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MOSAIC THEME RESULTS: Clobal Wetlands Mapping Using ALOS PALSAR data

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An Inundated Wetlands Earth System Data Record: Global Monitoring of Wetland Extent and Dynamics

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PALSAR Regional Coverage: ScanSAR regions

Science Products:

•Inundated wetland area (swath-by-swath)

•Principal wetland vegetation classes (non-vegetated, herbaceous, shrub, woodland, forest)

•Seasonally based summary products describing timing and extent of wetland inundation

Production is phased according to K&C acquisitions







ALOS Image Mosaics

- Dual Polarization mosaics
 - N/S America
 - HH, HV, Ratio
 - Topography, Date, Incidence Angle
 - Inundation state (derived product)
- ScanSAR mosaics (extension phase)
 - Global ScanSAR regions
 - HH
 - Topography, Date, Incidence Angle
 - Inundation state (derived product)





Current Processed Coverage (May 2008) (dual-pol) Processed by JAXA EORC







ALOS





Image Mosaics

- Method for ortho-rectification
 - Using software from Gamma Remote Sensing
 - Using SRTM DEM data interpolated to 1 arcsec (~30x30 meters)
 - Using CGIAR SRTM gap-filled data
 - Careful shifted 0.5 3-arcsec pixels relative to Standard SRTM DEM
 - Have to 'pad' DEM for Gamma software
 - http://srtm.csi.cgiar.org/
- Stitch SRTM-like tiles together to make continental scale image mosaics
- But we will keep all the data, so that the image mosaics may be custom built like a jigsaw puzzle based on science objectives
 - This is especially important for the SCANSAR coverage areas, and for filling in gaps
 - Have to accommodate overlap and zero fill







North America





HH: Brightness Height: SRTM color wrap (1000m)



Image Strip Calibration

- There are sometimes radiometric calibration errors in the KC image strip products that need to be corrected
 - Images fall off in brightness in the near and far range
- Some trends are due to target-dependent incidence angle variations in brightness
- If there was more overlap between strips, might not be an issue.
- South America data processed prior to September 2007 needs special processing to calibrate





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Correction of data processed prior to September 2007



Before correction

M. Shimada has provided software to perform this task

Must correct Radiometric Antenna Pattern for data processed prior to Sept. 2007

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After Correction





ALOS



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After correction – mosaic results





Brightness : HH Color : height





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After correction – mosaic results





Brightness : HH Color : height Perfect further South!



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Cross track calibration

đB

Step 1: for selected segment of image strip, find mean and standard deviation for each range bin

Step 2: recalculate mean excluding data outside 1 standard deviation of mean Step 3: smoothed version of range dependence applied to entire image strip (0 dB overall gain)



RSP249 HH

Average over entire 1500 km long track







Cross track calibration



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Alaska



How do we make these image mosaics available for use?

For the casual user and for data discovery:

Make zoomable image mosaics available for browsing on web

With links to other available image products



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ALOS

 $(64^{\circ}, -163^{\circ})$ to $(60^{\circ}, -159^{\circ})$ HH – red, HV – green, HH/HV - blue



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How do we make these image mosaics available for use?

For an intermediate user, perhaps unfamiliar with SAR imagery:

Enable georeferenced Google-Earth compatible viewing, with links to image mosaic products









How do we make these image mosaics available for use?

For the ALOS KC science team:

ALOS

SRTM-like tiles of HH, HV, HH/HV, Date, Incidence Angle, DEM, etc., in addition to mosaic products.

> These image products can be used to make thematic products (wetlands/non-wetlands, forest/non-forest, etc.)

20070802_280_HH_001_N60W160.date.geo.mli 20070802 280 HH 001 N60W160.dem 20070802_280_HH_001_N60W160.dem.geo.mli 20070802 280 HH 001 N60W160.hdr 20070802_280_HH_001_N60W160.hdr.geo.mli 20070802_280_HH_001_N60W160.inc 20070802_280_HH_001_N60W160cal.geo.mli 20070802_280_HV_001_N60W160cal.geo.mli 20070802_280_RT_001_N60W160cal.geo.mli 20070819_281_HH_001_N60W160.date.geo.mli 20070819_281_HH_001_N60W160.dem 20070819_281_HH_001_N60W160.hdr 20070819_281_HH_001_N60W160.inc 20070819_281_HH_001_N60W160cal.geo.mli 20070819_281_HV_001_N60W160cal.geo.mli 20070819_281_RT_001_N60W160cal.geo.mli 20070831_279_HH_001_N60W160.date.geo.mli 20070831_279_HH_001_N60W160.dem 20070831 279 HH 001 N60W160.hdr 20070831_279_HH_001_N60W160.inc 20070831_279_HH_001_N60W160.pix 20070831_279_HH_001_N60W160cal.geo.mli 20070831_279_HV_001_N60W160cal.geo.mli 20070831_279_RT_001_N60W160cal.geo.mli 20070905_282_HH_001_N60W160.date.geo.mli 20070905_282_HH_001_N60W160.dem 20070905_282_HH_001_N60W160.hdr 20070905_282_HH_001_N60W160.inc 20070905_282_HH_001_N60W160cal.geo.mli 20070905_282_HV_001_N60W160cal.geo.mli 20070905_282_RT_001_N60W160cal.geo.mli

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Status

- DEM assembled
- Ortho-rectification Gamma software
 - Nearly complete for N. America
 - Need to fill in gaps
- Calibration
 - Evaluate where necessary
 - HH or HV
- Processing to mosaics
 - Tile by tile
- Distribution being developed
- South America dual-pol data processed with old version of EORC processor and must be recalibrated.





Yukon River (Holy Cross), Alaska

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Lat: 62.2, Lon: -159.64, Summer 2007

ALOS



N. America mosaic image tiles

 About 250 out of 300 image strips have been ortho-rectified

ALOS

- There are some gaps in coverage
- Once I know the exact location of gaps, I will request replacement.

Mt Chapman

- <u>This image tile is about</u>
 <u>5deg x 5deg</u>
- Centered over Colorado
- No radiometric correction applied.
- HH image shown with color=DEM



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- No radiometric correction applied.
- <u>HH image shown with</u> <u>color=DEM</u>







Rosamond Calibration Array

ALOS



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