover Daily L3 Global 0.05Deg CMG</td>
</tr>
<tr>
<td>MOD10C1</td>
<td>MODIS/Terra Snow Cover Daily L3 Global 0.05Deg CMG</td>
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<tr>
<td>MOD10C2</td>
<td>MODIS/Terra Snow Cover 8-Day L3 Global 0.05Deg CMG</td>
</tr>
<tr>
<td>MY10CM</td>
<td>MODIS/Terra Snow Cover Monthly L3 Global 0.05Deg CMG</td>
</tr>
<tr>
<td>MOD10CM</td>
<td>MODIS/Aqua Snow Cover Monthly L3 Global 0.05Deg CMG</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Short Name</th>
<th>Sea Ice Products</th>
</tr>
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<tbody>
<tr>
<td>MYD29</td>
<td>MODIS/Aqua Sea Ice Extent 5-Min L2 Swath 1km</td>
</tr>
<tr>
<td>MOD29</td>
<td>MODIS/Terra Sea Ice Extent 5-Min L2 Swath 1km</td>
</tr>
<tr>
<td>MYD29P1D</td>
<td>MODIS/Aqua Sea Ice Extent Daily L3 Global 1km EASE-Grid Day</td>
</tr>
<tr>
<td>MOD29P1D</td>
<td>MODIS/Terra Sea Ice Extent Daily L3 Global 1km EASE-Grid Day</td>
</tr>
<tr>
<td>MYD29P1N</td>
<td>MODIS/Aqua Sea Ice Extent Daily L3 Global 1km EASE-Grid Night</td>
</tr>
<tr>
<td>MOD29P1N</td>
<td>MODIS/Terra Sea Ice Extent Daily L3 Global 1km EASE-Grid Night</td>
</tr>
<tr>
<td>MYD29E1D</td>
<td>MODIS/Aqua Sea Ice Extent and IST Daily L3 Global 4km EASE-Grid Day</td>
</tr>
<tr>
<td>MOD29E1D</td>
<td>MODIS/Terra Sea Ice Extent and IST Daily L3 Global 4km EASE-Grid Day</td>
</tr>
</tbody>
</table>

New Product

MODIS Data at NSIDC - M. McAllister & T. Haran
Presented at the MODIS C5/LTDR Workshop, Jan. 17-18, 2007
Existing Access Methods

- Data Pool
- Subscription
- SNOWI
- MODIS-SNOWI
- EDG (EOS Data Gateway)

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Ordering MODIS Products from NSIDC

On Tuesdays from 9:00 A.M. to 11:00 A.M. (USA Mountain Time), AMSR-E, ICESat/GLAS, MODIS, and NISE data are normally unavailable for ordering due to system maintenance.

MODIS snow and sea ice products are available from four sources: Data Pool, SNOWI, MODIS-SNOWI, and the EOS Data Gateway. The highest version number represents the best quality data available.

<table>
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<th>Access Method</th>
<th>Description</th>
</tr>
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<tr>
<td>Data Pool</td>
<td>Quick access to a limited number of data granules. The most recent 30 days of data are available for most products. The complete timeseries is available for MOD10A1 Version 4.</td>
</tr>
<tr>
<td>Subscription</td>
<td>Subscribe to have new data automatically sent via FTP to your local server, or staged on NSIDC’s FTP site when they become available.</td>
</tr>
<tr>
<td>SNOWI</td>
<td>Search and order all MODIS/Terra and MODIS/Aqua products.</td>
</tr>
<tr>
<td>MODIS-SNOWI</td>
<td>Search and order Level-3 gridded MODIS data by specific tiles.</td>
</tr>
<tr>
<td>EOS Data Gateway</td>
<td>Access the entire archive of MODIS/Terra and MODIS/Aqua products.</td>
</tr>
<tr>
<td>Web Tutorial</td>
<td>No specific information provided.</td>
</tr>
</tbody>
</table>
Existing Access Methods contd.

• Data Pool
  - Short-term data cache providing FTP access to DAAC products
    - Quick access to a limited number of data granules
  - MODIS data availability:
    - All Collection 5 MODIS snow and sea ice products will be available on-line (as soon as they are released)
    - Complete timeseries of MOD10A1 V004 and MOD10C1 V004

- Type of access:
  - Web drilldown interface ([http://n0dps01u.ecs.nasa.gov:22000/OPS/home](http://n0dps01u.ecs.nasa.gov:22000/OPS/home))
    - HDF-EOS-to-GeoTiff conversion available for most products (regridding, reformatting, subsetting capabilities)
  - Direct ftp access ([ftp://n0dps01u.ecs.nasa.gov/SAN](ftp://n0dps01u.ecs.nasa.gov/SAN))
  - Metadata and most browse data viewable directly in your browser
  - Content can be tailored to meet specific needs.
    - Contact nsidc@nsidc.org to request specific data be inserted in the Data Pool.

Note: Contents of the Data Pool will not match the contents of the (EOS) Data Gateway (EDG)
• Subscriptions
  
  MODIS data availability:
  o All MODIS L2/3 snow and sea ice products

  Type of access:
  o have new data automatically sent via FTP to your local server, or staged on NSIDC's FTP site when data matching your criteria become available (http://nsidc.org/daac/subscriptions.html)
Existing Access Methods contd.

• MODIS-SNOWI
  ▪ MODIS data availability:
    o MODIS L3 tiled/gridded snow and sea ice products only
  ▪ Type of access:
    o Same as SNOWI but allows specification of tiles (http://nsidc.org/data/modis_snowi/search.html)
Existing Access Methods contd.

- EOS Data Gateway (EDG)
  - MODIS data availability:
    - Entire archive of MODIS L2/3 snow and sea ice products
  - Type of access:
    - Allows subsetting by spatial region and/or parameter
    - Allows searching by Tile
Resources for Selecting Data:

- Climate Modeling Grid (CMG) Browse Images
  - The MODIS Climate Modeling Grid (CMG) Browse page provides quick access to reduced-resolution JPEG images of Terra and Aqua daily global snow cover in a CMG.
  - The smaller file size of these images allows users to browse data and identify regions of interest.
  - The images are organized by date, making it easy to find data for a particular day or time series. New images are added daily; images from previous dates will be added over time.
Resources for selecting Data:
MODIS Land Global Browse Images
Terra, MOD10, day 2007008 (01/8/2007), Collection 005

http://landweb.nascom.nasa.gov/cgi-bin/browse/browse.cgi
Tile Searching: Snow Products

MODIS Sinusoidal Grid

• Tiles are 10 degrees by 10 degrees at the equator.
• The tile coordinate system starts at (0,0) in the upper left corner and proceeds right (horizontal) and downward (vertical).
• The tile in the bottom right corner is (35,17).

MODLAND Tile Calculator:
http://landweb.nascom.nasa.gov/cgi-bin/developer/tilemap.cgi
Existing Access Methods contd.

• Search ‘N Order Web Interface (SNOWI)
  ▪ MODIS data availability:
    o All MODIS L2/3 snow and sea ice products
  ▪ Type of access:
    o A “one-screen” version of the EDG
      (http://nsidc.org/data/snowi/index.html)
    o Can automatically order everything returned in a search
Tile Searching: Sea Ice Products

- Lambert Azimuthal Equal Area map projection centered on each pole.  
  - Compatible with NSIDC EASE-Grid.
- Tiles are 951 pixels by 951 pixels.
- Half of the tiles (313) are in the north polar grid; the other half are in the south polar grid.
- The north polar grid tile coordinate system starts at (0,0) (horizontal tile number, vertical tile number) The tile in the bottom right corner is (18,18).
- The south polar grid tile coordinate system starts at (0,20) and the tile in the bottom right corner is (18,38).
Tile Searching: Using EDG
MODIS Tools

MODIS Swath-to-Grid Toolbox (MS2GT):

- Developed at NSIDC
- Resample MODIS HDF-EOS swath data (MOD02*, MOD10_L2, and MOD29) into flat binary gridded files
- Supports a variety of map projections
- Can “stitch” multiple input files
- Unix/Linux only (no Windows)
- Best for MOD02* (destriping ice sheets)
MODIS Tools contd.

- MODIS Reprojection Tool (MRT):
  - Developed by LP-DACC
  - Resample MODIS grid data (MOD10A1, MOD29P1D) into flat binary, HDF-EOS, or GeoTIFF gridded files
  - Supports a variety of map projections
  - Can “stitch” multiple input files (sinusoidal grids only, e.g. MOD10A1 not MOD29P1D)
  - Unix/Linux and Windows (via Cygwin)
  - Best for MOD10A1 and MOD10A2
• MODIS Swath Reprojection Tool (MRT-Swath):
  - Developed by LP-DACC
  - Resample MODIS swath data (MOD02, MOD10_L2, MOD29) into flat binary, HDF-EOS, or GeoTIFF gridded files
  - Supports a variety of map projections
  - No stitching capability
  - Unix/Linux and Windows (via Cygwin)
MODIS Tools contd.

- HDF-EOS to GeoTIFF Conversion Tool (HEG):
  - Developed by HDF-EOS team
  - Resample many kinds of HDF-EOS swath and grid data (MODIS, ASTER, MISR, AIRS, AMSR-E) into flat binary, HDF-EOS, or GeoTIFF gridded files
  - Supports a variety of map projections
  - Can “stitch” multiple input files
  - Unix/Linux and Windows
  - Best for MOD10_L2 and MOD29
Questions?

- Contact NSIDC User Services
  nsidc@nsidc.org