## Amazonian Wetlands Mapping with ALOS PALSAR:

### **Project Objectives**

ALOS

Maps of wetland extent, vegetation type, and inundation periodicity are being produced for the Amazon Basin at ~90 m resolution using a combination of ALOS K&C Fine-beam and ScanSAR strip data, ALOS PALSAR is currently the only earth satellite that can provide regional mapping of seasonal inundation patterns of tropical wetlands at this resolution.

#### Status

Multi-date ScanSAR image stacks are compiled by UTM zone using terrain-corrected, coregistered, multi-temporal ScanSAR strips provided by the KC Mosaic Theme (B. Chapman, JPL). Sub-pixel multi-temporal co-registration and consistent calibration of hundreds of strips is required for accurate multi-temporal inundation mapping.

The mosaic to the right shows the progress made since an upgrade of the GAMMA software KC strip module. Banding is minimal and strip-to-strip geolocation is subpixel. For each multi-temporal stack of strips. an image segmentation is performed using terrain-corrected multi-temporal ScanSAR amplitude and terrain-corrected multitemporal mean amplitude. A rules-based classification is applied, incorporating elevation, local incidence angle, look angle, and multi-date and single-date image statistics.

The results clearly illustrate the capability of ALOS ScanSAR to capture regional variability in the extent and timing of inundation. During 2010, KC Fine-beam strips are being incorporated into the classification algorithm, and products are being validated.

These products will be publicly available through a web interface and will be used in 2010 for studies of regional hydrology, methane emissions (Carbon), comprehensive regional mapping of wetland habitats (Conventions), and biodiversity and habitat management studies (Conservation).

# ScanSAR Update for the Central Amazon



66 W UTM Tile 20M: mosaic of 5 ScanSAR pixelwise 60 W multi-temporal mean images, 2007 (40 strips)



Forest, flooded 1-2 m/a Fonast floodad 3-6 m/a Fonast flooded > 6 m/s



Example of ScanSAR product for

Piagacu-Purus Reserve, Brazil

Raster layers for wetland extent,

vegetation cover, and inundation period are

accompanied by shapefile and dbf file giving

flooding status for all available dates.



Missed ScanSAR acquisitions can impact the ability to derive inundation period estimates based on time series of flood maps for single dates. This issue was studied for UTM Zone 20M, and shown here for the year 2007. The panel above shows the number of coverages per RSP during 2007. At right, the total number of coverages for the year is plotted. Only strips that completely cross the zone are included.

Owing to the substantial scene overlap built into the ScanSAR acquisition plan, the effect of dropped passes is mitigated. In 2007, all areas of this tile received at least 12 coverages per year, and many areas were covered 13 to 16 times during the calendar year.

K&C Science Team Members

Laura Hess, UC Santa Barbara

Bruce Chapman, JPL



12 13-14 15-16 17-22 UTM Zone 20M: ScanSAR coverages, 2007

Solimões (Amazon) River Stage (cm). Tefé gauge





K&C Initiative

An international science collaboration led by JAXA



Volumetric surface water estimates can be derived by combining PALSAR mapping with altimetry. Envisat tracks over UTM 20M are shown at far left. At left. water level changes during 2003 to mid-2008 are shown for 10 sites at the Piagacu-Purus Reserve. (Analysis by Frédérique Seyler, IRD)

### Collaborators

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### Combination of PALSAR products with Envisat Altimetry

