AMSR-E SIPS Processing Status

Image provided by Matt Smith

Kathryn Regner
Information Technology and Systems Center at the University of Alabama in Huntsville
kregner@itsc.uah.edu  www.itsc.uah.edu
Image provided by Matt Smith
Outline

• What’s New at the SIPS
• Data Flow Review
• Processing Status
• Hardware Configuration Update
• Reprocessing Plans
What’s New

• The RSS-generated Level-2A brightness temperatures product is validated.
• New LINUX hardware has been received at the GHCC and is being configured for operations.
AMSRE Data Flow

- **NASA EDOS**
  - Ground Stations
  - NASA FDS

- **JAXA-EOC**
  - L1A Product Generation
  - GBAD

- **PO.DAAC**
  - Level-1

- **NSIDC DAAC**
  - Data Archive and Distribution

- **TLSCF**
  - Science Software I&T
  - RBD & PDS

- **SIPS-RSS**
  - L2A Product Generation
  - L2A algorithm
  - L2 and L3 algorithms
  - Product Delivery Record Server (PDRS)

- **SIPS-GHCC**
  - L2B and L3 Product Generation
  - (science, metadata, qa, ph, subsets, browse)

- DATA Archive

Data Sources:
- **NASAFDS**
- **GBAD**

Data types:
- Rain
- Ocean
- Algorithm Teams
- Sea Ice
- Snow
- Land

Data Delivery:
- Product Delivery Record Server (PDRS)
Forward Processing

• Routine forward processing is running very smoothly
  - *automated to run 24 x 7, unattended*

• Nominal near real time ingest of the L2A files at GHCC ranges typically from 10-12 hours after observation

• Routinely dealing with the occasional straggler or replacement Level-2A files, which requires
  - *regeneration of the composite products*,
  - *replacement files being sent to the DAAC for archive*
SIPS-GHCC Hardware Operational Configuration

- **SGI Origin 2100**
  - 4 x 350Mhz Processors
  - 2GB RAM
  - Used for:
    - Reprocessing
    - Special Processing
    - Development
    - Integration & test
  - **Melody**
    - Network File System Interface

- **SGI Origin 2100**
  - 4 x 250Mhz Processors
  - 2GB RAM
  - Used for:
    - Routine processing
    - Late L2A processing
  - **Ariel**
    - Fibre Channel Interface

- **2 TB RAID file system**
  - **Restricted FTP Server**

On line storage of most recent six weeks of Level-2 and Level-3 daily products for:
- transfer to DAAC
- science team quality control
SIPS-GHCC Hardware Planned Configuration

Forward Processing
Reprocessing 1
Reprocessing 2
Development, Integration & Test

Dell PowerEdge 2850
2 x 3.4 GHz Processors
4 GB RAM

5.5 TB Dell EMC CX300 Storage Area Network Array

Near line storage of all Level-2A and most recent Level-2B & Level-3

Restricted FTP Server

NASA Network (100 Mb/sec)
2 GB/sec Fibre Channel Switch
Recertification Plans

- Configuration of the new hardware is well under way and on target for completion this month
  - currently installing commercial software and testing fault tolerance
  - SIPS processing automation scripts have been certified portable; TLSCF is porting and certifying the science algorithms in the SCF
  - planning to test with interfacing data centers, RSS and NSIDC, later this month
First Reprocessing

- Plans are to begin reprocessing the standard products this fall, from the beginning of the mission
  - using validated (V08) Level-2A files generated at RSS
  - using updated versions of Level-2B and Level-3 algorithms
  - product maturity will be either validated or transitional

- The reprocessed data will be available to the science and validation teams on Ariel and for public distribution at the NSIDC DAAC.
## Algorithm Processing Rates (Ariel)

<table>
<thead>
<tr>
<th>Algorithm Short Name</th>
<th>Algorithm Version(s)</th>
<th>12-Month Average Aug 05 - Jul 06</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2A Tb (Swath)</td>
<td>05, 06, 07, 08</td>
<td>0.7 min *</td>
</tr>
<tr>
<td>L2B Land (Swath)</td>
<td>04, 05</td>
<td>0.49 min</td>
</tr>
<tr>
<td>L2B Ocean (Swath)</td>
<td>03, 04</td>
<td>7.24 min</td>
</tr>
<tr>
<td>L2B Rain (Swath)</td>
<td>07, 08</td>
<td>8.91 min</td>
</tr>
<tr>
<td>L3 Daily Land</td>
<td>03</td>
<td>0.76 min</td>
</tr>
<tr>
<td>L3 Daily Ocean</td>
<td>02</td>
<td>3.35 min</td>
</tr>
<tr>
<td>L3 Daily Sea Ice (6 km)</td>
<td>04, 05, 06</td>
<td>46.9 min</td>
</tr>
<tr>
<td>L3 Daily Sea Ice (12.5 km)</td>
<td>04, 05, 06</td>
<td>46.9 min</td>
</tr>
<tr>
<td>L3 Daily Sea Ice (25 km)</td>
<td>04, 05, 06</td>
<td>46.9 min</td>
</tr>
<tr>
<td>L3 Daily Snow</td>
<td>05, 06</td>
<td>14.74 min</td>
</tr>
<tr>
<td>L3 5-Day Snow</td>
<td>05, 06</td>
<td>0.15 min</td>
</tr>
<tr>
<td>L3 Weekly Ocean</td>
<td>02</td>
<td>21.99 min</td>
</tr>
<tr>
<td>L3 Monthly Ocean</td>
<td>02</td>
<td>88.8 min</td>
</tr>
<tr>
<td>L3 Monthly Rain</td>
<td>04, 05</td>
<td>362.26 min</td>
</tr>
<tr>
<td>L3 Monthly Snow</td>
<td>05, 06</td>
<td>0.25 min</td>
</tr>
</tbody>
</table>

* Metadata and QA insertion, only
### Estimated Reprocessing Rates (Current Hardware)

<table>
<thead>
<tr>
<th>Algorithm Short Name</th>
<th>1 Processing Environment</th>
<th>2 Processing Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2A Tb (Swath)</td>
<td>17 min per pass</td>
<td></td>
</tr>
<tr>
<td>L2B Land (Swath)</td>
<td>~8 hrs per 29 pass</td>
<td></td>
</tr>
<tr>
<td>L2B Ocean (Swath)</td>
<td>~3 days per day</td>
<td>~6 days per day</td>
</tr>
<tr>
<td>L2B Rain (Swath)</td>
<td>~160 min per day</td>
<td>~18 days per day</td>
</tr>
<tr>
<td>L3 Daily Land</td>
<td>~9 days per day</td>
<td></td>
</tr>
<tr>
<td>L3 Daily Ocean</td>
<td>~1 day per day</td>
<td></td>
</tr>
<tr>
<td>L3 Daily Sea Ice (6 km)</td>
<td>~1 day per day</td>
<td></td>
</tr>
<tr>
<td>L3 Daily Sea Ice (12.5 km)</td>
<td>~1 day per day</td>
<td></td>
</tr>
<tr>
<td>L3 Daily Sea Ice (25 km)</td>
<td>~1 day per day</td>
<td></td>
</tr>
<tr>
<td>L3 Daily Snow</td>
<td>~1 day per day</td>
<td></td>
</tr>
<tr>
<td>L3 5-Day Snow</td>
<td>~1 min per month</td>
<td></td>
</tr>
<tr>
<td>L3 Weekly Ocean</td>
<td>~1.5 hrs per month</td>
<td></td>
</tr>
<tr>
<td>L3 Monthly Ocean</td>
<td>~450 min per month</td>
<td></td>
</tr>
<tr>
<td>L3 Monthly Rain</td>
<td>~7.5 hrs per month</td>
<td></td>
</tr>
<tr>
<td>L3 Monthly Snow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Estimated Reprocessing Rates
(New Hardware)

- Assuming that the algorithms continue to run at the same or similar rates, SIPS expects processing and reprocessing on the new hardware to be significantly faster
  - *Twice the number of reprocessing environments*
  - *Much faster processor speeds (350 MHz to 3.4 GHz)*

- In addition, having space to keep all Level-2A data on-line will enable processing by product streams rather than in monthly chunks
Software Architecture (Nominal Processing)

Level-2A Brightness Temperatures

- L2B Ocean (1/2-orbit)
- L2B Rain (1/2-orbit)
- L2B Land (1/2-orbit)

Level-2A Brightness Temperatures (with Metadata and QA files)

- L3 Ocean (Daily)
- L3 Sea Ice (Daily, 3 Res)
- L3 Snow (Daily)
- L3 Land (Daily)

Product Generation Scheduling

- ~ 29 times per day
- Once per day
- Once every five days
- Once per week
- Once per month

Near Real Time Ingest from RSS
## Reprocessing Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Team</th>
<th>Qtr 3, 2006</th>
<th>Qtr 4, 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMSR-E V08 Forward Processing</td>
<td>SIPS</td>
<td>8/2</td>
<td></td>
</tr>
<tr>
<td>AMSR-E V08 Reprocessing Preparation</td>
<td>TLSCF</td>
<td></td>
<td>9/15</td>
</tr>
<tr>
<td>Complete installation, configuration, and test of LINUX HW at SIPS</td>
<td>SIPS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install and Configure LINUX Hardware at TLSCF</td>
<td>TLSCF</td>
<td>8/30</td>
<td>9/15</td>
</tr>
<tr>
<td>Deliver PGE Updates to TLSCF</td>
<td>Science Teams</td>
<td>L3</td>
<td></td>
</tr>
<tr>
<td>SSIT new L2B algorithms and deliver to SIPS</td>
<td>TLSCF</td>
<td>8/15</td>
<td>9/30</td>
</tr>
<tr>
<td>Port L2B Algorithms to LINUX</td>
<td>TLSCF</td>
<td></td>
<td>10/2</td>
</tr>
<tr>
<td>Complete SW Integration at SIPS and deliver Level-2B DAPs to NSIDC</td>
<td>SIPS</td>
<td></td>
<td>10/27</td>
</tr>
<tr>
<td>Begin Level-2B Reprocessing at SIPS</td>
<td>SIPS</td>
<td></td>
<td>10/30</td>
</tr>
<tr>
<td>SSIT new Level-3 algorithms and port to LINUX</td>
<td>TLSCF</td>
<td></td>
<td>10/23</td>
</tr>
<tr>
<td>Complete SW Integration at SIPS and Deliver Level-3 DAPs to NSIDC</td>
<td>SIPS</td>
<td></td>
<td>11/22</td>
</tr>
<tr>
<td>Begin Level-3 Reprocessing at SIPS</td>
<td>SIPS</td>
<td></td>
<td>12/1</td>
</tr>
</tbody>
</table>

Note: Dates are placeholders and need to be replaced with actual dates.
Backup Charts

- Products Retention Plan
- Algorithm Versions
- FTP Data from Ariel
- Operational Hardware
- Beautiful Sea Ice
SIPS-GHCC Products Retention Plan

• Current:
  - All Level-2 and Level-3 daily science files are kept on line for approximately 60 days, for science team QC and to facilitate product regeneration due to late arriving L2A files
  - The 5-day, weekly and monthly science files are kept on line for approximately 6 months

• Future: Same as above, except all latest version Level-2A files will be kept on line to facilitate reprocessing.
## Algorithm Versions and Product Maturity Codes

<table>
<thead>
<tr>
<th>Algorithm Short Name</th>
<th>Current Versions (as of 9/1/2006)</th>
<th>1st Reprocessing</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2A Tb</td>
<td>V08</td>
<td>V08</td>
</tr>
<tr>
<td>L2B Land</td>
<td>B05</td>
<td>T06</td>
</tr>
<tr>
<td>L2B Ocean</td>
<td>B04</td>
<td>V05</td>
</tr>
<tr>
<td>L2B Rain</td>
<td>B08</td>
<td>V09</td>
</tr>
<tr>
<td>L3 Land</td>
<td>B03</td>
<td>T04</td>
</tr>
<tr>
<td>L3 Ocean</td>
<td>B02</td>
<td>V03</td>
</tr>
<tr>
<td>L3 Rain</td>
<td>B05</td>
<td>T06</td>
</tr>
<tr>
<td>L3 Sea Ice</td>
<td>B06</td>
<td>T07</td>
</tr>
<tr>
<td>L3 Snow</td>
<td>B06</td>
<td>T07</td>
</tr>
</tbody>
</table>

**Product Maturity Codes**

B=beta; T=transitional; V=validated
FTP Data from Ariel

• SIPS-GHCC completed the migration of science team users from Restricted FTP to Secure FTP in January 2005.

• If you are new to the team or have not yet made the switch to secure FTP and wish to be able to retrieve data from Ariel, please contact kregner@itsc.uah.edu
Hardware is Aging

- SIPS-GHCC processing servers were procured in 1999 (Ariel) and 2000 (Melody)
  - SGI stopped manufacturing the Origin 2000 class of server on June 30, 2002
  - SGI will continue to support these systems through June 30, 2007 (also known as “end of life”)

- SIPS production systems must be under hardware maintenance plan
  - implementing a plan to replace this hardware without impact to ongoing operations.
South Polar view of sea ice showing the ice extent near its yearly maximum