ALOS

K&C Initiative
An international science collaboration led by JAXA

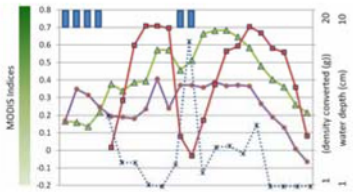
Mapping rice paddies and agroecological attributes in Monsoon Asia with ALOS PALSAR

Overview

As part of JAXA's Kyoto and Carbon Initiative, our team is utilizing regional and continental scale PALSAR acquisitions for routine monitoring of rice agriculture and land use/cover patterns. In conjunction with the K&CI, this effort supports mapping land use land cover change in Monsoon Asia with NASA; and mapping agro-ecological attributes to support disease ecology and monitoring Highly Pathogenic Avian Influenza (HPAI) in Asia with NIH

Project Objectives

- Map rice paddy extent for Monsoon Asia using multi-temporal ALOS PALSAR Mosaics and 'Strips'
- Characterize agro-ecological paddy attributes including hydroperiod, crop calendar, cropping intensity using K&C products
- Develop regional and continental scale products of rice paddy attributes, land use patterns, and land use land cover change by integrating PALSAR products,, MODIS, and Landsat



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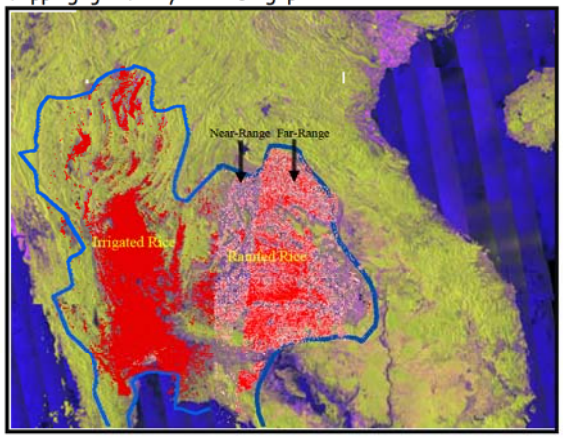
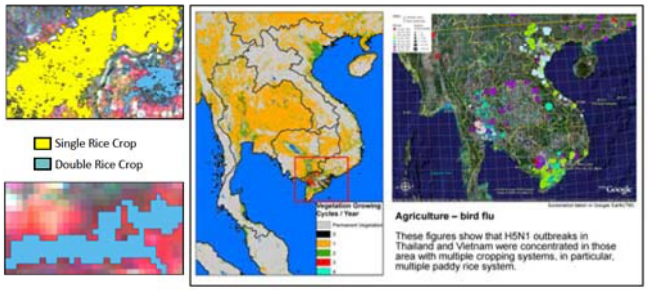
Thailand rice mapping efforts

• Utilizing multi-temporal Strips for automated rice paddy mapping: geometry and RSP gaps.

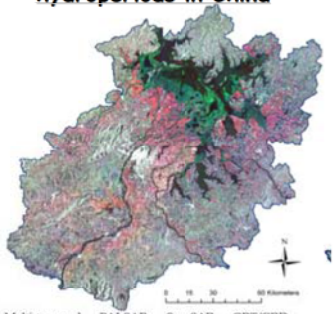


Indonesia rice mapping efforts

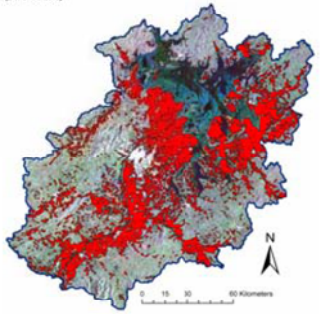
- Using to improve HPAI forecasting by enhancing rice paddy activity monitoring; events occur when people, poultry, and waterfowl mixed in paddy regions
- Applying both operational & Classification and Regression Tree (CART) approaches to Strips & SRTM DEM
- Mapping cropping intensity with multi-temporal Strips



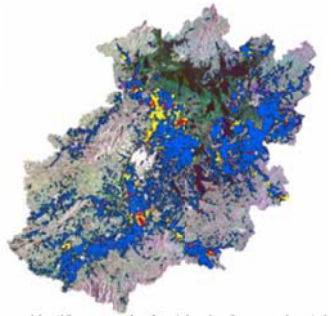
Mapping crop intensity & hydroperiods in China



Multi-temporal PALSAR ScanSAR ORT/GRD (Red:DOY241, Green: DOY149, Blue: DOY103) WB1 (HH:100m)



Red shows classified rice paddies derived from multi-temporal, regional PALSAR acquisition strategy; 25% of region rice paddy agriculture



Able to identify crop calendar (planting/harvest dates) based off hydroperiod; 85% of paddies had two distinct hydroperiods

ALOS PALSAR data

- Multi-temporal ScanSAR HH Strips (p91-106); Slant, ORT, & Ground Range Products
- FBS/S Mosaics (JAWA2008FBS/D; HH & HV)
- Multi-temporal ScanSAR Stamps (HH: 100m)
- AUIG FBS/D used as training & scaling data

Other Data Sources

- Landsat 5 TM mosaics
- MODIS 8-day products

Field campaigns

- Poyang Lake, China field work complete
- Indonesia field campaign and workshop is now in place for March 2010 to support HPAI modelling; sites in Jakarta, Bandung, & Yogyakarta regions
- Thailand field work and GPS photos underway currently to validate products

Technical Challenges

- ScanSAR ORT Strip Radiometery (2007): near- and far-range geometry influences (degrades) the accuracy of the automated rice classifier (see NE Thailand). Will do comparison between with coincident AUIG products.
- Acquisition timing of time series: gaps in a single Cycle can reduce accuracy significantly (90 day revisit can miss temporal dynamic range).
- Need to adjust automated mapping algorithms for rainfed rice (NE Thailand).
- SLT products may improve mapping accuracies (will be used in 2010).

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