# **GIPSY Update**

### Ken Jezek

STG-3

MODIS image courtesy P. Gudmandsen

# GIIPSY Activities since STG-2

- A. Fleming GIIPSY Presentation at EGU
- Earthzine, STR paper, Imaging Notes articles published or in press
- Preparations for SCAR, St. Petersburg
- Planning for a Town hall meeting at Fall AGU.
- Participation in CSA SAR Workshop (R. Kwok, I. Joughin, B. Goodison, K. Jezek)

# **SAR Acquisition Templates**

- Guided by the objectives of solving an important science problem, filling IPY data gaps, and involving interagency cooperations, the workshop adopted four acquisition themes:
  - C-Band coverage (3-day snapshots) for the Arctic Ocean during the remainder of IPY (background missions, operation data acquisitions, etc.).
  - Winter Pole to Coast InSAR coverage of the Antarctic in high-resolution mode (3-4 consecutive cycles in ascending and descending).
  - Greenland and Major Canadian Icefields of InSAR acquisition over 3-4 consecutive cycles of high-resolution in winter.
  - Supersites (where possible using what exists already): determine acquisition parameters (frequency, resolution, etc.) for multi-polarisation and polarimetry data collection.
- Science community tasked with preparing requirements templates

# SAR Requirements for Antarctica

• Thematic Objective: Sea level rise, and hemispheric climate:

1) For the first time, one summer, one winter SAR snapshot of the polar ice sheet. Near simultaneous imagery at L, C, and X band, polarimetric quad pole for documenting ice surface physical parameters.

2) For the first time, pole-to-coast multi-frequency InSAR measurements of ice surface velocity.

3) For the first time, repeated X-band InSAR topography for detecting local changes in ice sheet elevation

associated with motion of subglacial water.

#### **Coverage Requirement**

1) From pole to 150 km seaward of RAMP coastline (right image)

- 2) 4 successive cycles of observations
- 3) Ascending and descending coverage

4) Observations during the period of April to November (can be relaxed for regions south of 80 degrees Latitude)



# SAR Requirements for Antarctica

### Sensor Requirements

- 1. Fine beam and standard beam coverage to southerly limit of right looking satellites
- 2. Fine beam and standard beam coverage between about 78 South to pole for left looking satellites
- 3. Observations with highest bandwidth and shortest repeat over fast glaciers (right image) and Antarctic Peninsula.
- 4. Desirable to have overlap between left and right looking coverage areas (extended beams)



## SAR Requirements for Arctic Land Ice

### Thematic Objective: Sea level rise, and hemispheric climate:

 One summer, one winter SAR snapshot of the Arctic Ice Caps. Near simultaneous imagery at L, C, and X band, polarimetric quad pole for documenting ice surface physical parameters.
One, winter, multi-frequency InSAR measurement of ice surface velocity.
Repeated InSAR observations of the most

rapidly changing outlet glaciers

#### **Coverage Requirement**

1) Canadian Ice Caps InSAR: 4 consecutive cycles in Dec 2008-March 2009 (see map at right)

2) Greenland Ice Sheet InSAR: 4 consecutive cycles covering the entire ice sheet in Dec 2008-March 2009

3) Jakobshavn Glacier: every cycle for 3 adjacent tracks





## SAR Requirements for Arctic Land Ice

#### **Sensor Requirements**

- 1. InSAR observations: select highest bandwidth radar modes and shortest repeat cycles over fast glaciers (right image). 200 m baseline.
- 2. One summer and one winter, L, C and X band near simultaneous image mapping with comparable beam modes (25 m, 23°).



### SAR Requirements for Sea Ice (Arctic and Southern Oceans)

• Thematic Objective

#### Ocean circulation and polar air-sea interactions (Sea ice):

- 1) For the first time, L-band SAR mapping of the Arctic ocean and marginal seas sea ice cover for leads and ridges.
- 2) For the first time, repeat fine resolution SAR mapping of the entire Southern ocean sea ice cover for ice motion.
- 3) *For the first time*, SAR and optical fine resolution mappings of the entire Arctic ocean.
- 4) Systematic 3-day medium resolution SAR mapping of sea ice covered waters for motion, and melt pond coverage.



Envisat Arctic SAR Mosaic



#### **Coverage Requirement**

- 1) Coverage of ice-covered waters with the ice edge of the Arctic and Southern Oceans
- 2) 3-day systematic mapping of the Arctic Ocean
- 3) Ascending and descending coverage
- 4) Year round coverage defined by the time-varying ice edge

Nares Strait

### SAR Requirements for Sea Ice (Arctic and Southern Oceans)



**RGPS** ice deformation

#### **Sensor Requirements**

#### C-band

Wide-swath C-band ScanSAR for systematic 3-day mapping of ice-covered oceans.

Short time-separation (daily) repeat coverage of the Lincoln Sea, Nares Strait and Fram Strait at C-band.

#### L-Band

L-band quad-pol SAR coverage of the Arctic and Southern Ocean sea ice.

L-band ScanSAR coverage of the sea ice cover.

#### Optical coverage

Optical coverage of the Arctic and Southern Oceans sea ice.



Optical coverage

# Arctic Science Super Sites

- Ice Cap: Devon Island; Canadian in situ, airborne and spaceborne campaign
- Ice Sheet: Jacobshavn Glacier Greenland; Multi-national insitu and airborne campaign
- Sea Ice: Amundsen Gulf and Franklin Bay; large, IPY ship-based campaign
- Sea Ice: Fram Strait, Lincoln Sea and Nares Strait. Danish and US areas of science interest





# **SAR Implementation**

- How do we assure data continuity between observations north and south of the 'pole hole' (eg beam selection) and across the arctic basin?
- How do we propagate Antarctic ground control for orbit refinement?
- How do we assemble a consistent set of Antarctic and Greenland velocity control points?
- Where should we allocate highest bandwidth SAR acquisitions?
- At what agency level should these questions be addressed, or is the data portfolio concept sufficient?
- Can developments from the SAR workshop be used to guide thinking on a hi-res optical workshop?

## USGS LANDSAT

Data release

AAG Presentation by Rachel Headley, USGS

# Landsat Standard Products

All no-charge data will be processed with these parameters.

- Pixel size: 15m/30m/60m
- Media type: Download (web-enabled), CD/DVD (\$50)
- Product type: L1T (terrain-corrected)
- Output format: GeoTIFF
- Map projection: UTM (Polar Stereographic for Antarctica)
- Orientation: North up
- Resampling:
- DEM:

Cubic convolution GLS DEM (SRTM, NED, CDAD, DTED, GTOPO 30)

## Expansion of Landsat Standard Product

- Landsat 7 SLC-Off global expansion
  - North America & Africa (generated daily)
  - Eurasia/Greenland May
  - Australia/New Zealand/South America May
  - Rest of World (Indonesia/Japan/other islands) June
- Landsat 7 ETM+ archive: late September 2008
- Landsat 5 TM newly acquired: early December 2008
- Landsat 5 TM archive: late December 2008
- Landsat 4 TM archive: January 2009
- Landsat 1-5 MSS archive: January 2009

### Landsat Standard Product Release Schedule



- As phased data become available, all other parameters will be discontinued.
- Subscribe to the Landsat Update under 'About' @ http://landsat.usgs.gov