4th Science Advisory Panel Meeting

WETLANDS THEME

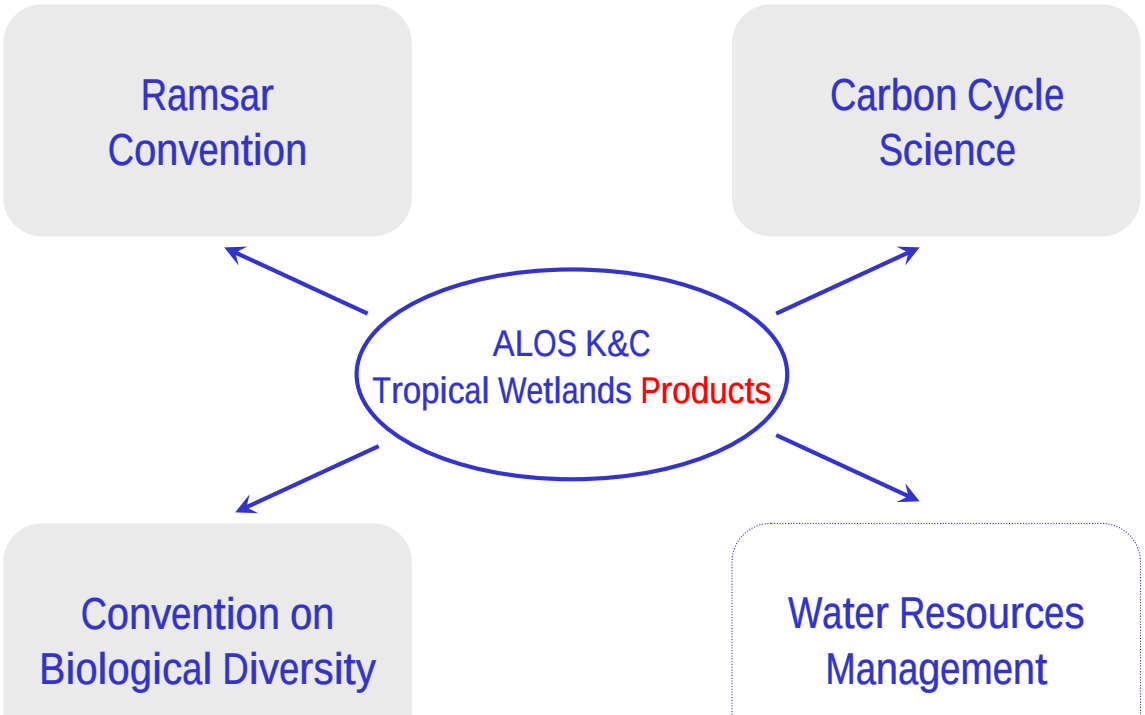
Product Outline:

Obj. I. Tropical Wetlands Extent

Obj. II. Tropical Wetlands Cover

Obj. III. Seasonal Dynamics of Large Tropical Wetlands

L. Hess & J. Melack, ICESS, UC Santa Barbara



Carbon cycle science

- critical need for a global wetlands dataset suitable for landscape-based and process-based methane modeling
- basic parameters needed are vegetation structure, seasonal inundation state, phenology; for prediction, need to be link-able to hydrologic models

Ramsar

- support to Global Wetlands Inventory (products + training)
- disturbance monitoring of sensitive habitats (mangroves, peatlands)
- hydrologic monitoring of regionally significant wetlands

Convention on Biological Diversity

- Ramsar is lead partner for wetlands; fish, waterfowl

Water resources management; natural hazards planning

- need for datasets to enable watershed-based regional planning to ensure water supplies and quality and to predict/prevent catastrophic flooding; e.g., River Basin Initiative

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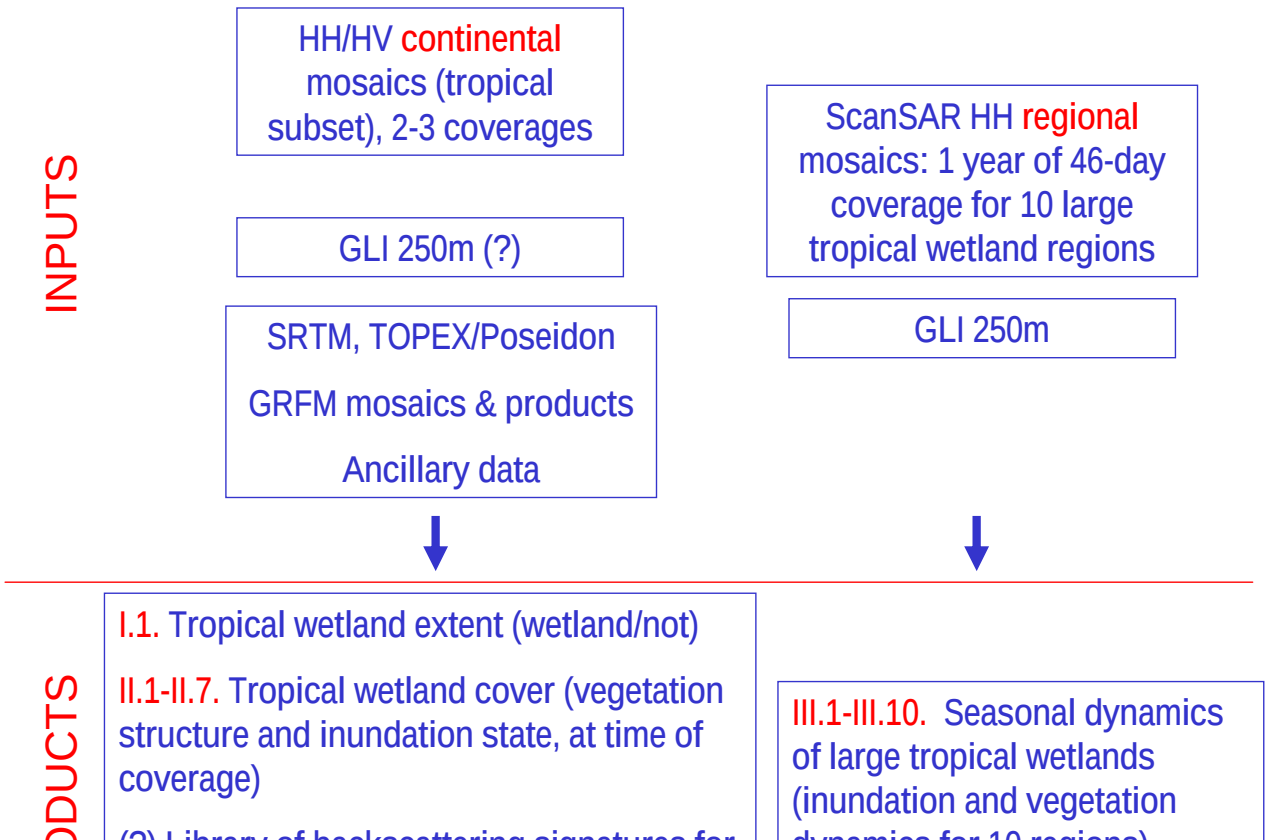


- uniform core methodology and classification system; initial phase based on methodology used for GRFM Amazon; WI/Ramsar input

- provide products at multiple scales (reduced resolution for global modeling applications)

- served via Wetlands International and EDC DAAC

- tied to SRTM DEM and watershed delineations (link to NASA Hydrology surface waters group); Hydro1K example

- integrated with wetland change monitoring and irrigated rice products

- collaborative effort with regional partners

SAR Remote Sensing of Amazonian Wetlands

Laura Hess
University of California, Santa Barbara

UCSB	INPE	INPA
John Melack	Evlyn Novo	Bruce Forsberg
Laura Hess	Maycira Costa	UCLA
Mary Gastil	Claudio Barbosa	Doug Alsdorf

Hydrology

- inundation depth and duration
- seasonal variability
- interannual variability

+

Vegetation Structure

- woodiness
- height
- stem density / canopy cover

Biogeochemistry

Fisheries & wildlife habitat

Environmental sensitivity

Ecosystem services

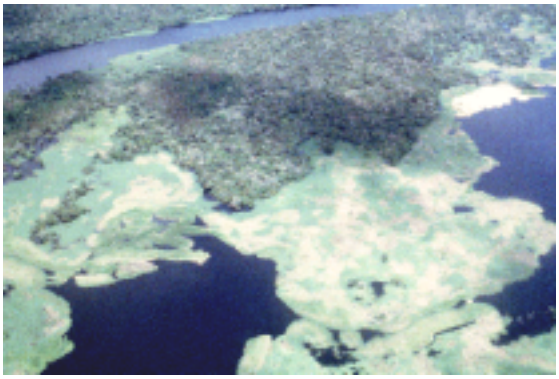
Biodiversity

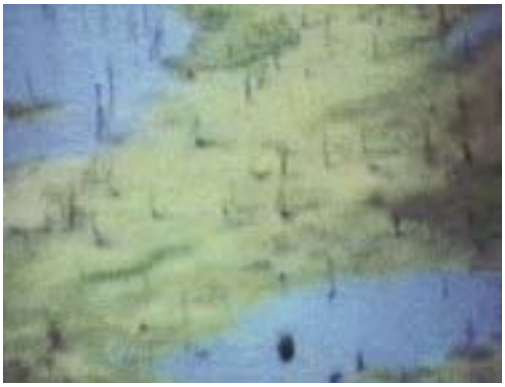
Cabaliana floodplain:

Flooded forest, woodland, and shrub vegetation, aerial views

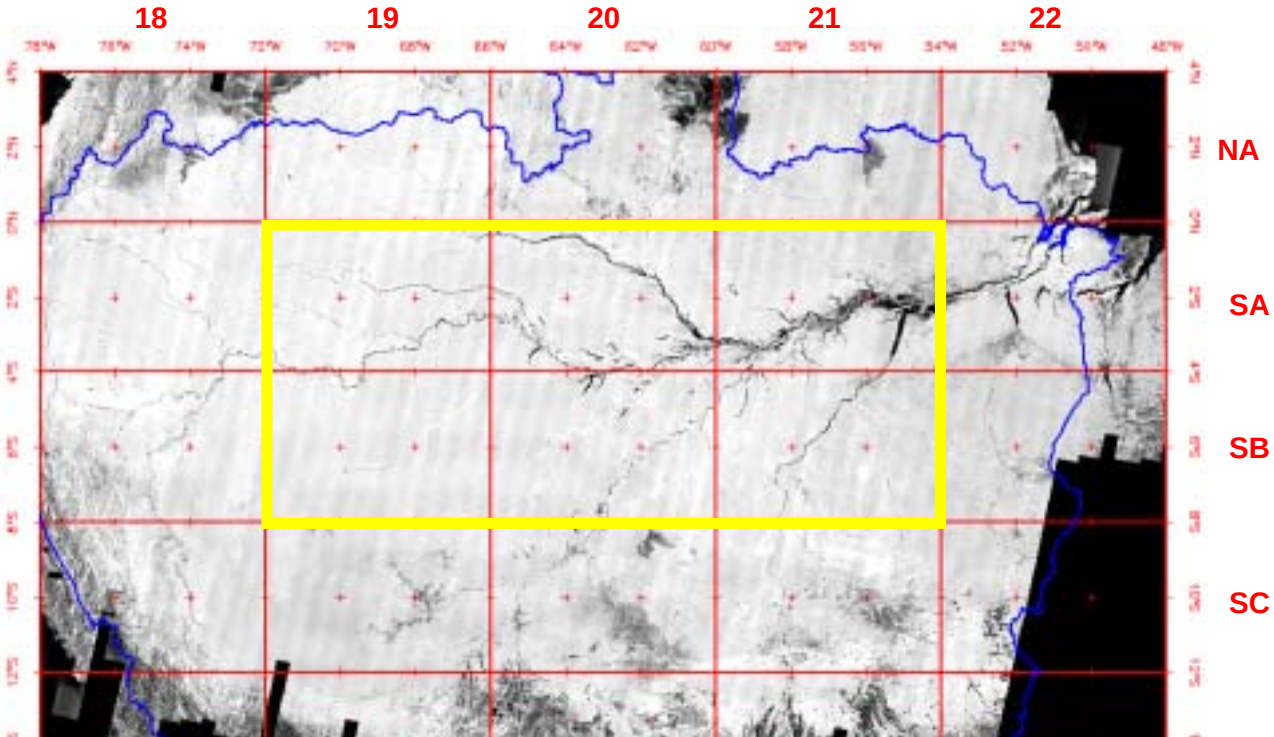
Upper and lower left: high water

Lower right: low water

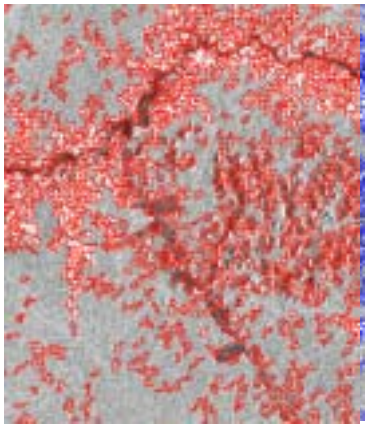




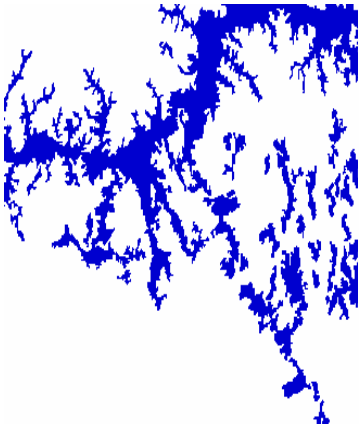
Central Amazon study area, Melack/Novo LBA Study



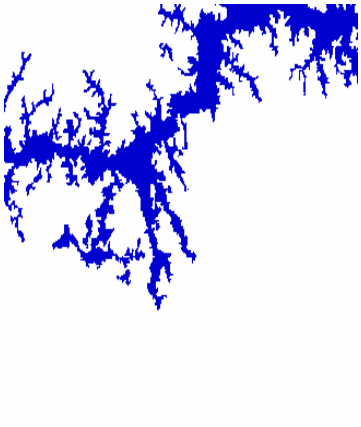
1. Mask out non-wetlands for the entire study area by semi-automated image segmentation and classification



A. Segment high-water image into polygons



B. Cluster and classify polygons

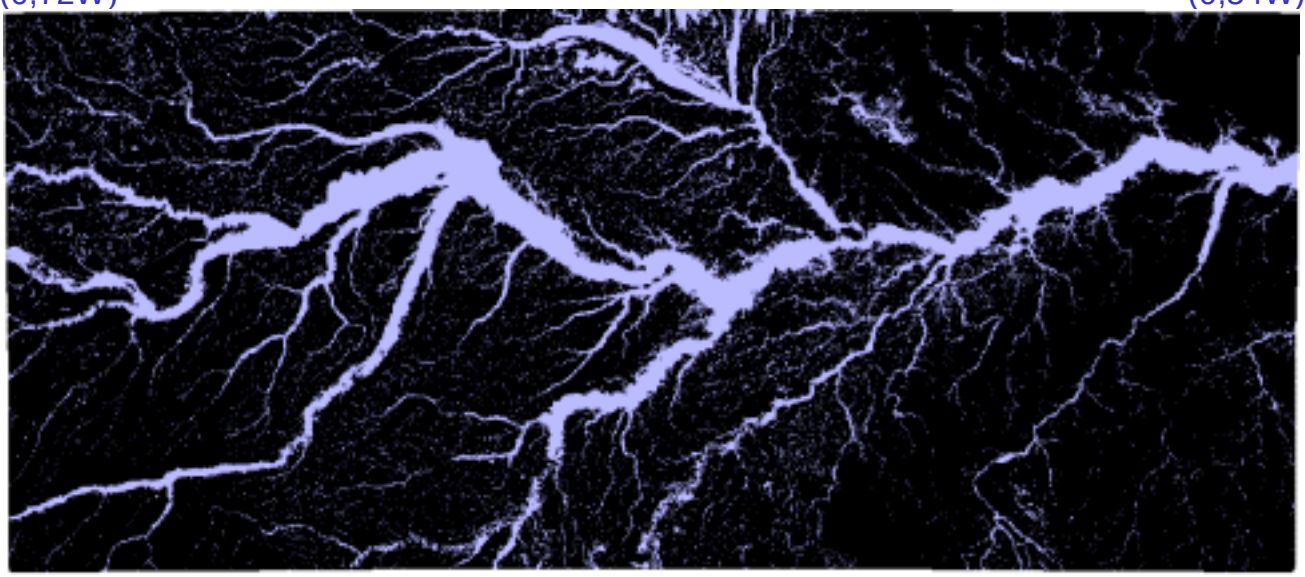


C. Edit polygons

2. For wetlands only, apply a rules-based classifier

Central Amazon Wetlands Mapping
from JERS-1 Mosaics (100m resolution)

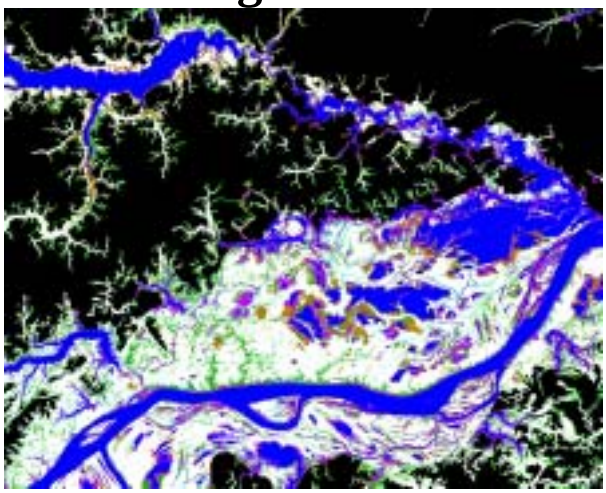
(0,72W) (0,54W)



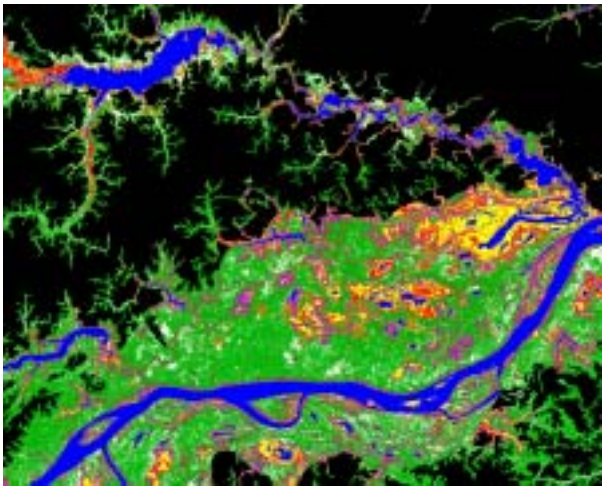
(8S,72W) (8S,54W)

Wetland	0.30 $km^2 x 10^6$	17%

High Water

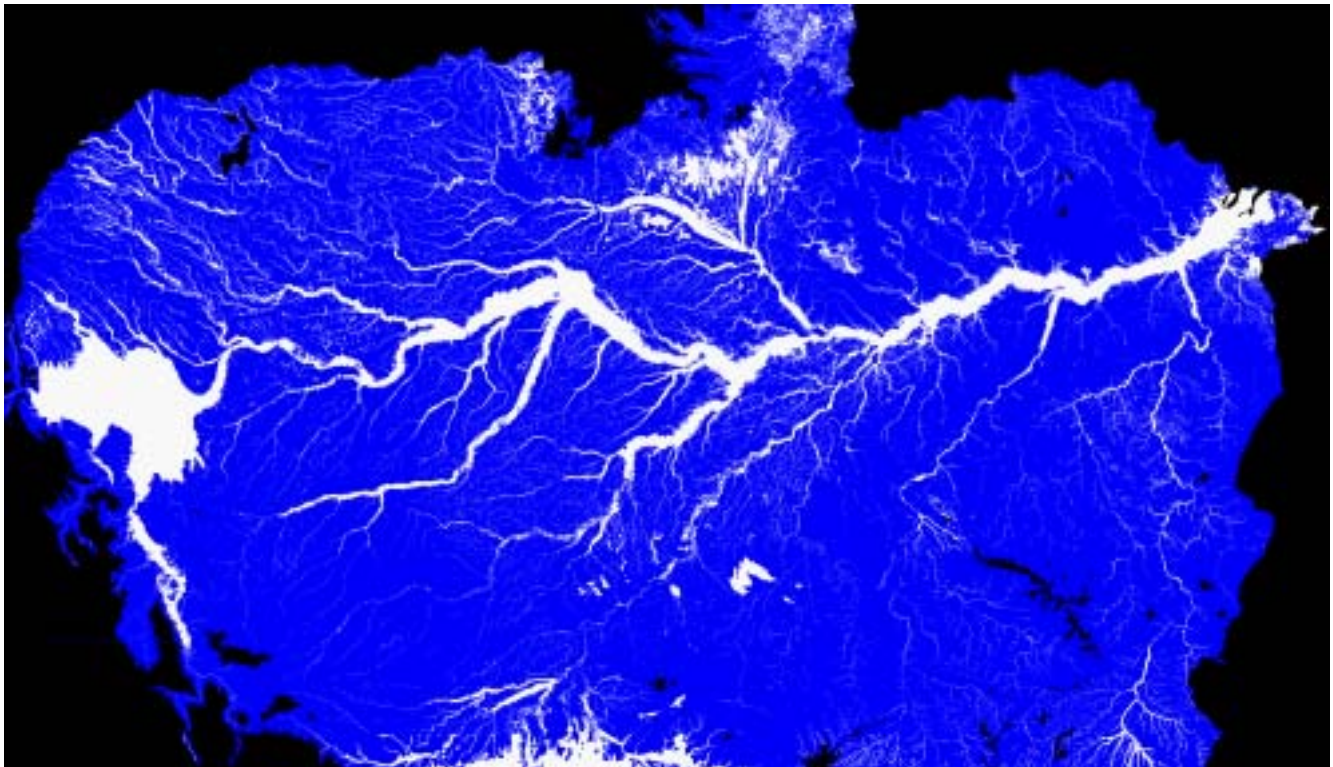


Low Water



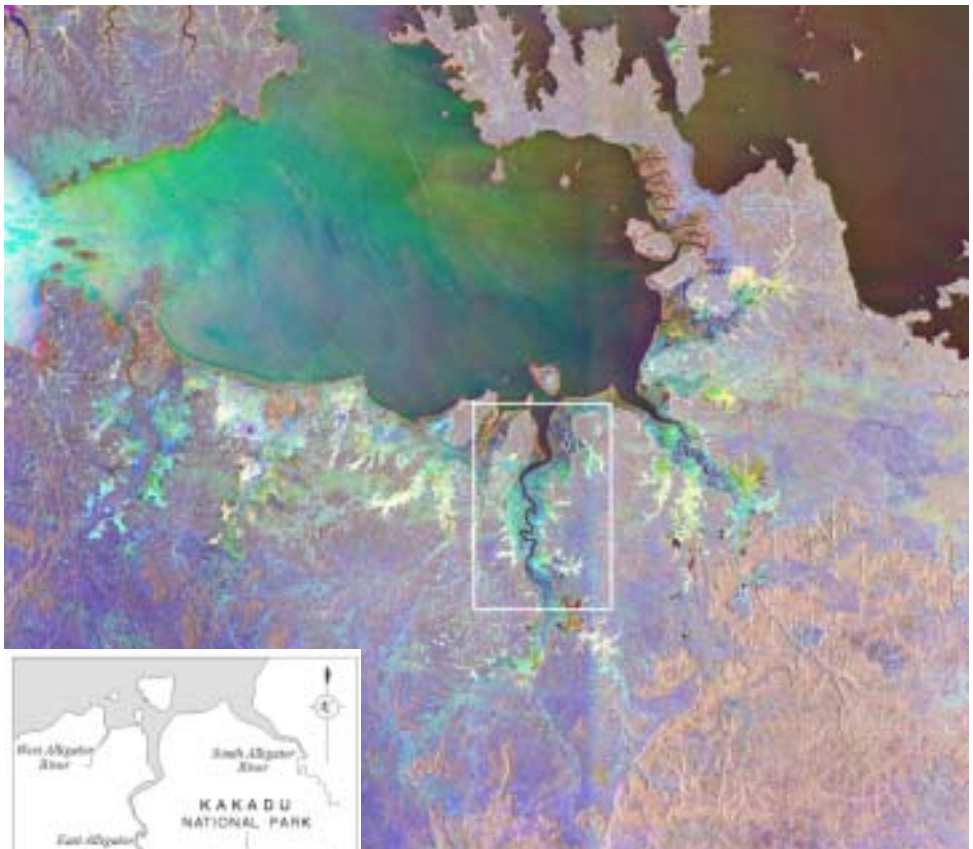
Water
Bare or herbaceous, non-flooded
Herbaceous, flooded
Shrub, non-flooded
Shrub, flooded
Woodland, flooded
Forest, non-flooded
Forest, flooded

Amazon Basin below 500m: wetlands 17%, uplands 83%



Lowland Amazon Basin (<500 m asl) (5.19 million km^2)

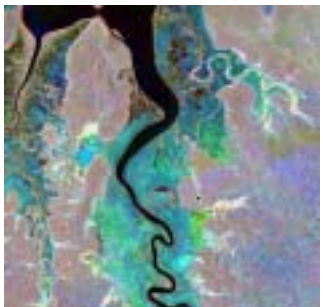
Methane Emission	**25 ± 8 Tg C y^{-1}**
Greenhouse gas potential as CO_2	**~ 0.5 Pg C y^{-1}**



STUDY SITES

West Alligator River, Kakadu N.P. Australia. (1998 RADARSAT Scansar Composite/ Change Image)

February (Blue)
WET SEASON
May (Green)
EARLY DRY SEASON
September (Red)
LATE DRY SEASON



- coordination between K&C tropical wetlands product leads

- need mosaics ASAP

- how to incorporate capacity-building, training

- to what extent will GLI be used; sunglint on inland waters

- funding!!!!