MODIS Land
Data Formats and Access

MODIS Science Team Meeting
(Land Discipline Breakout Session)

July 13, 2004

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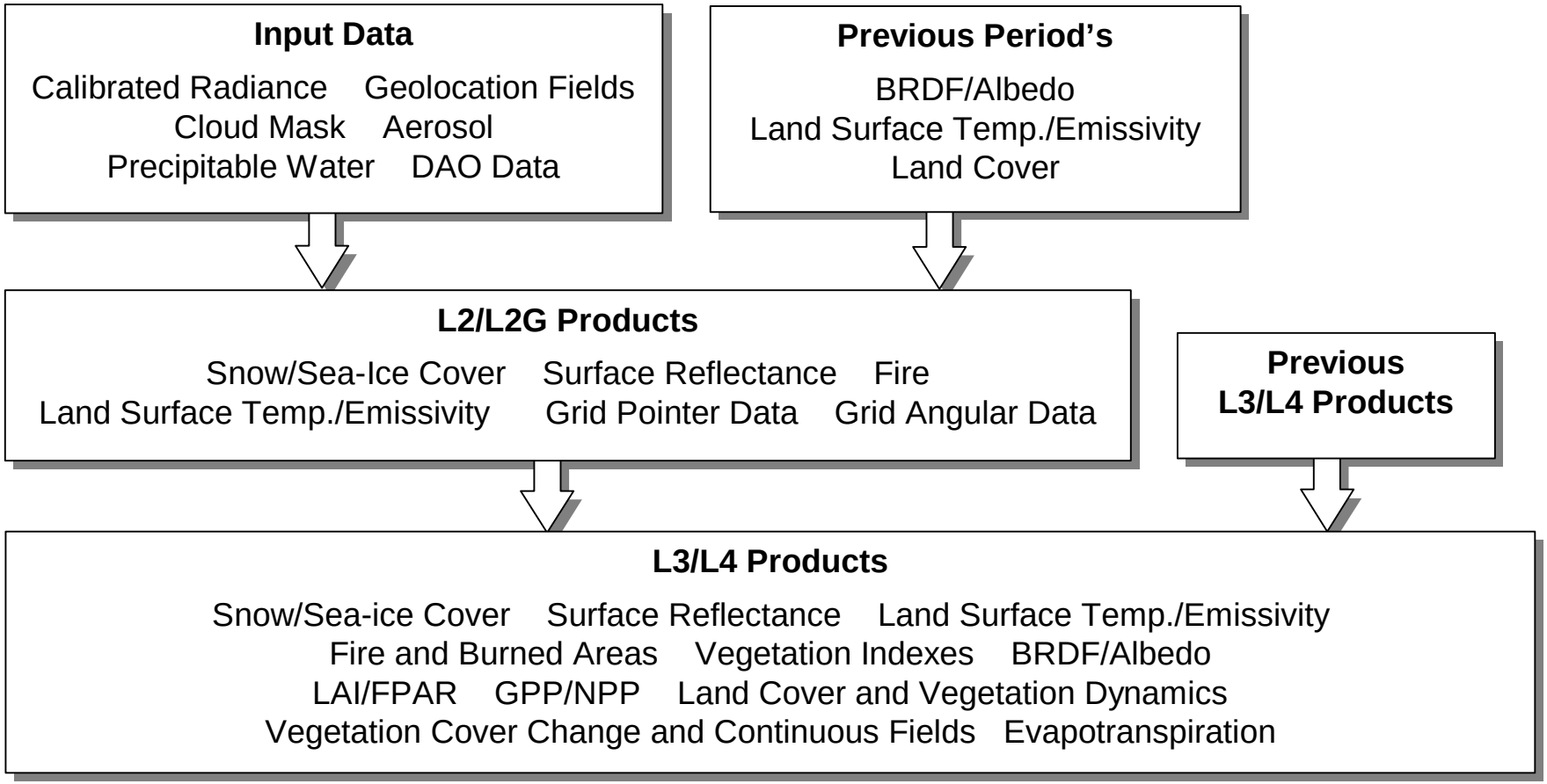
Raytheon ITSS @
NASA GSFC Code 922

Land Algorithm Dependency

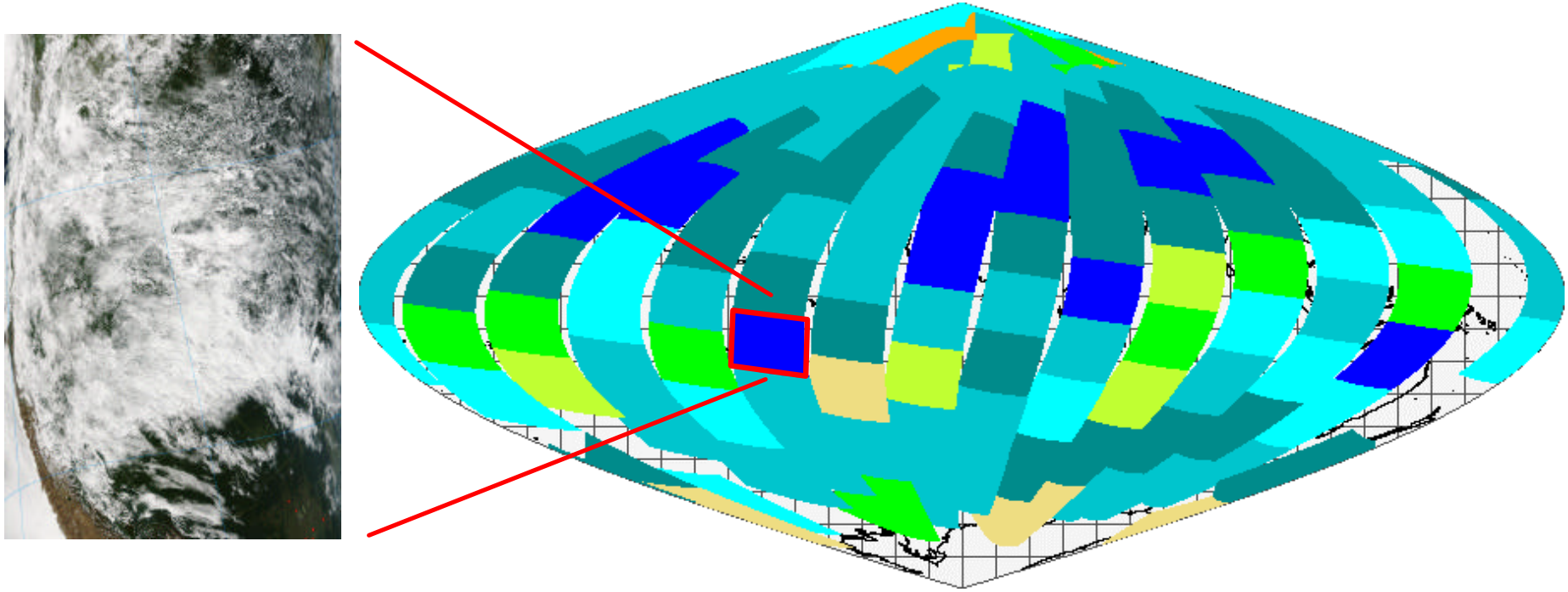


Product Format

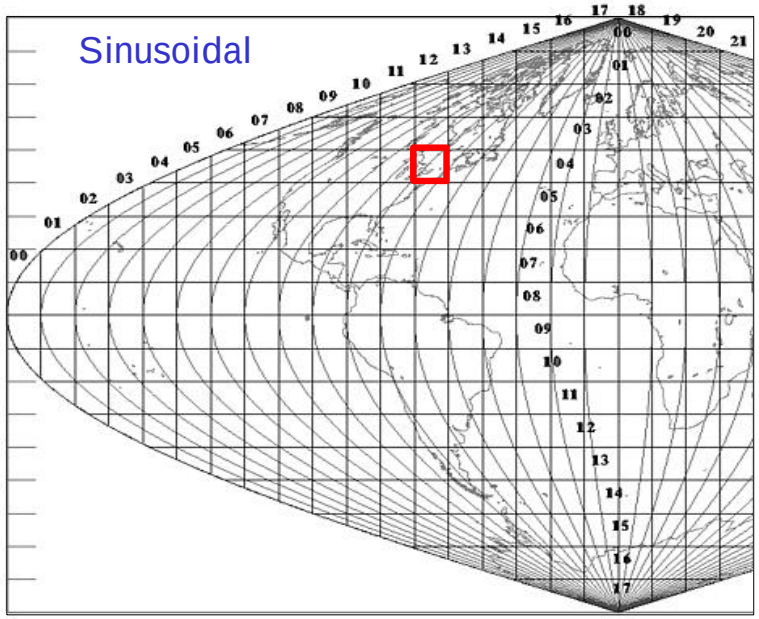
- Hierarchical Data Format (HDF) – Self describing file format
- Science Data Sets (SDSs) – 2D, 3D or 4D arrays
  - Bit Fields – unsigned integers broken into groups of bits
  - Discrete values – e.g., Snow, Cloud, etc.
  - Scaled Integers – valid range, scale and offset included
- Attributes – text or other data that annotates the file (global) or arrays (SDSs)
- Metadata – ECS metadata for products (stored as attributes)
  - includes QA information, date/time products acquired/produced, etc.
- .met file contains the ECS core metadata
  - some additional fields
  - some fields (QA, etc.) may be updated when product distributed
- HDF-EOS Metadata (SWATH or GRID) – geometric information that relates data to specific earth locations

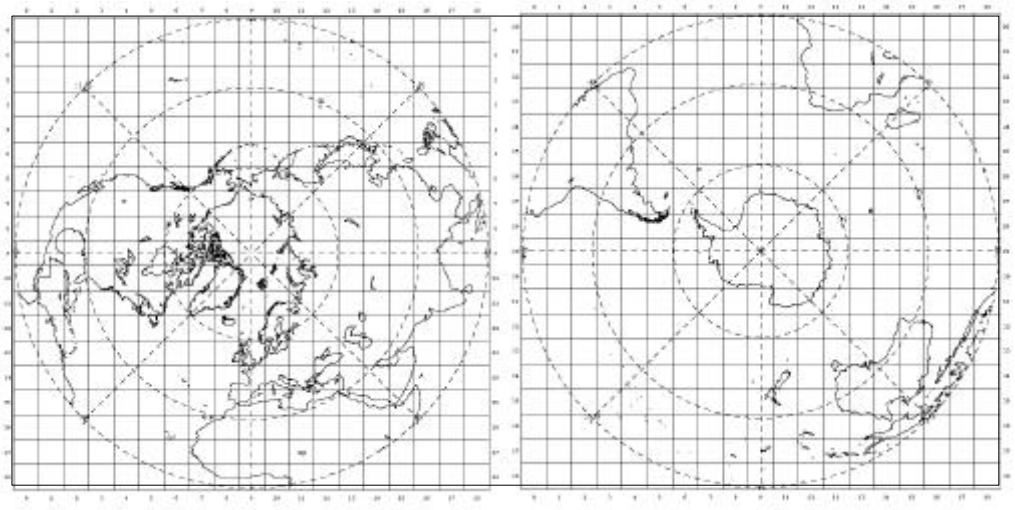
Level 2 Products

- Retrieved geophysical parameters at the same location and in the same format as the MODIS Level 1 instrument data
  - 288 granules/day; 5 min.; approx. 2340 x 2030 km
  - 250m, 500m and 1km nadir resolutions



Level 2G, 3 and 4 Products (fine resolution)



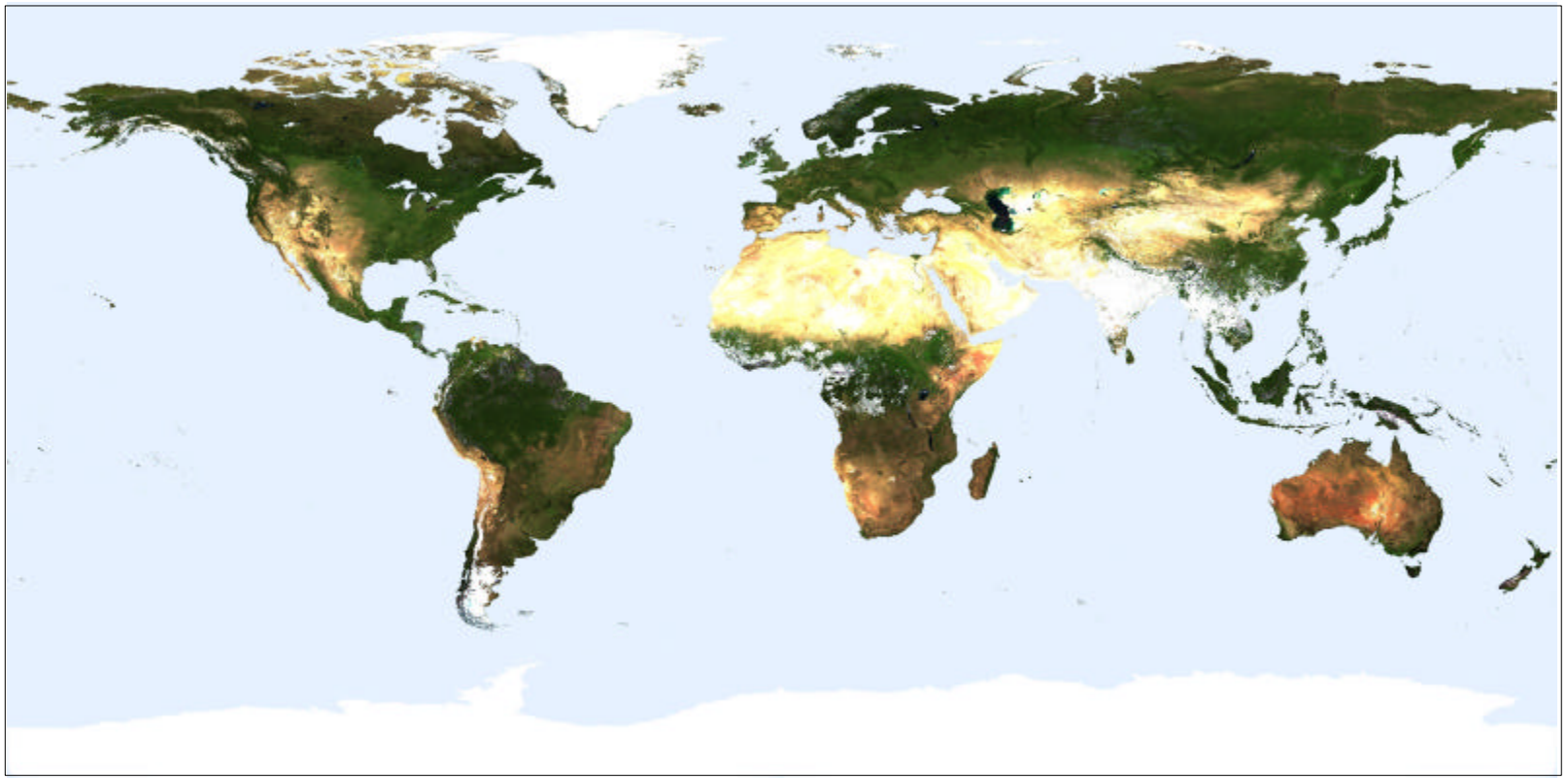


- Level 2G/3: earth-gridded geophysical parameters
- Level 4: earth-gridded model outputs
- Daily, 8-day, 16-day, 32-day, monthly and yearly products
- Fine resolution grid(s)
  - 10º x 10º Tiles:
  - Sinusoidal (equatorial); 7.5, 15 and 30 arcsec. resolution (roughly 250m, 500m and 1 km)
  - LAEA (sea-ice products, polar projection)

Lambert Azimuthal Equal Area (LAEA)

Climate modeling grid products

- Resolution: 0.05º (now) and 0.25º (previous) degrees
- Almost all products are lat/long
  - sea-ice is current exception – in polar grid (snow in C5)



(from BU – NBAR CMG – days 193-208, 2001)

MODIS products per day @ 1X*

Type	Produced by	Product Generation Executives	Volume GB/day	Files/day
Level 0	EDOS	N/A	67	12
Level 1+	GES DAAC MODAPS	6 DAAC 2 MODAPS	235	4,500
Oceans SST, Atmospheres	MODAPS	16	18 Atmos 80 SST	2,400 Atmos 2,950 Oceans
Land	MODAPS	27	330	9,500
Snow/Sea Ice	MODAPS	9	12	2,300
Totals		**60**	**742**	**24,600**

* Sustained processing rate is currently 6X (4X for reprocessing + 1X forward Terra + 1X forward Aqua)

Getting MODIS Data

- Order from DAAC through EOS Data Gateway
  - response is a few hours
  - services (e.g. subsetting) available for some products
- Get data from DAAC data pools
  - most recently produced data are on-line and available via FTP
- Get data from other sources (Science team sites, MODIS Rapid Response, direct broadcast, etc.)

Earth Observing System Data Gateway
Search for and order earth science data products from NASA and affiliated centers

DAAC Data Pool

VISIBLE EARTH
a new collection of earth imagery

MODIS Rapid Response

DAAC Unique Ordering Interfaces
Data Sets

earth observatory

DIRECT READOUT

THE FEDERATION OF EARTH SCIENCE INFORMATION PARTNERS

the BLUE MARBLE

MODIS Data Distribution

- MODIS DAACs distribute more than 1.3 TB/day of MODIS standard products
  - about 130,000 product files/day
  - Land products distributed from EDC and NSIDC DAACs are about 1/3 of the total
- Science team and other non-DAAC distribution (rapid response) add an additional 0.1 TB/day

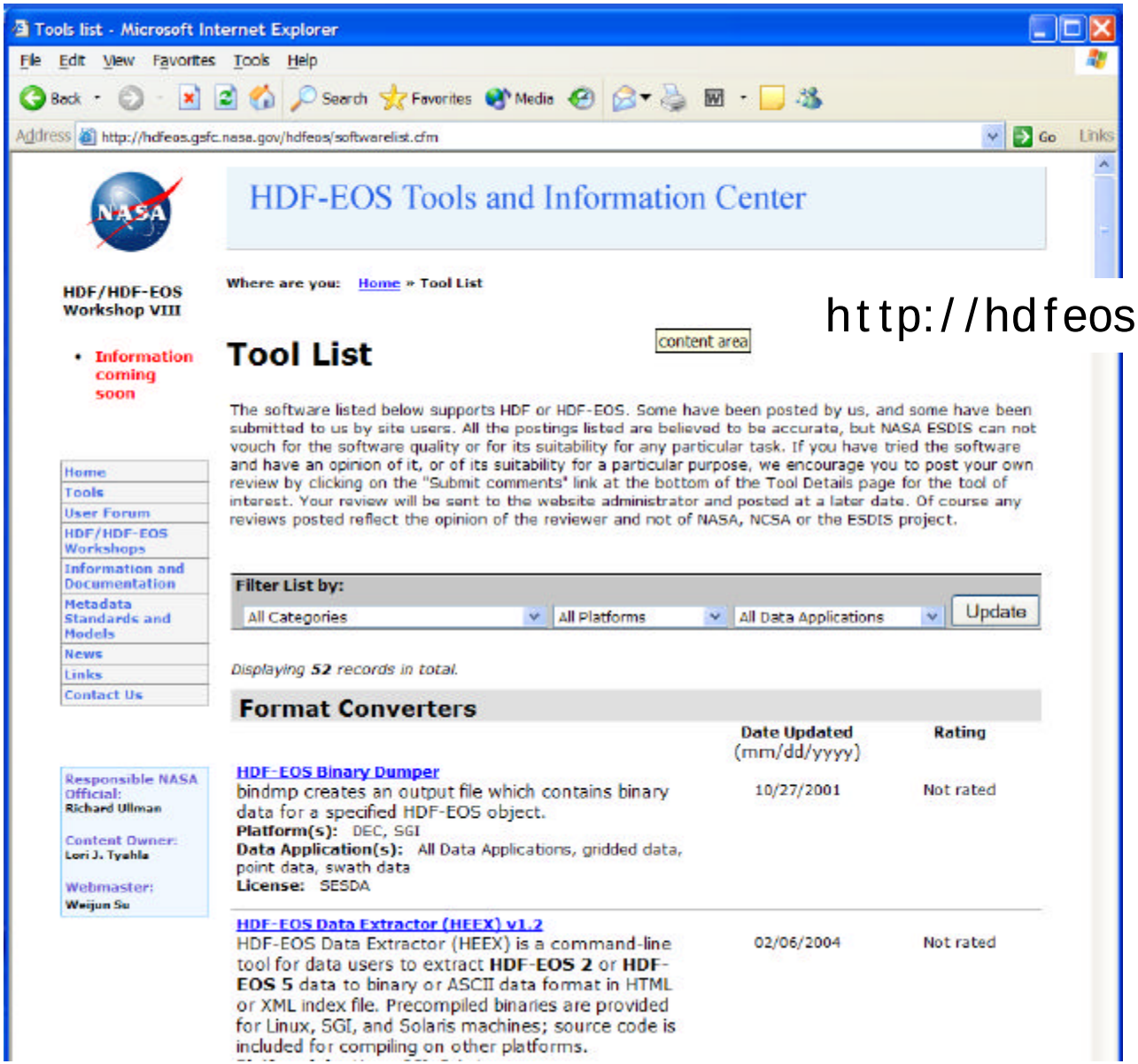
DAAC distribution services

- Subsetting via. EDG (through HEW Subsetting Appliance)
  - Only implemented at NSIDC – all products (except CMGs)
- Service for products in Data Pools using HEG
  - Spatial and parameter subsetting
    - NSIDC: all product except CMGs
    - EDC LP: phased release – some product already released
  - Compression – Gzip, Zip, Unix compression (.gz, .zip, .z)
  - Format conversion
    - NSIDC: L2 products currently (L2 swath); other products soon
    - EDC all products (as released)
  - Newly installed ECS version 6A.07 system has capability to stage data through data pools – so users "should" be able to apply Compression and Format Conversion by first ordering the data using EDG and then performing the services before downloading data
- USGS seamless distribution system (spatial and parameter subsetting, compression and format conversion)
  - currently only 500m 16-day VI/EVI (MOD13A2 for 2000 to 2003)
- Data mining script for data pools (MODextract)
  - works for L3 tiles for user specified date range – finds and downloads data automatically

DAAC developed/supported user tools

- MODIS Reprojection Tools (EDC LP DAAC)
  - both grid and swath (new)
  - reprojection (resampling)
  - also: spatial subsetting, parameter subsetting, mosaics and format conversion
- LDOPE tools (EDC LP DAAC)
  - (see Roy's slides)

Other tools



http://hdfeos.gsfc.nasa.gov/hdfeos

HDF-EOS Tools
User Forum
can be useful for new EOS data users
(same site)