Wetlands and Paddy Rice Working Group (14-15 May 2002)

Scientific relevance:

- Carbon cycle (CH4, CO2)
- LC/LUC
- Biodiversity / Ramsar
- Hydrologic cycle

Users:

- carbon modelers
- hydrologic and climate modelers
- Ramsar
- resource managers

Laura Hess

Bill Salas

Doug Alsdorf

John Melack

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Lead organizations:

Initially:

- UCSB (tropical/subtropical wetlands)
- UNH (paddy rice)
- JPL (Kyle), Schmullius, Canada? (boreal wetlands)

Product types:

1. Wetlands / lowland paddy rice extent
2. Inundation seasonality
3. Vegetation structure (nonveg, herb, woody, phenology)

R&D:

1. Drainage management in rice paddies
2. Interferometric water level change (Alsdorf)

Inputs:

Mosaics (except for R&D)

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PADDY RICE (Bill Salas, UNH):

- acreage of paddy rice is useful, do-able product (operational); excludes dryland rice and terraced paddies on slopes

- can be done with Scansar (100 m)

- principal areas are China (G4), SE Asia and India (A1), and Indonesia (A2); additional small regions in Brazil, Africa, N. America

- in China, good collaborative network already in place for validation and for modeling (Changsheng Li, UNH: DNDC model; IRSA, Beijing; IRRI); beginning of network in SE Asia

- need to expand network, especially in India; check C-band projects

- frequent and well-timed Scansar acquisitions are critical (need two acquisitions for cultivation cycle but timing of cycles varies regionally); temporal sampling can be supplemented with Envisat, VGT, AVHRR, GLI (GLI could become critical follow-on to AQUA etc.)

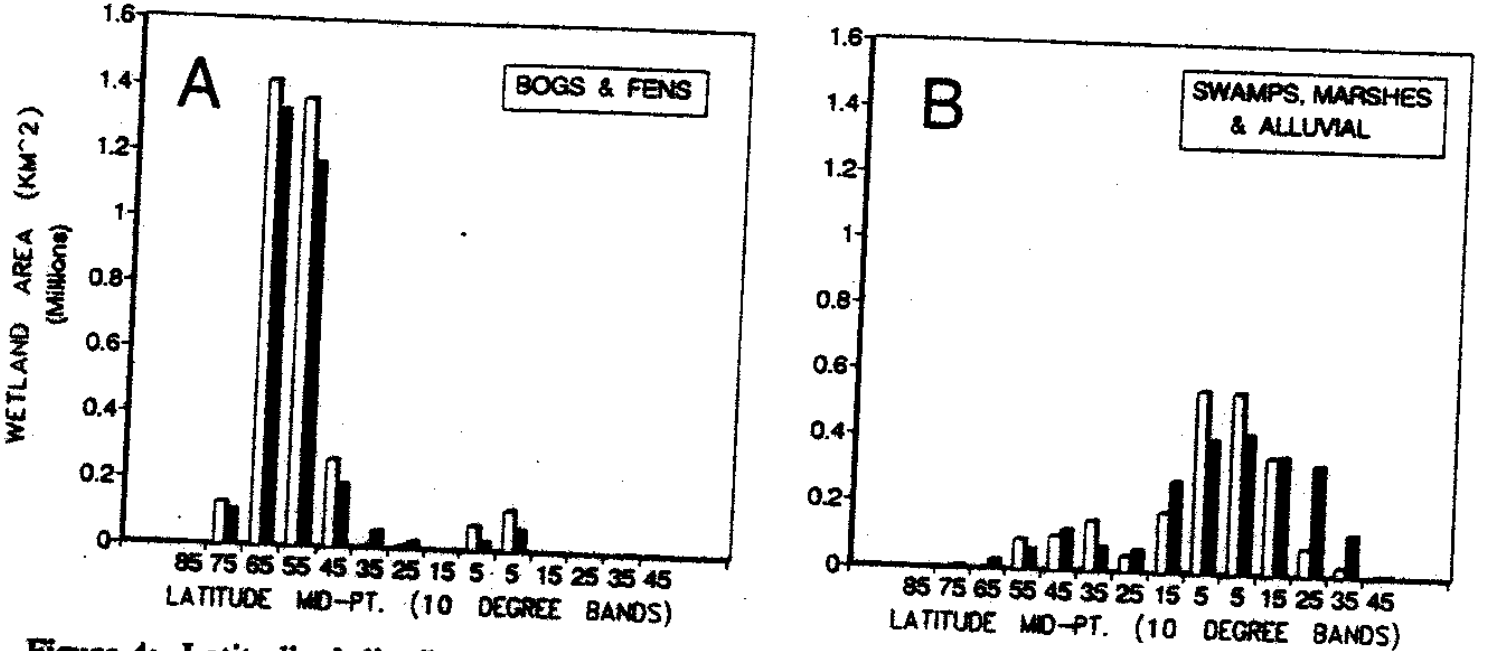

Figure 4: Latitudinal distribution of areas of broad wetland classes. Open bars represent Aselmann and Crutzen (1989) figures; solid bars represent Matthews and Fung (1987) figures. A: Bog wetland types - for Aselmann and Crutzen, bogs and fens; for Matthews and Fung, forested and nonforested bogs. B: Swamp wetland types - for Aselmann and Crutzen, swamps, marshes, and floodplain wetlands; for Matthews and Fung, forested and nonforested swamps and alluvial wetlands.

(Bartlett & Harriss 1993)

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WETLANDS:

- scope yet to be determined

minimum: Amazon, Pantanal, Bananal; Congo; Mekong; Kakadu; India?

- how global should products be?

- Amazon work as prototype

- wetlands extent map at 100 m resolution, using JERS-1 mosaics

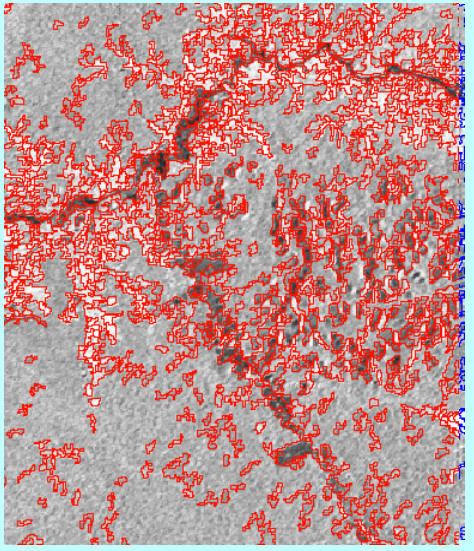
- seasonality using Scansar (100 m)

- timing is everything

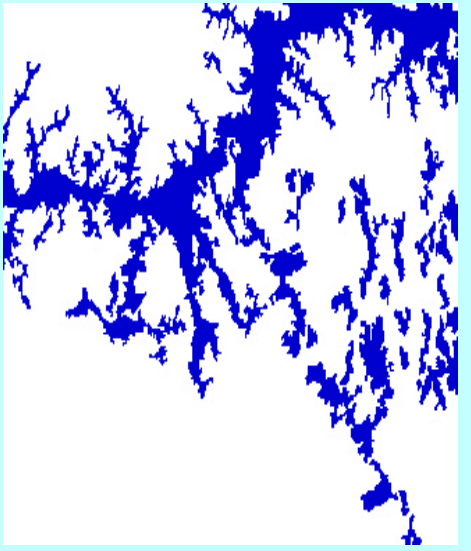
- we will provide Ake with additional timing input

Wetlands Mapping Methodology

1. Mask out non-wetlands for the entire study area by semi-automated image segmentation and classification



A. Segment high-water image into polygons

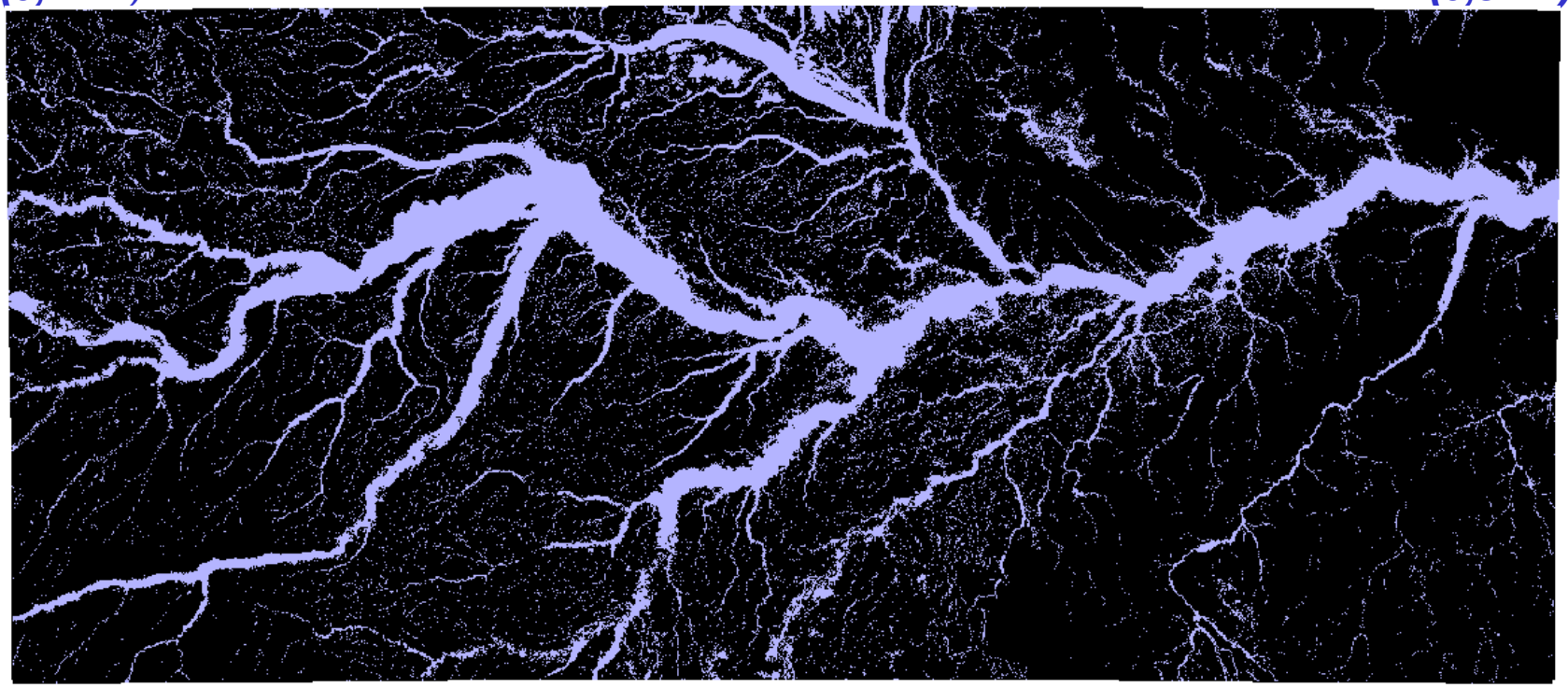


B. Cluster and classify polygons

C. Edit polygons

Central Amazon Wetlands Mapping from GRFM Mosaics (100 m resolution)

(0,72W) (0,54W)

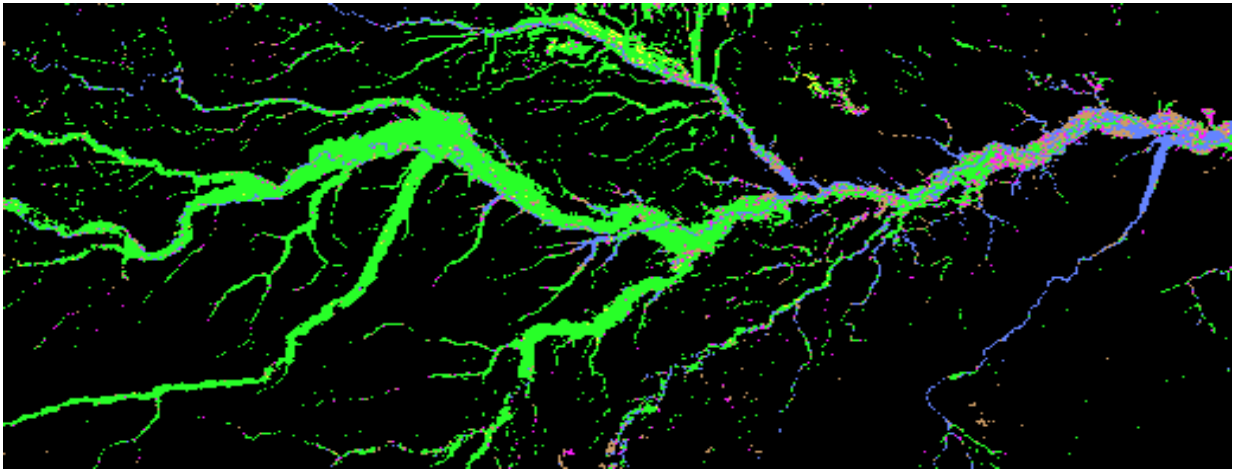


(8S,72W) (8S,54W)

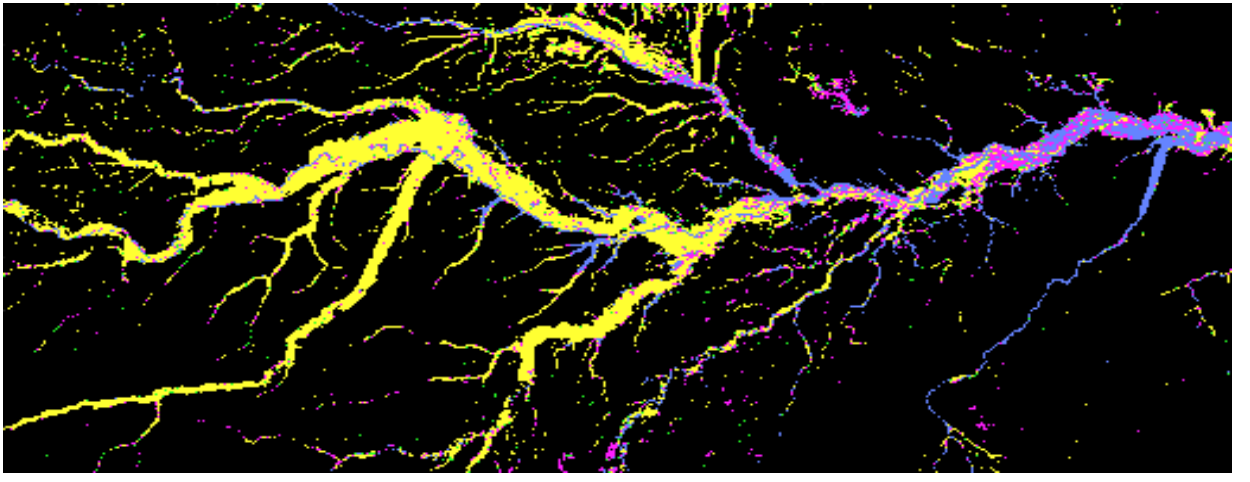
Wetland	0.30 $km^2 x10^6$	17%
Non-Wetland	1.46 $km^2 x10^6$	83%
Total	1.76 $km^2 x10^6$	

Classified JERS-1 Mosaics: Low and High Water

Low-water stage



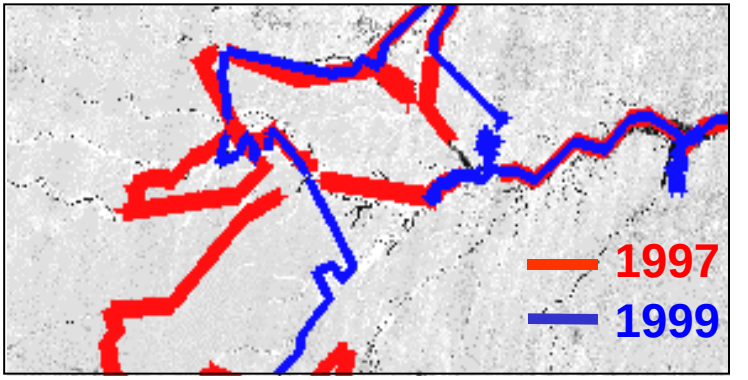
High-water stage

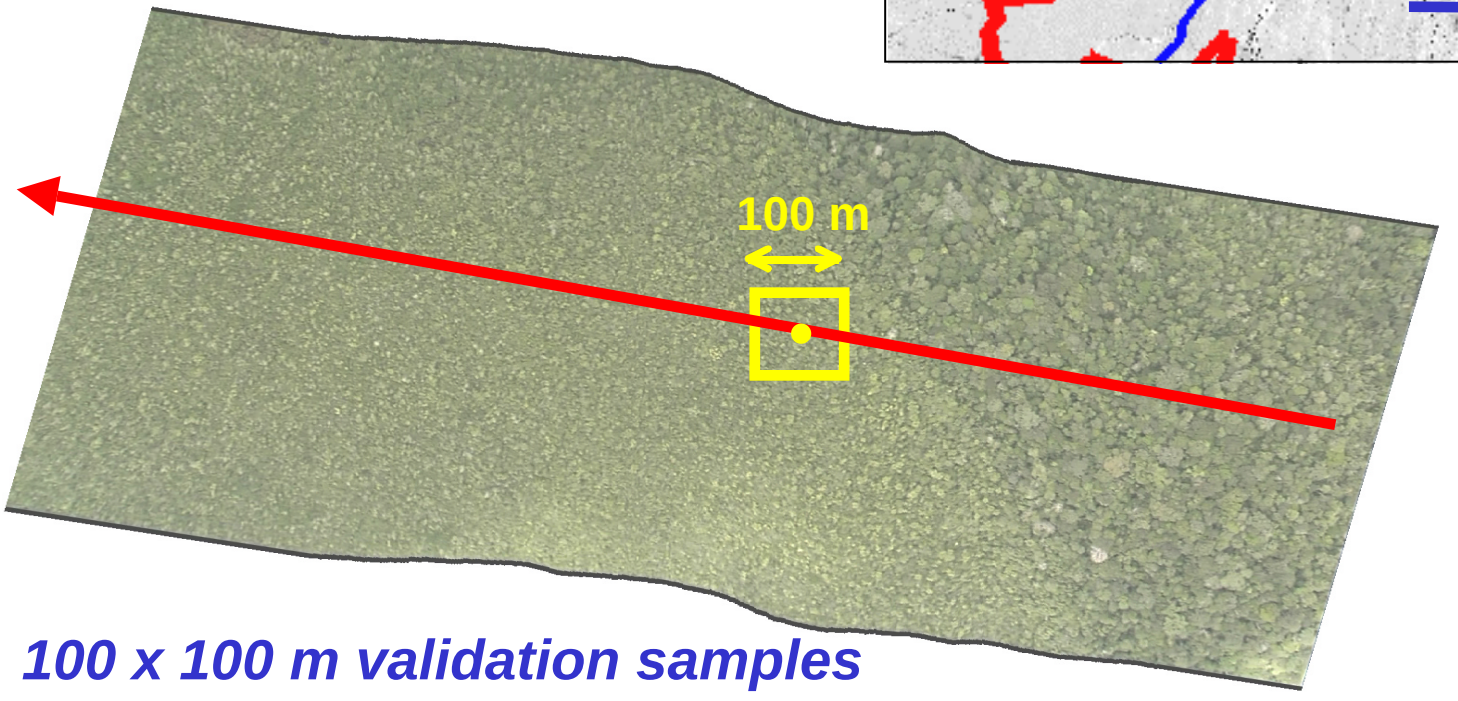


Non-wetland mask
Open water
Soil, grass, low shrub
Flooded grass, shrub
Forest (not flooded)
Flooded forest

Accuracy Assessment

High-resolution digital videography was acquired during two aerial surveys





100 x 100 m validation samples were taken at randomly selected points along flight track

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Technical concerns:

- **Scansar calibration**
- **incidence angle variability**
- **Scansar timing**
- **co-registration of multi-temporal sequences**
- **gain variability**
- **geocoding**