ALOS Kyoto & Carbon Initiative

Phase 1 Results for Amazonian Wetlands

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PHASE I OBJECTIVE:
Map wetland extent, vegetation, and seasonal inundation for 3 prototype areas on the Amazon floodplain

SCIENCE GOALS:
- Estimate seasonal rates of CH$_4$ emissions and CO$_2$ evasion
  -> current best estimates are based on seasonal flood mapping at 25 km scale
- Characterize and preserve the biodiversity of Amazonian wetlands
  -> SAR-based mapping of “biodiversity surrogates”
CENTRAL AMAZON PROTOTYPE REGIONS

ALOS ScanSAR composites for focus areas

Background: GRFM
Amazon Mosaic

Mamirauá
14 Nov 2006
14 Feb 2007
2 Jul 2007

Piagaçu
22 Sep 2007
22 Mar 2007
7 May 2007

Curuai
3 Dec 2007
18 Jan 2007
19 Apr 2007

500 km
ALOS ScanSAR acquisition dates relative to Amazon River stage at Tefé

ALOS ScanSAR acquisition dates relative to Amazon River stage at Tefé

ScanSAR acquisition date

River stage at Tefé (cm)

ScanSAR Time Series

Amazon, Japurá, and Negro Rivers
Flood Pulse of Amazonian Wetlands: ALOS ScanSAR Time Series

An ALOS Kyoto & Carbon Initiative Wetlands Theme Product

Start date: 4 Nov 2006
End date: 7 Nov 2007
Repeat interval: 46 days

ALOS PALSAR, ScanSAR mode
L-band, HH-pol
350-km swath width
100 m pixel

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http://www.eorc.jaxa.jp/ALOS/kyoto/kyoto_index.htm
Classified ScanSAR (5 dates)

Mamirauá

Piagaçu-Purus

Open water
Aquatic macrophyte
Shrub
Non-wetland

Forest, flooded 1-2 m/a
Forest, flooded 3-6 m/a
Forest, flooded > 6 m/a
Large/rough water bodies in ScanSAR near range can cause serious problems for classification.

This issue increases the impact of missed passes.
Fine Beam Single Mode: 30 October 2007
Fine Beam Dual Mode: 14 June & 30 July 2007

Jarauá Sector, Mamirauá Sustainable Development Reserve
Fine Beam Single Mode: 30 October 2007
Fine Beam Dual Mode: 14 June & 30 July 2007

Classified image, Mamirauá Sustainable Development Reserve
Validation: Aerial Overflights

- overflight with hi-res geocoded dual-camera and laser system was postponed until 2009 (June and October flights planned)

- reconnaissance survey was flown in late November 2008
Validation: 1999 dataset (high water only)
Validation: Thermochron iButtons
- deployed at Mamirauá in Nov 2009
- temperature readings every 6 hours
- testing suitability for low-cost floodplain gauging
ALOS K&C Phase I Summary

- Initial non-validated vegetation and inundation products completed for 3 sites with generally good results
- Refined products (incorporating Nov. field survey info) by March 09
- Validation following 2009 flights
- Many enthusiastic users at SDRs, INPA
- 100 m pixels are limiting for certain geomorphologic types, e.g. scroll-bar topog
- For finer-scale habitat mapping, 3 dates are needed for good results; HH coverage on 3 dates is higher priority than dual-pol coverage (but needs to be re-evaluated using revised HV calibration coefficient)
ALOS K&C Phase II

- New training/validation sites (Amapá, Juruá)
- Extend mapping to Amazon Basin (using mosaics generated by Bruce Chapman)
- Extend to other tropical and subtropical ScanSAR polygons
- Use to calibrate passive microwave inundation estimates to create accurate historical time series at high temporal, low spatial resolution
Thank you JAXA!