Overview

As part of JAXA's Kyoto and Carbon Initiative, our team is utilizing regional PALSAR acquisitions for routine monitoring of rice agriculture and modeling emissions.

Project Objectives

- Map rice paddy extent for Asia
- Characterize aquatic ecosystem attributes including hydroperiod and biomass
- Develop regional estimates of methane and nitrous oxide emissions from rice agriculture using PALSAR derived rice products and DNDC biogeochemical modelling

Mid-term Results

- Algorithm development using AUIG data; multi-temporal ALOS L-band successfully captures hydroperiod and dynamic range; enabling characterization of paddy status and rice development
- Decision-tree, threshold models of dynamic range and paddy flooding allow large-area rice mapping with little to no a priori data
- Mid-term ScanSAR-based rice models moderately agree ($R^2=.6$; aggregated fractional rice cover in regions with smaller rice paddies) with China NLCD rice layers; however, PALSAR provides more detail such as cropping cycles and intensity

K&C Science Team Member

William Salas
Applied GeoSolutions
87 Packers Falls Rd
Durham, NH, 03824, USA
wsalas@agsemail.com

ALOS PALSAR Rice Mapping and Monitoring for Asia

Our operational rice monitoring utilizes multi-temporal ScanSAR K&CI Strip Data for China, India, and Southeast Asia.

Below: Example model development site for approximate double rice crop calendar for Jiangxi Province, China

PALSSAR ScanSAR is augmented with fine-beam data to examine scaling issues.

Emissions Modelling

- Utilizing PALSAR to parameterize DNDC

The DNDC Model

- Plant growth
  - Water use
  - C accumulation
  - C allocation
  - Root respiration
- Soil climate
  - Temperature profiles
  - Water profiles • Water drainage
  - Redox potential profiles

Other data

- Field level plot data with measurements of plant fresh and dry weight, LAI & plant height
- Comparisons against & integration of MODIS products

Observed and DNDC-modelled CH4 fluxes from rice paddies in China, Thailand, Japan, Italy and the U.S.

Modeled CH4 flux, kg C/ha/yr