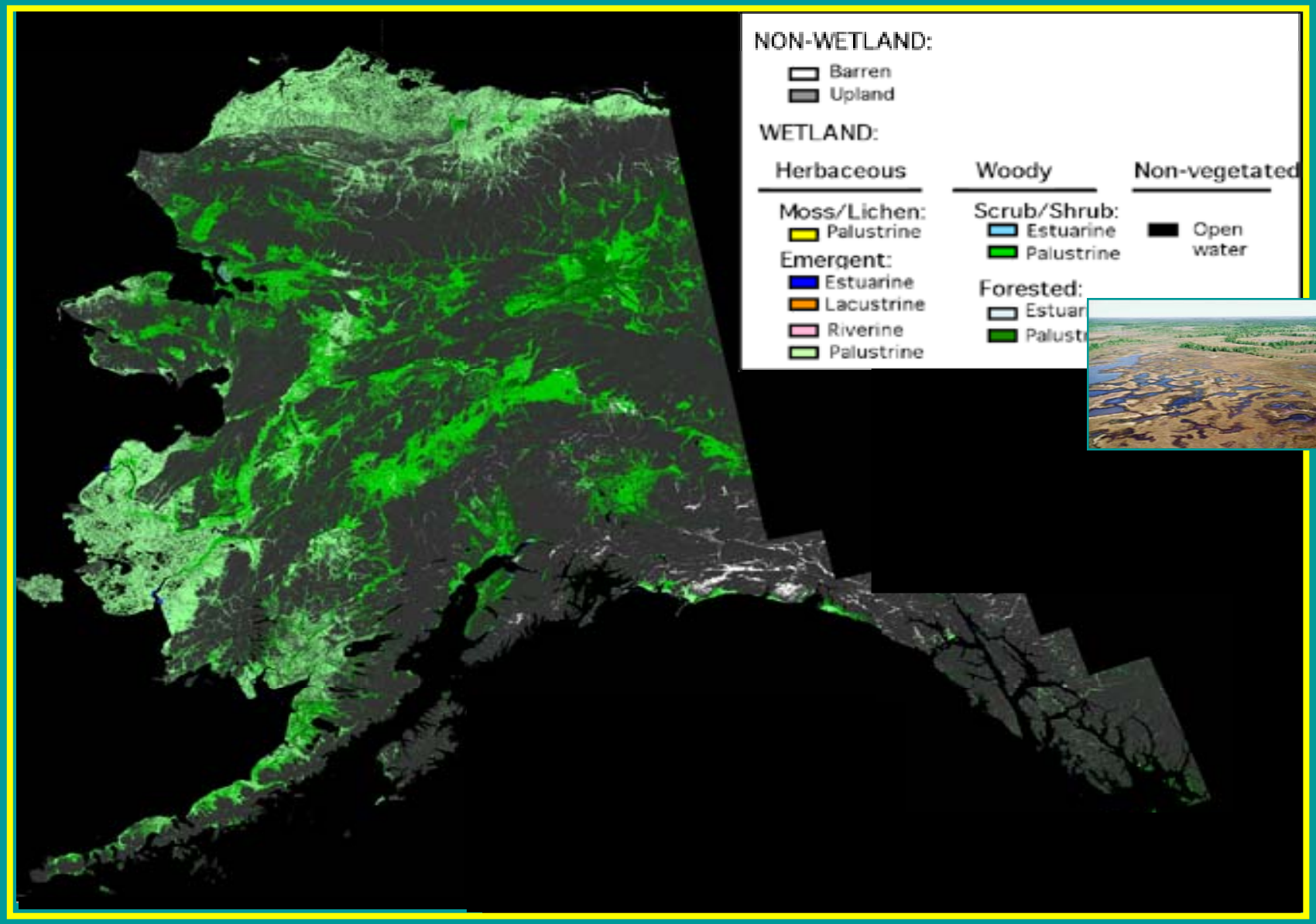
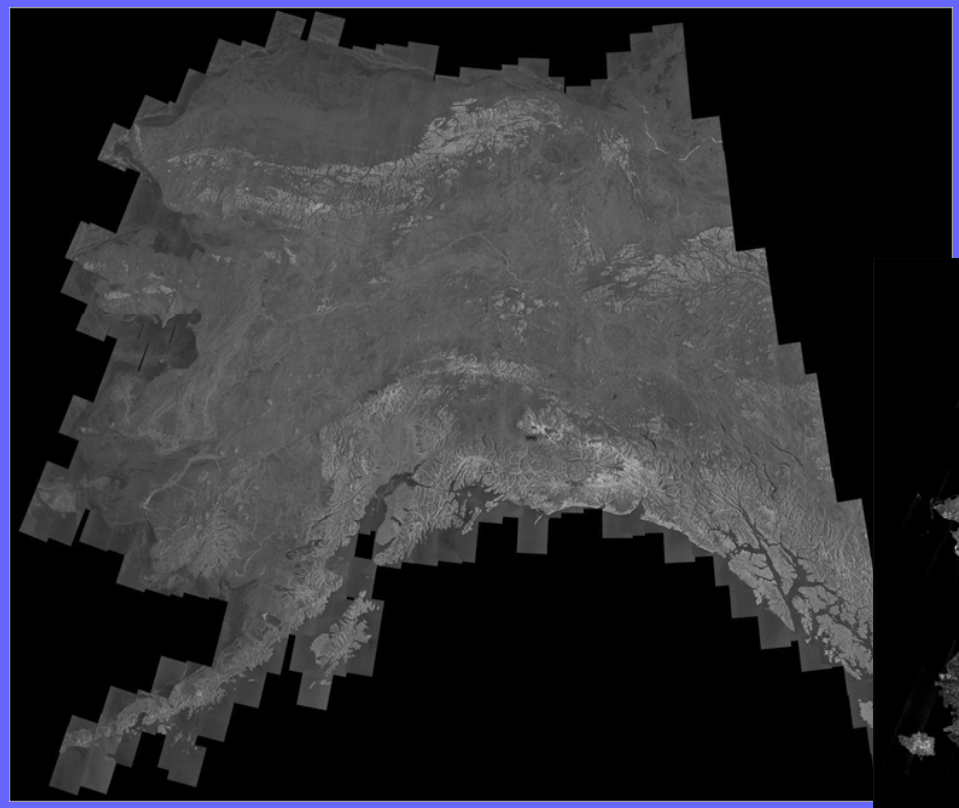
Alaska Wetlands Map from Satellite L-Band Synthetic Aperture Radar



A 100-meter resolution wetlands map of Alaska has been developed using JERS-1 SAR imagery.

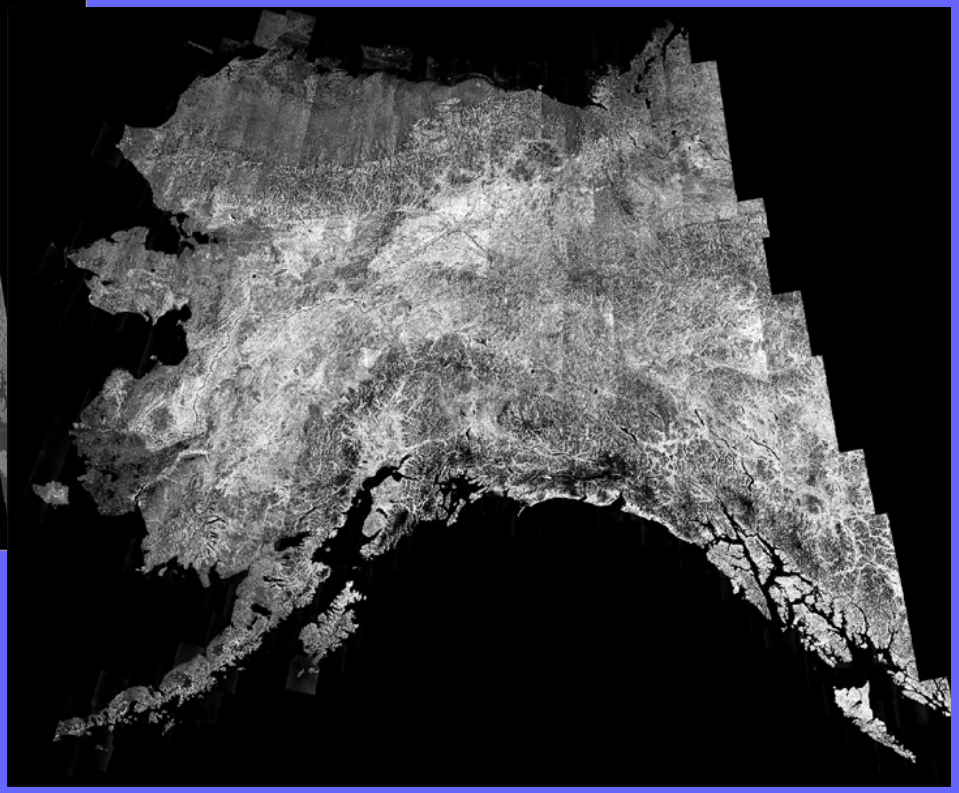
Whitcomb, Moghaddam, McDonald, Kellndorfer, and Podest, 2009

L-band Radar Imagery from JERS-1 Boreal Mapping Mission



Winter

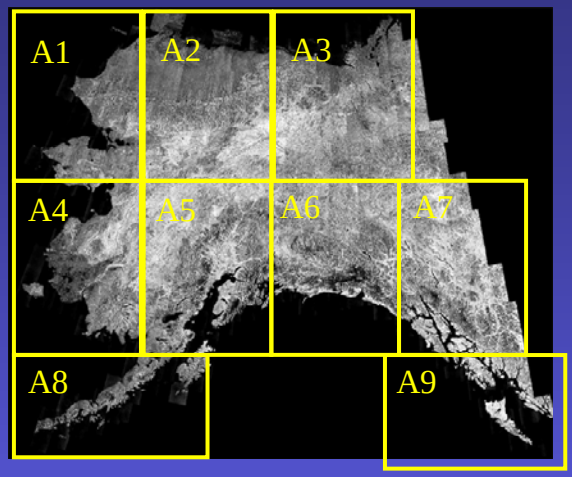
Significant pass-to-pass striping, pointing to temporal scene variations



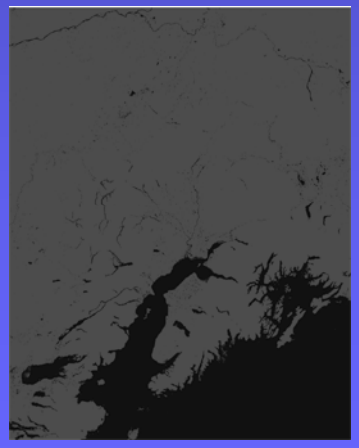
Summer

Wetlands Classification Approach

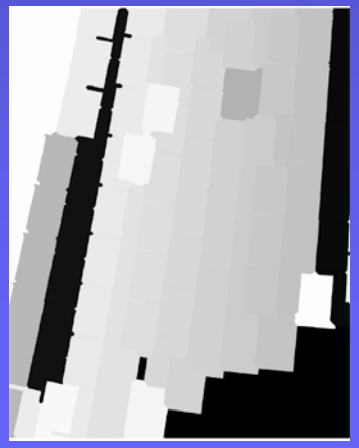
- The Alaska radar mosaic is divided into 9 tiles, and each tile classified separately, with enough overlap to ensure consistency of class definitions
- 100m resolution
- Example data layers for a tile:




Tile A5 DEM

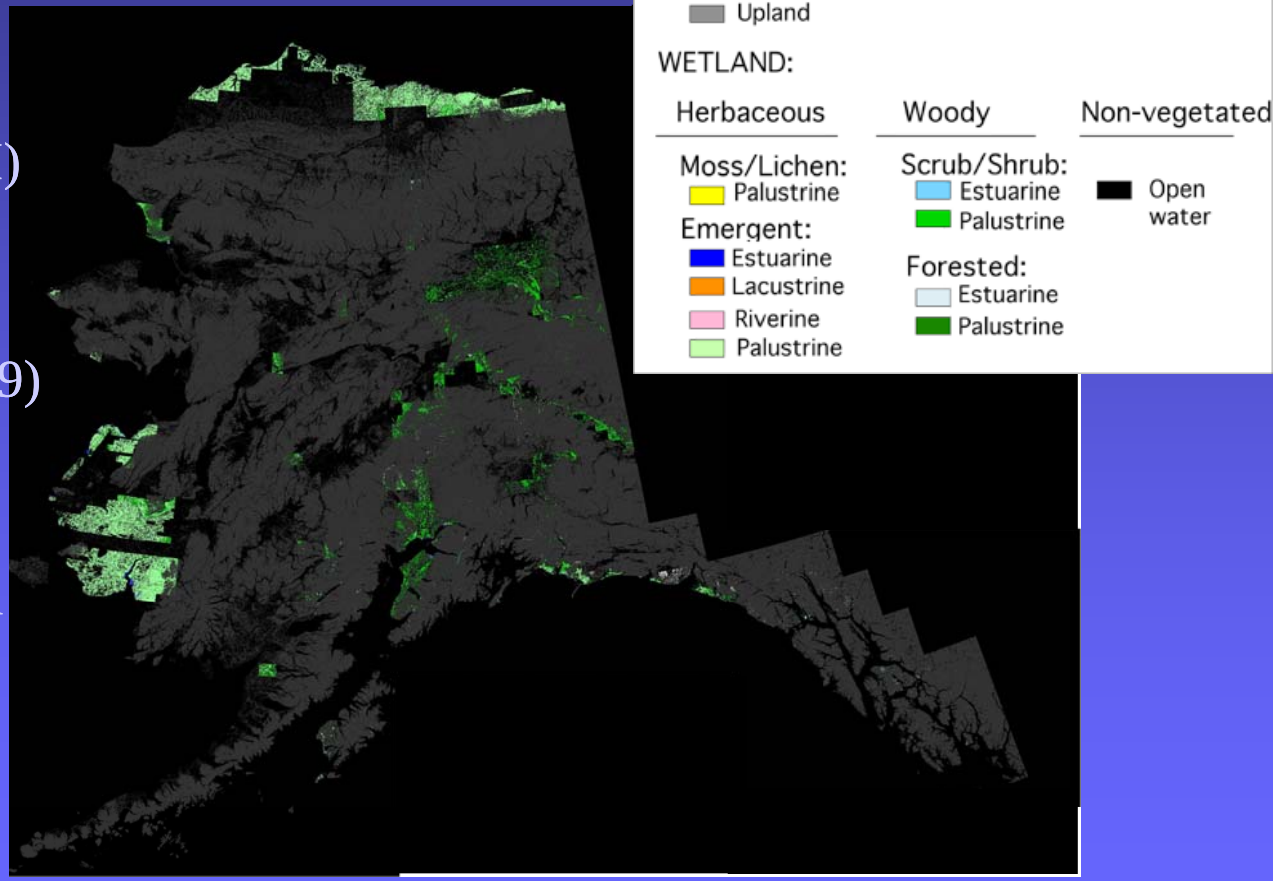

Tile A5 open water

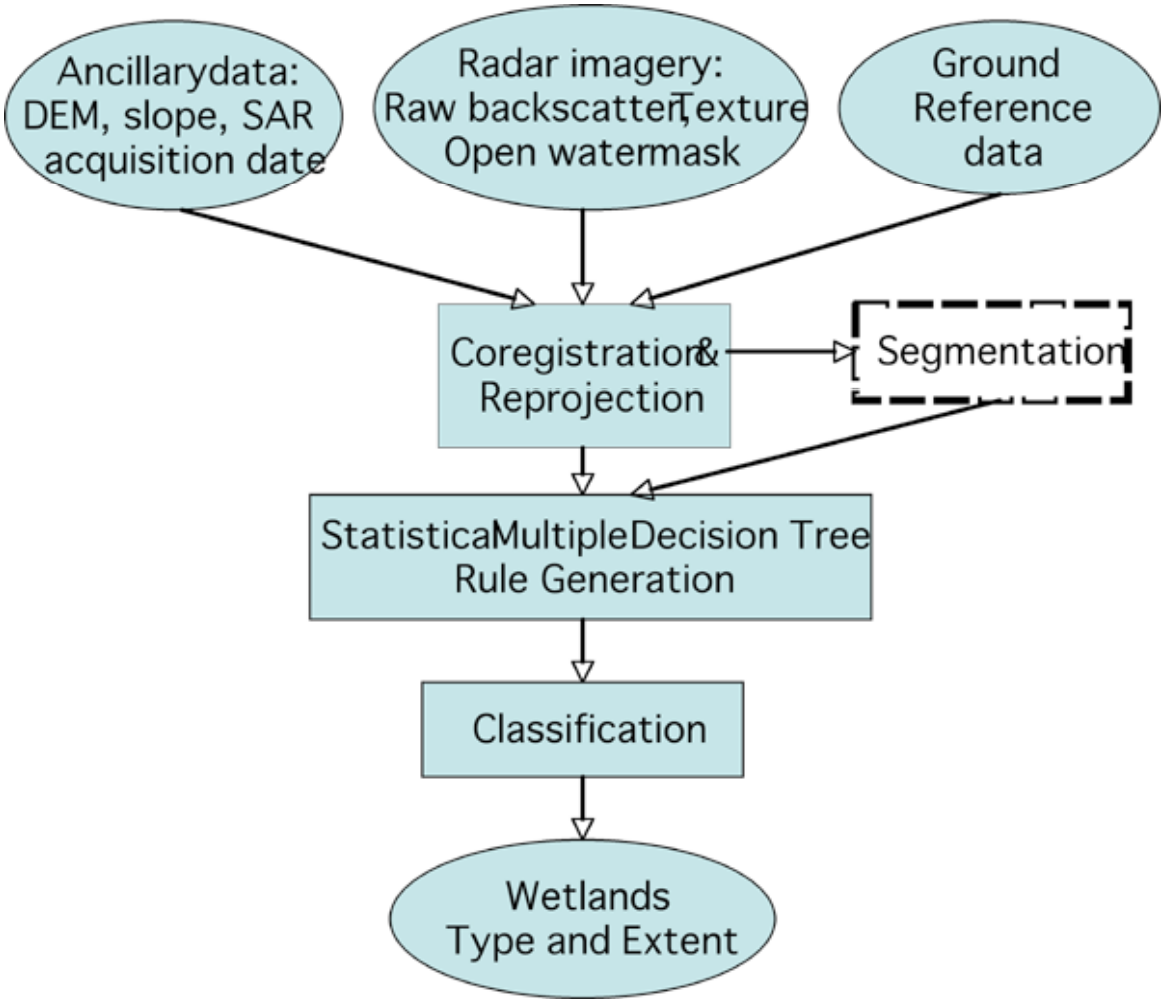

Tile A5 texture


Tile A5 acquisition date

Wetlands Classification Approach

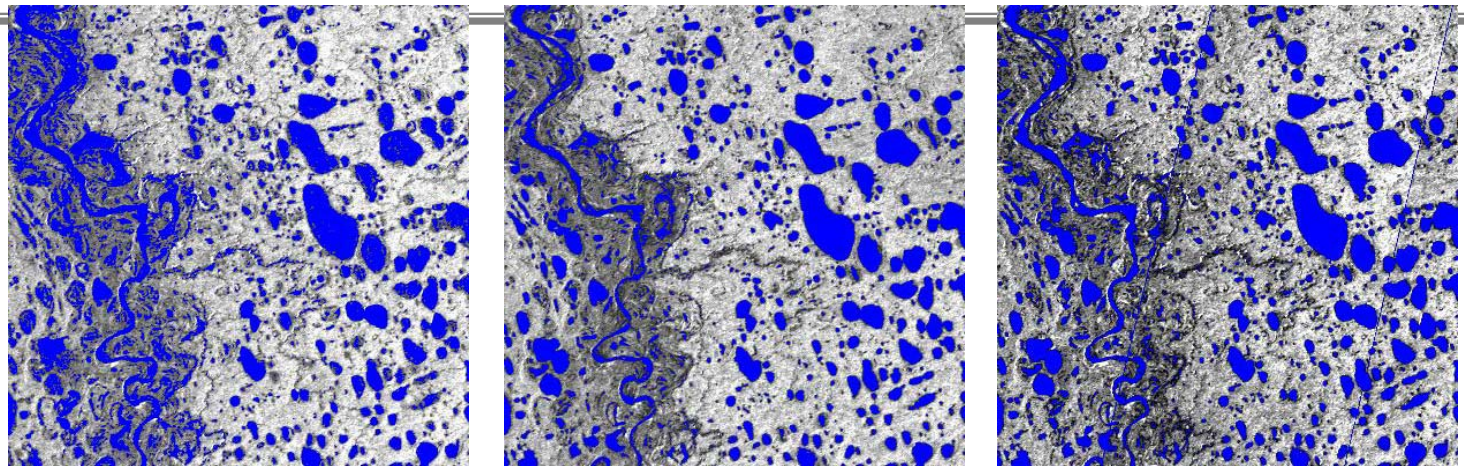
- Ground reference data set primarily from National Wetlands Inventory (NWI)
- NWI uses Cowardin's classification system (1979) for the US
- Nonwetlands classes from Alaska Geospatial Data Clearinghouse (AGDC)




Ancillarydata:
DEM, slope, SAR
acquisition date
Radar imagery:
Raw backscatter, Texture
Open watermask
Ground
Reference
data
Coregistration &
Reprojection
Segmentation
StatisticaMultipleDecision Tree
Rule Generation
Classification
Wetlands
Type and Extent

Open Water Change- North Slope, Alaska

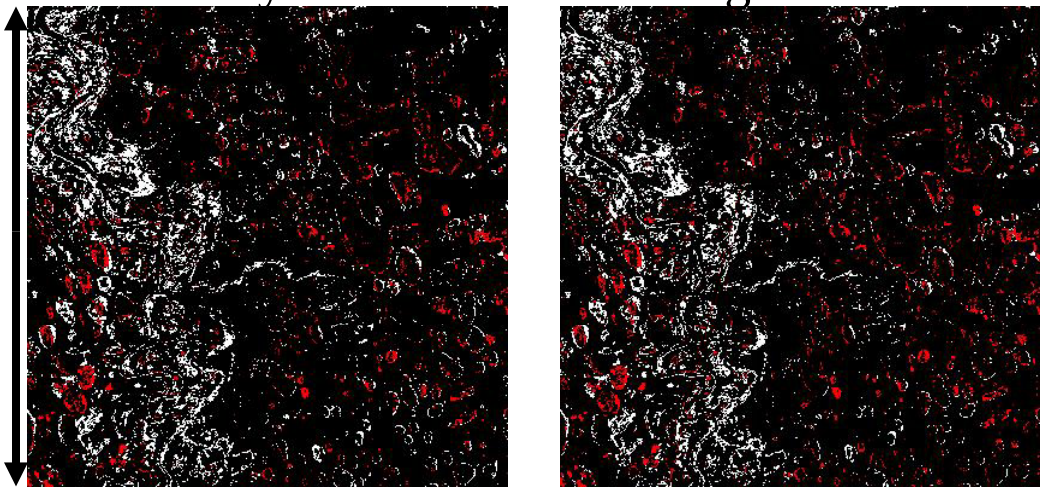
The top shows open water overlayed on the JERS image and the bottom shows open water change relative to June.



June 1998 July 1998 August 1998

More open water
Less open water
No change

40 km



Open water change June/July

Open water change June/August

Open Water Change Relative to June

	Dryer	Wetter
Jul.	7.7%	2.7%
Aug.	6.9%	3.2%

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

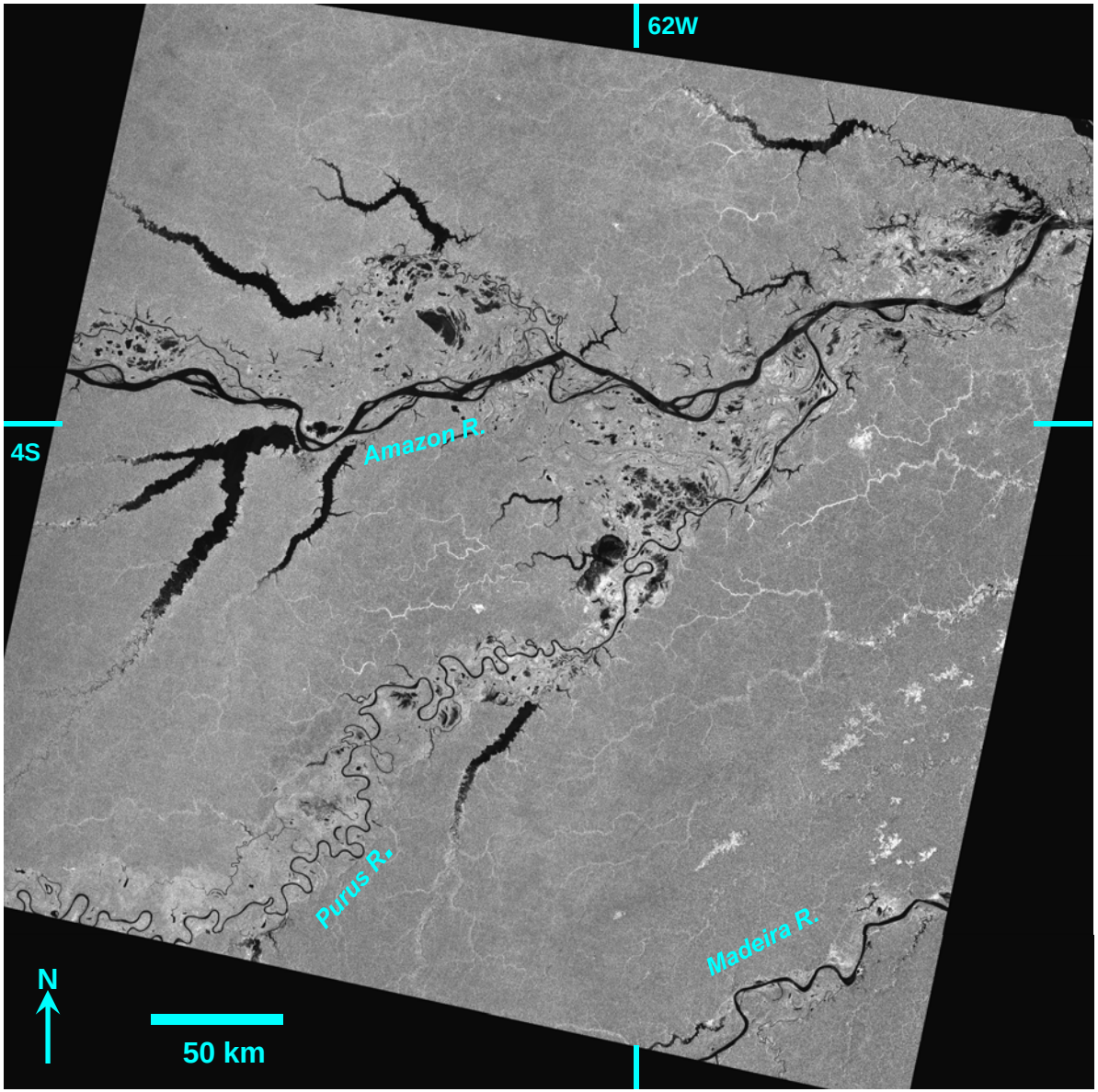
Repeat interval: 46 days

ALOS PALSAR, ScanSAR mode

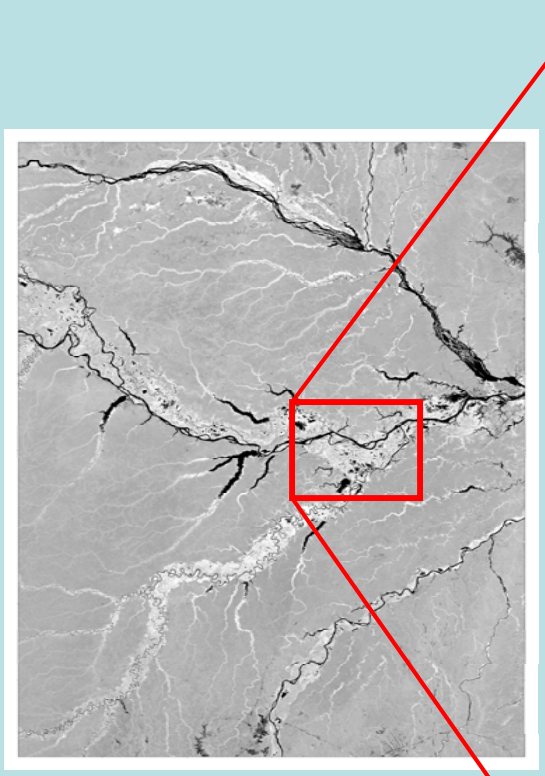
L-band, HH-pol

350-km swath width

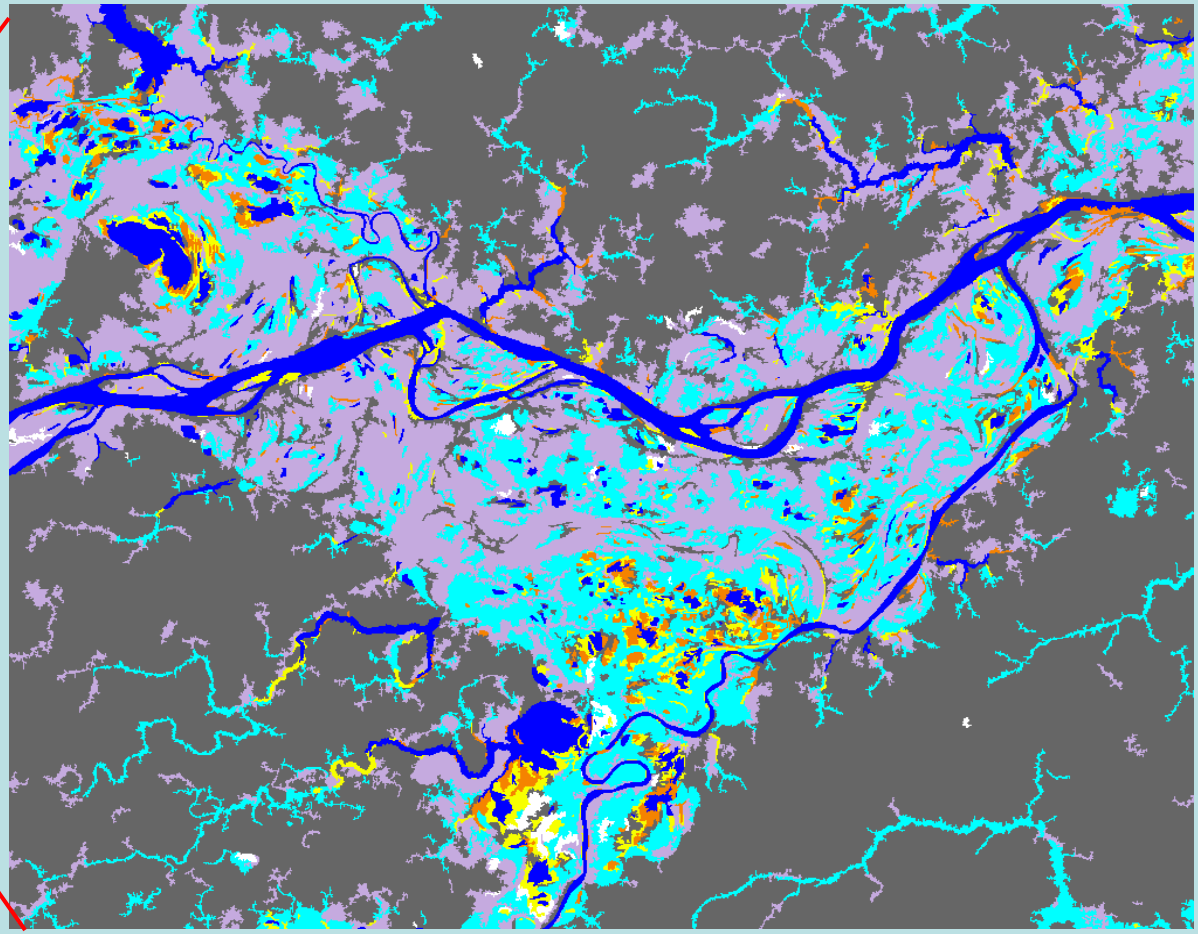
100 m pixel



Sample raster product for Piagaçu-Purus Reserve, Brazil



600 km



Open water

Aquatic macrophyte

Shrub

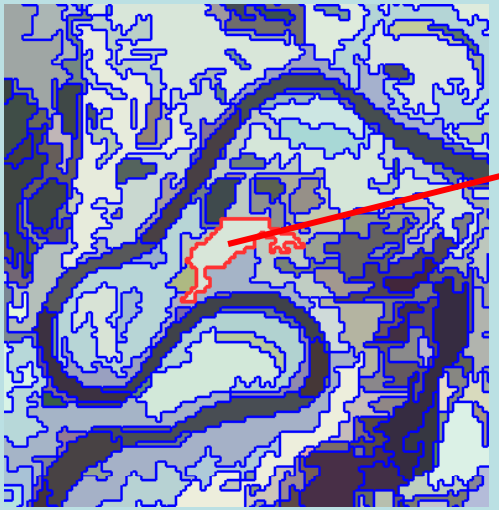
Non-wetland

Forest, flooded 1-2 m/a

Forest, flooded 3-6 m/a

Forest, flooded > 6 m/a

Sample vector product for Piagaçu-Purus Reserve, Brazil



No.	LCLevel4	LCLevel5	LCLevel6	LCLevel7	FIDate1	FIDate2	FIDate3
45	Woody	Tree	Closed	Tall	0	0	0
46	Woody	Tree	Closed	Tall	0	0	0
60	Woody	Tree	Closed	Tall	0	0	0
61	Woody	Tree	Closed	Tall	0	0	0
65	Woody	Tree	Closed	Tall	1	1	0
66	Woody	Tree	Closed	Tall	1	1	0
67	Woody	Tree	Closed	Tall	1	0	0
69	Woody	Tree	Closed	Tall	1	0	0
70	Woody	Tree	Closed	Tall	1	1	0
71	Woody	Tree	Closed	Tall	1	1	0
79	Woody	Tree	Closed	Tall	1	1	1
80	Woody	Tree	Closed	Tall	1	1	1

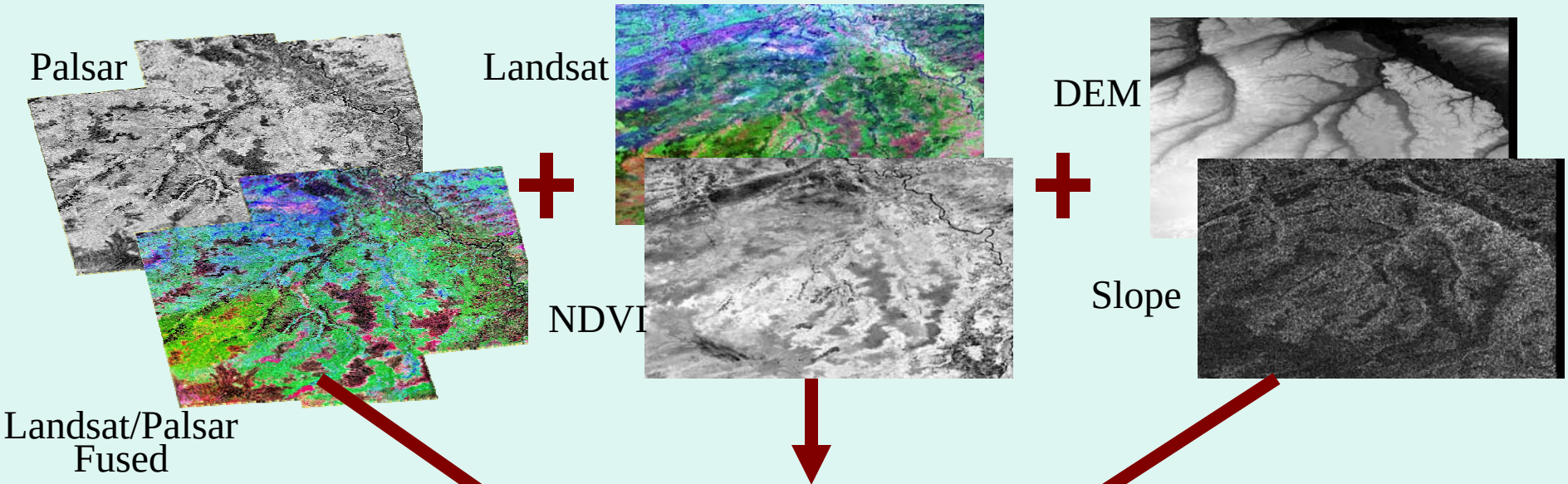
- Raster products (wetland extent, vegetation cover, and inundation period) synthesize flooding information from many dates

- Knowledge of flooding state on individual dates is important for cross-product comparison and use in models, but would increase product volume by roughly 10x if presented in raster format

- Flooding state for specific dates is therefore formatted as shapefile and attribute (dbf) file giving flooding status for all available dates for each image object

- Attribute file also includes presence/absence of seasonal aquatic macrophytes, and LCCS hierarchical classes

Wetland Classification of the Chaya Basin



The above images and derived products have been coregistered to a common projection and 30 meter resolution.

The open water classification generated previously was used to mask open water bodies

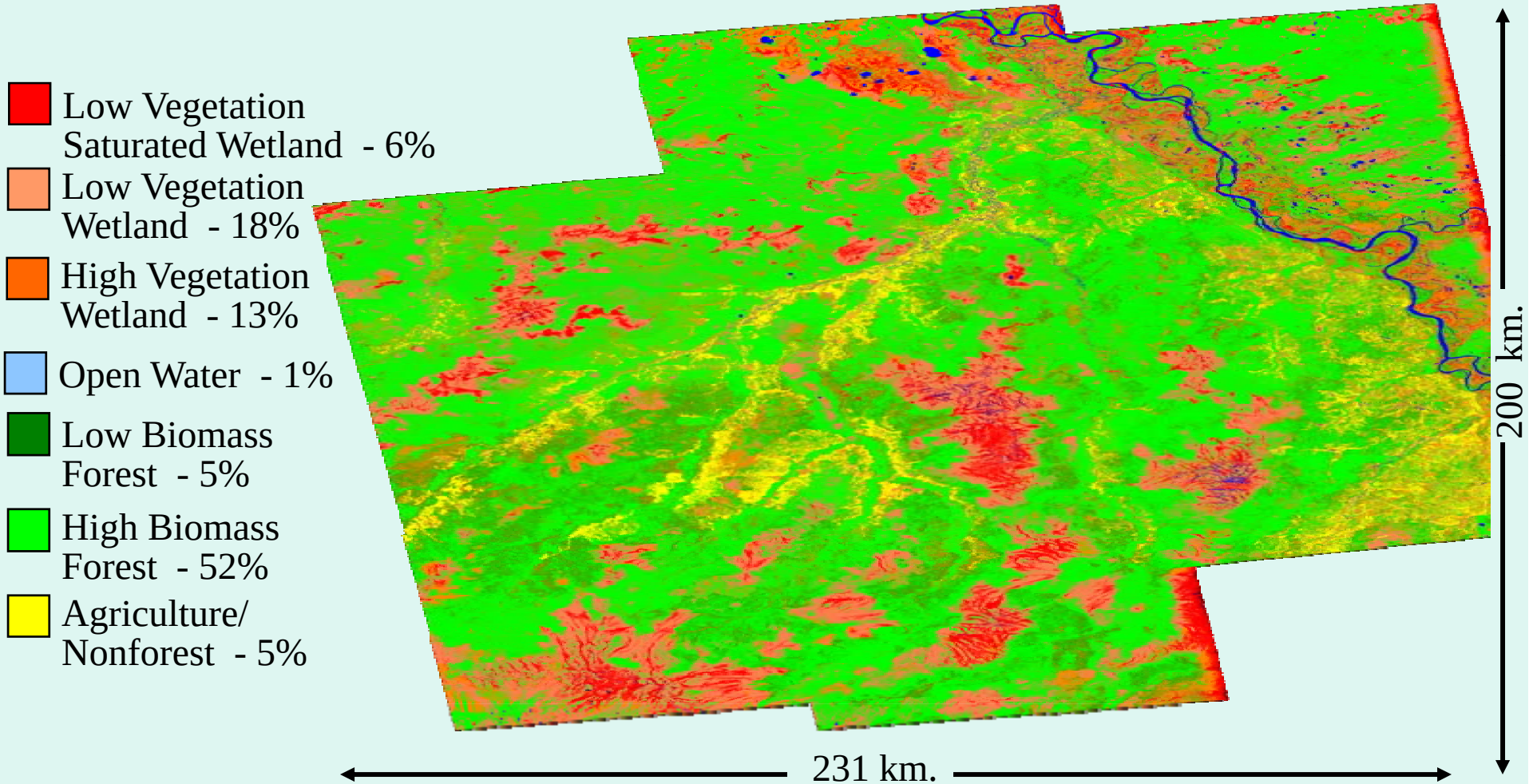
Image Segmentation, Training data

Image segmentation was applied using a classification software known as Ecognition.

Decision Tree Classifier

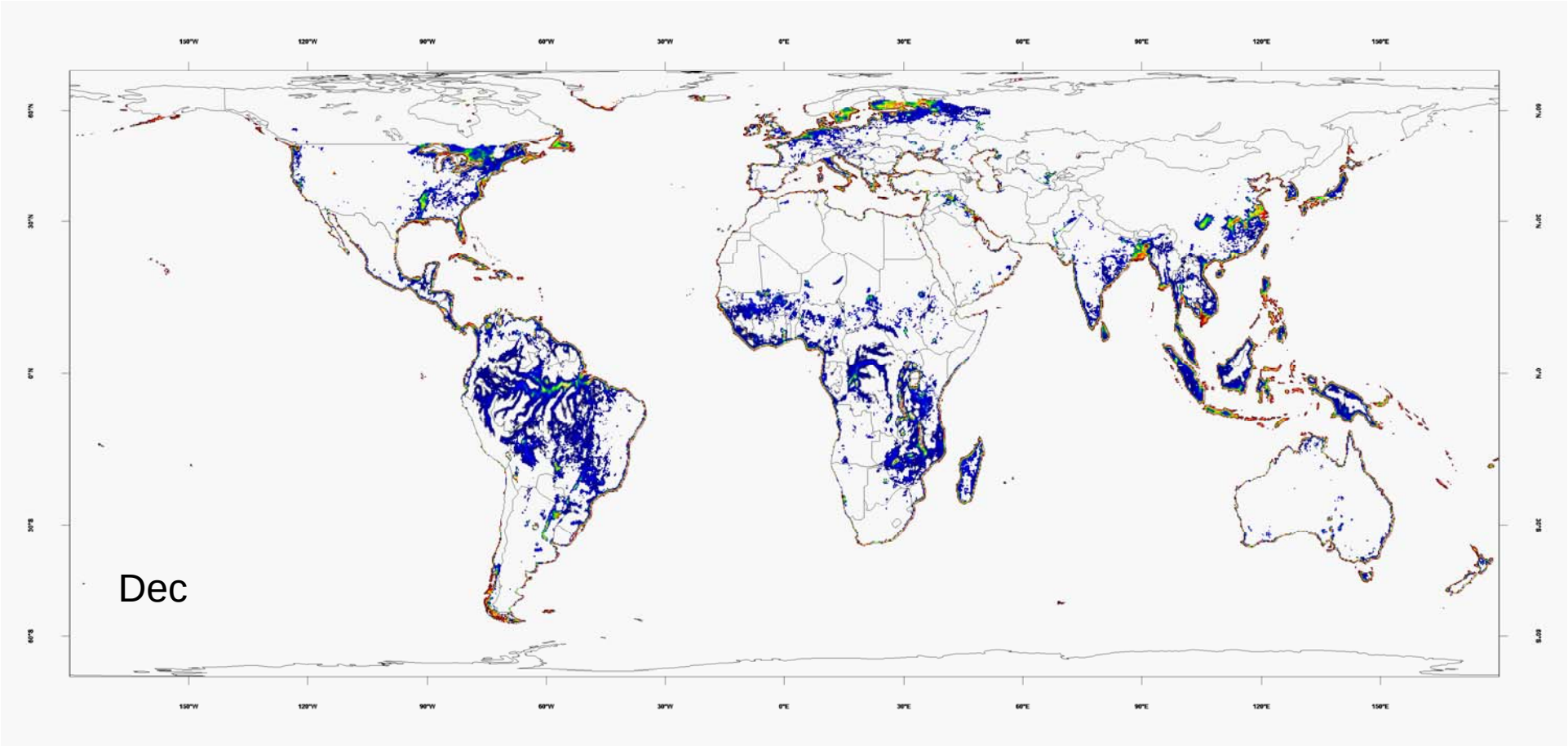
Wetland Classification of the Chaya Basin- cont.

Accuracy assessment was based on validation pixels not used for training. Accuracy varied between 2% and 20% according to class. However, because of limited ground truth data, these values may vary.



Monthly Inundated Area

QuikSCAT and AMSR-E



Inundated Area Fraction