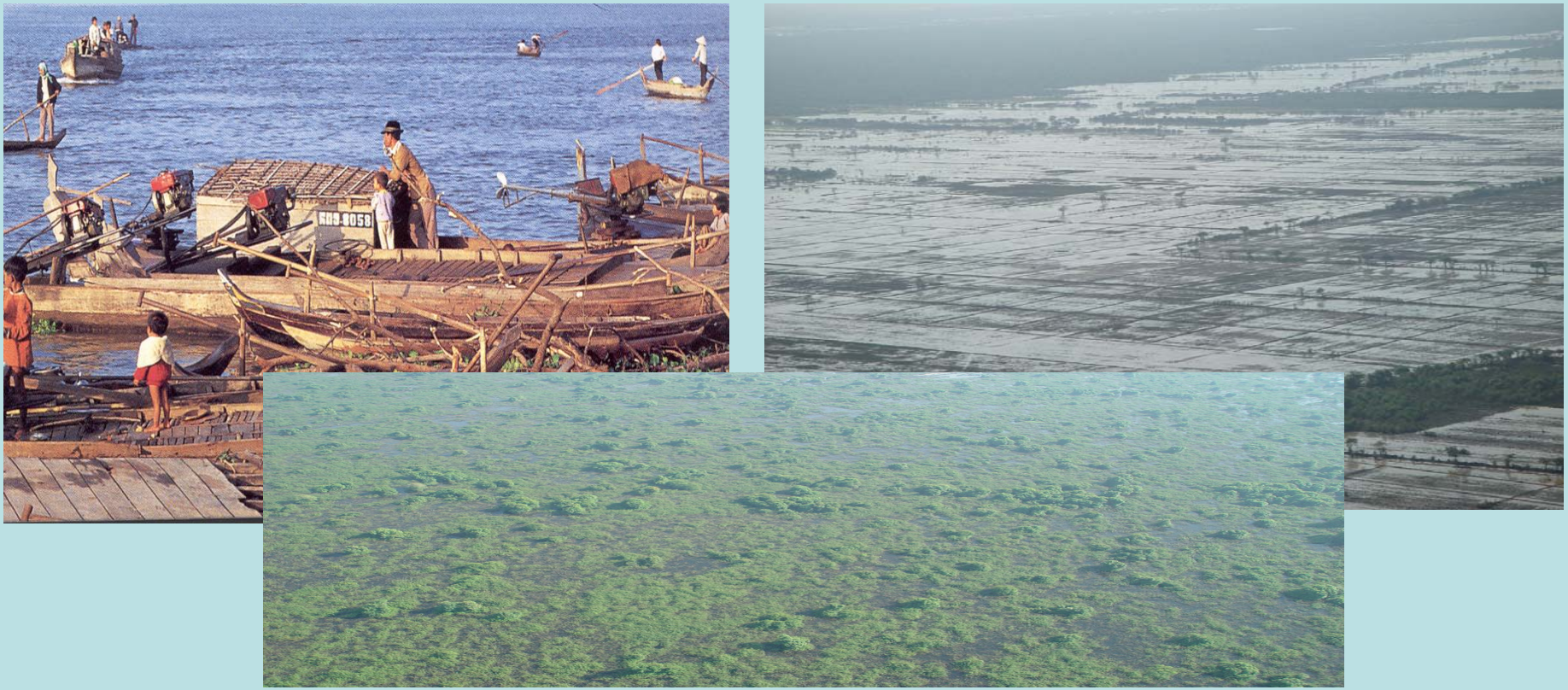
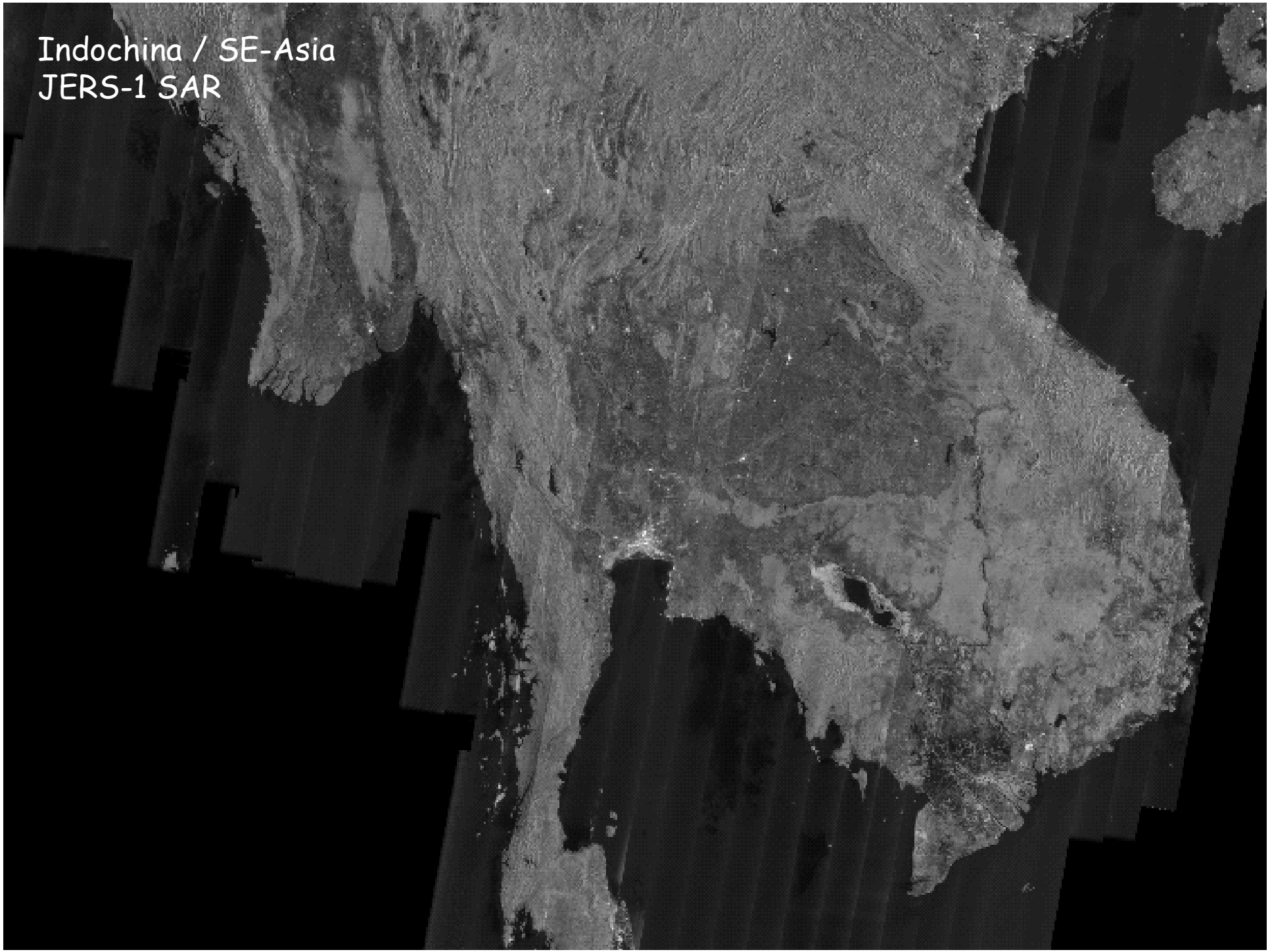
Wetland Extent, Inundation Patterns and Vegetation Change in the Greater Mekong River Basin

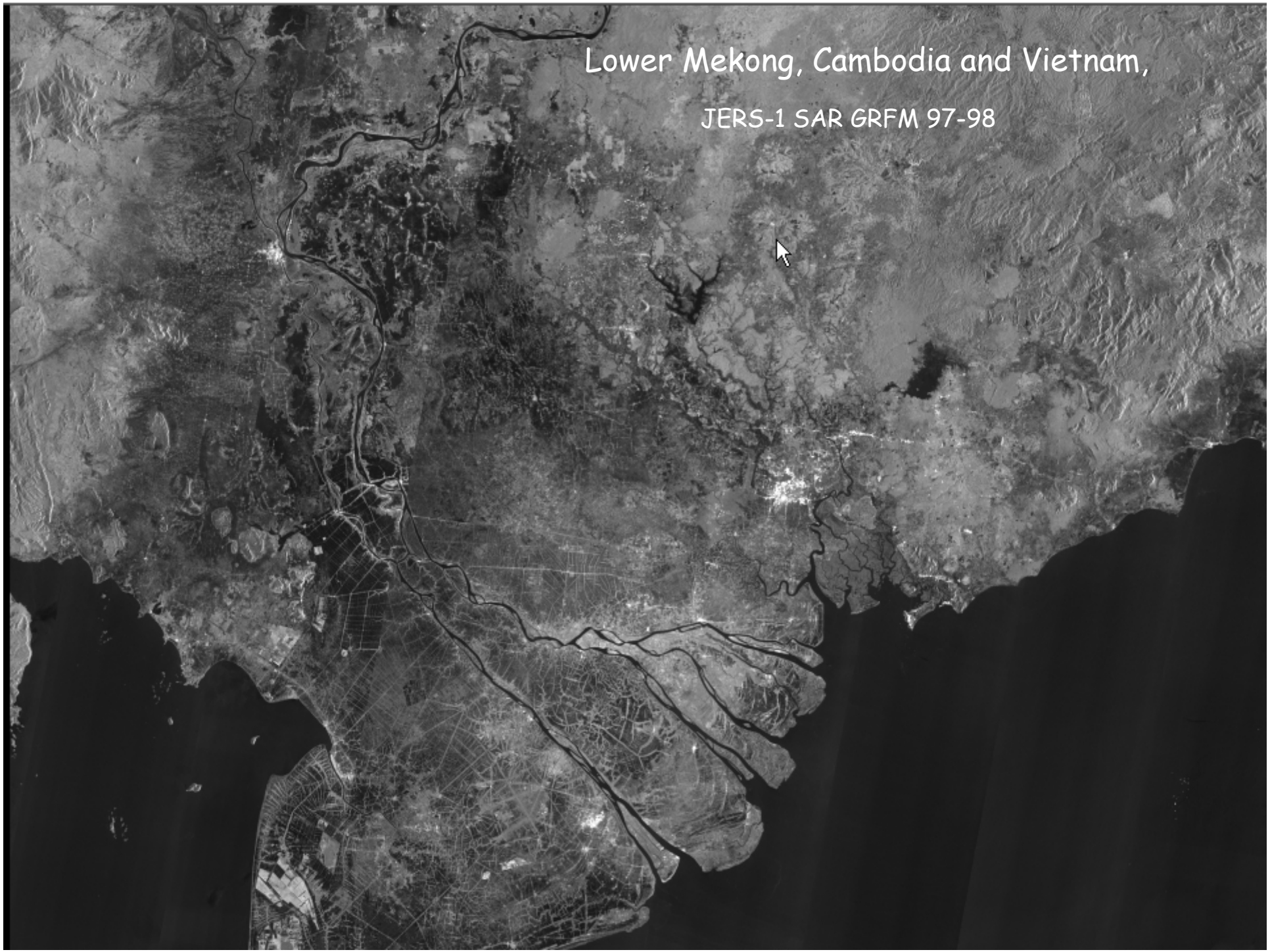
Tony Milne and **Ian Tapley**, Horizon Geoscience Consulting, Sydney, Australia,
and
Hans Guttman, Mekong River Commission, Vientanne, Laos.



ALOS Kyoto & Carbon, 7th Science Team Meeting

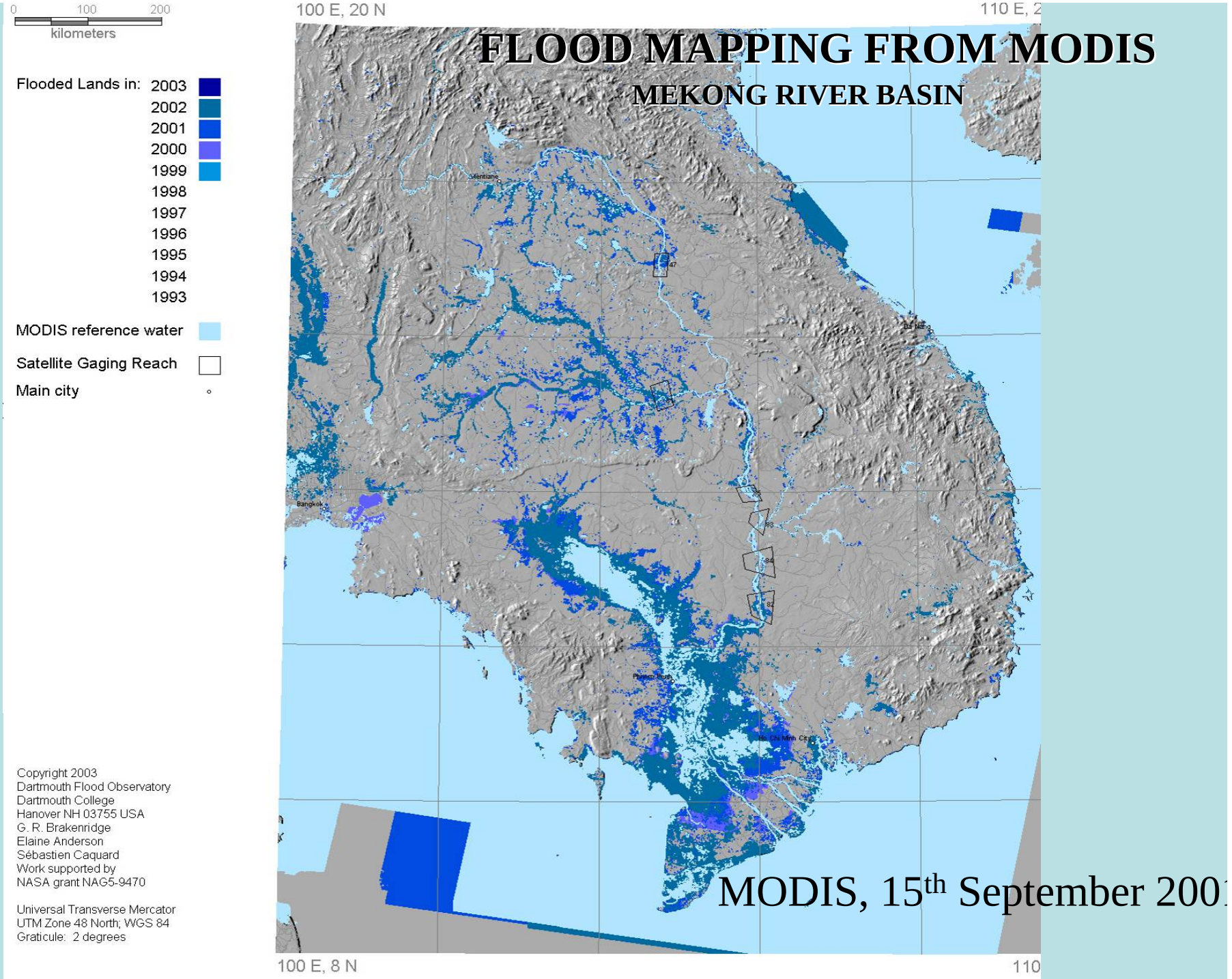
JAXA TKSC, 16-19 January, 2007


Indochina / SE-Asia
JERS-1 SAR


Lower Mekong, Cambodia and Vietnam,
JERS-1 SAR GRFM 97-98

FLOOD MAPPING FROM MODIS

MEKONG RIVER BASIN

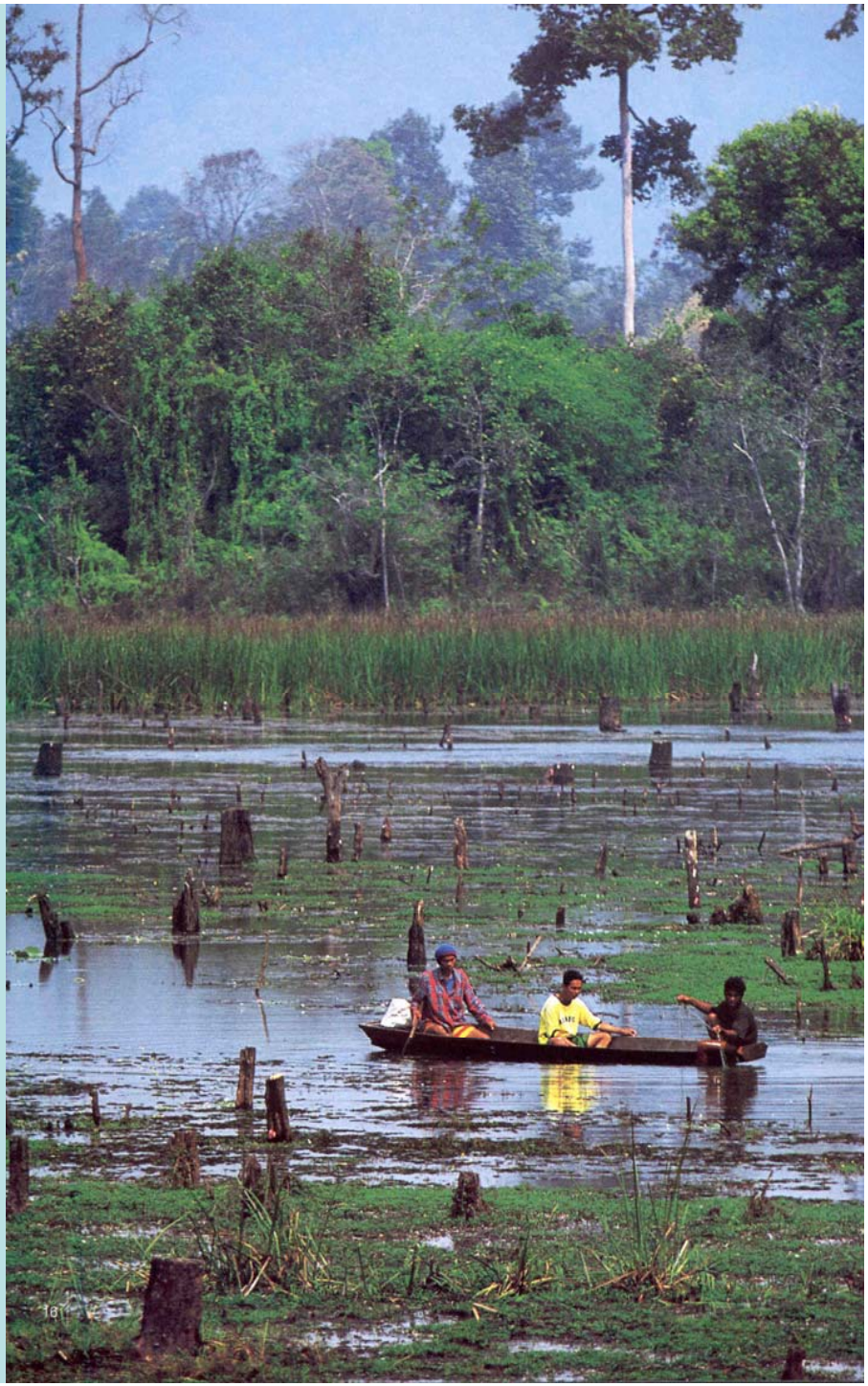


Work supported by
NASA grant NAG5-9470

Universal Transverse Mercator
UTM Zone 48 North; WGS 84
Graticule: 2 degrees

Wetland Pressures Include:

- Increased population and agriculture
- Over-fishing and loss of species
- Wetland forest decline as a result of clearing, firewood harvesting and charcoal production
- Invasion of exotic species including water hyacinth,mimosa and the golden apple snail
- Water pollution from silt and agrochemical runoff
- Reduced bird, reptile and mammal population though hunting
- Eco-tourism
- Infrastructure and economic development



Specific objectives are to:

- Establish a baseline dataset of wetland extent and characteristics;
- Map spatial and temporal variations in hydrological conditions in LMB wetland ecosystems;
- Map inundation patterns and hydroperiod of LMB wetland ecosystems; and
- Establish a compatible and operational monitoring system for the mapping and continued evaluation of wetlands in the LMB (with consideration of existing MRC spatial information infrastructure and capabilities).

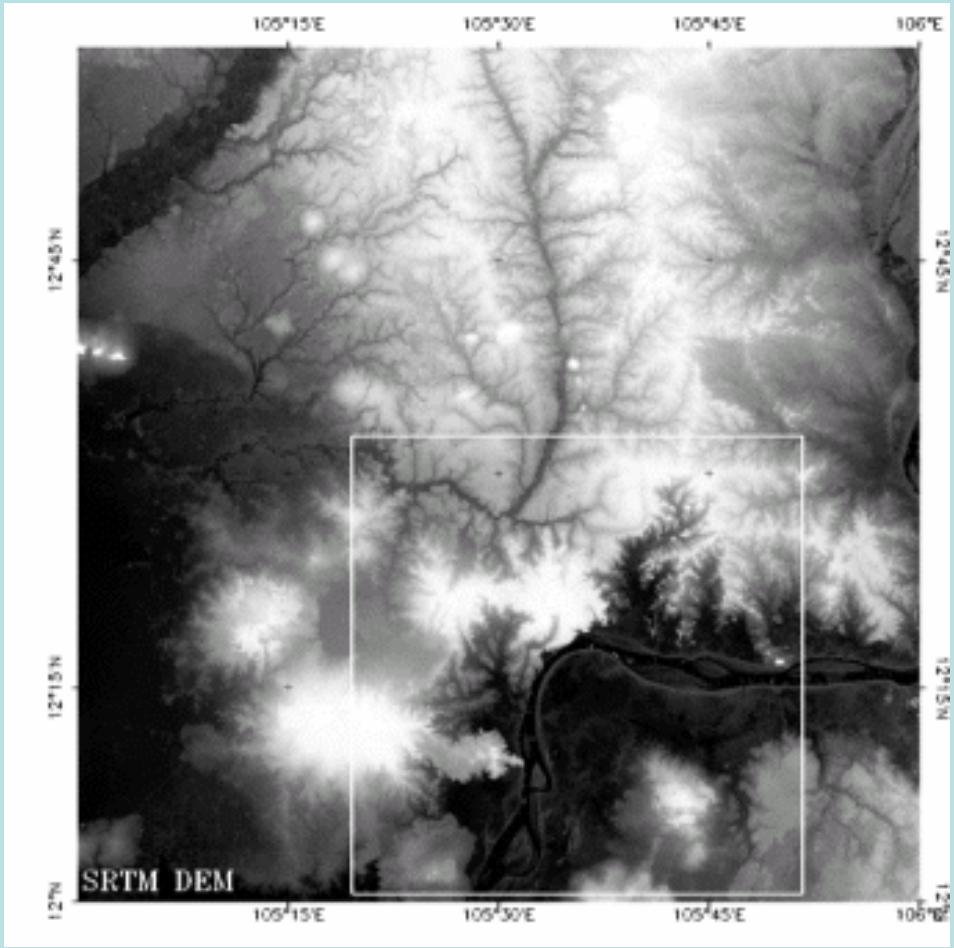
Specific aims

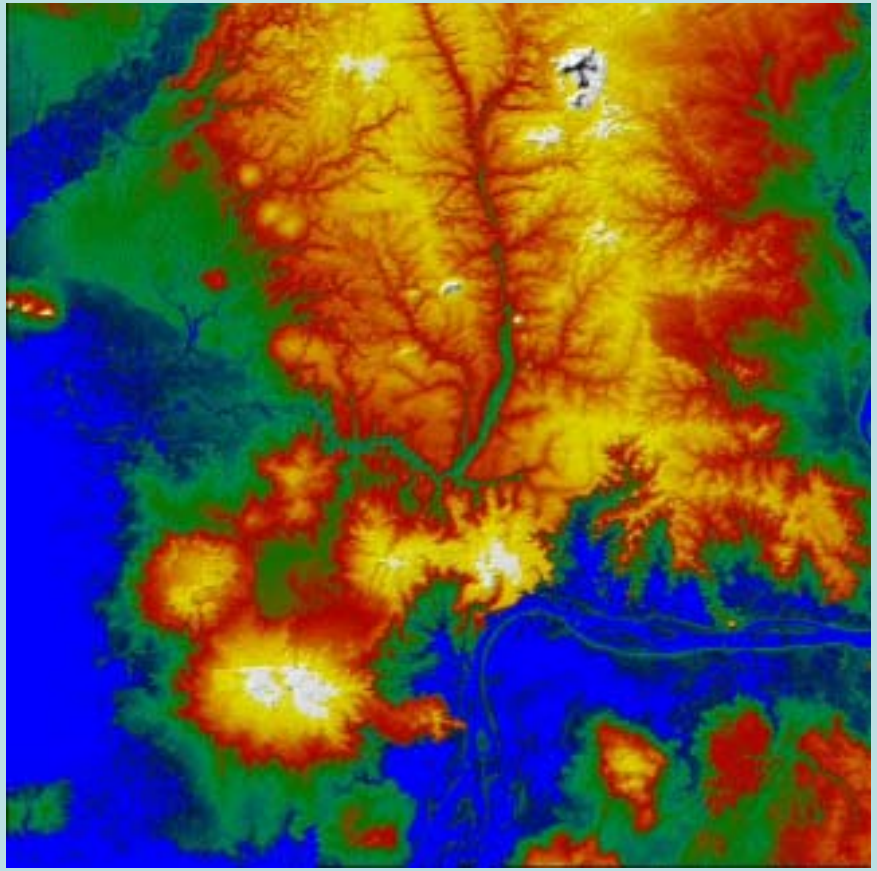
- Location of all wetlands in LMB
- Type and distribution of wetlands
- Status, namely condition and disturbance
- Provide baseline dataset for comparisons
- Identify areas subject to disturbance by seasonality and human interference
- Ensure methodology to be repeatable.

Approach

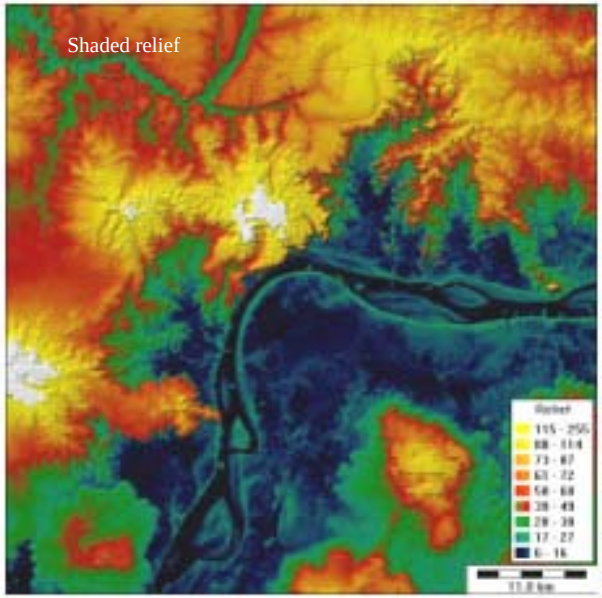
This project will develop and implement a method of integrating both JERS-1 historical and PALSAR near real-time data into an operational monitoring system with the following features:

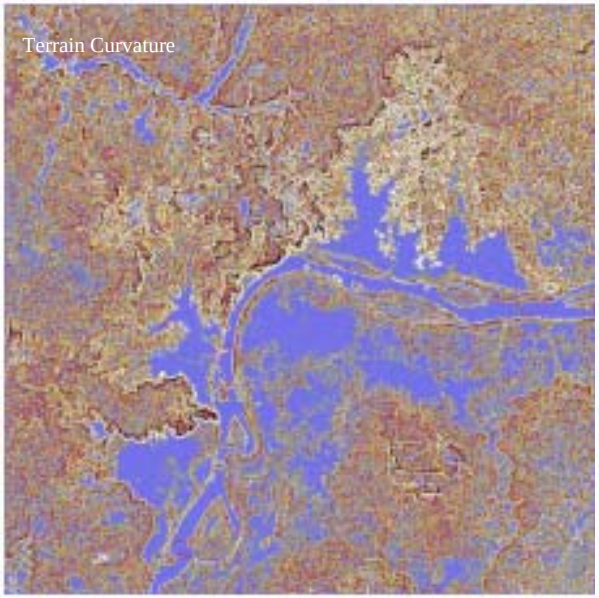
- establish baseline datasets incorporating changes in land cover that have occurred between 1992-98 using archival JERS-1 data;
- produce more detailed change maps of selected sites for the period 1992-98 and describe the nature of the changes taking place;
- using PALSAR data available from mid-2007 develop a time series analysis (2007-09) of wetland inundation and environmental change; and
- incorporate higher resolution imagery including optical data into the study of selected sites in order to increase



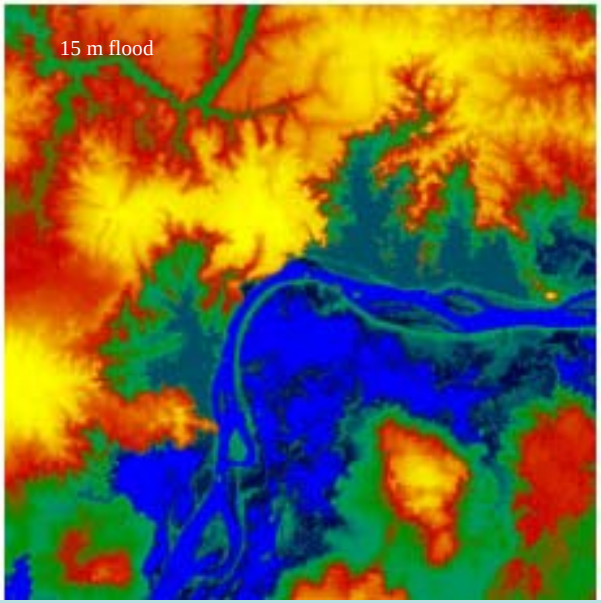


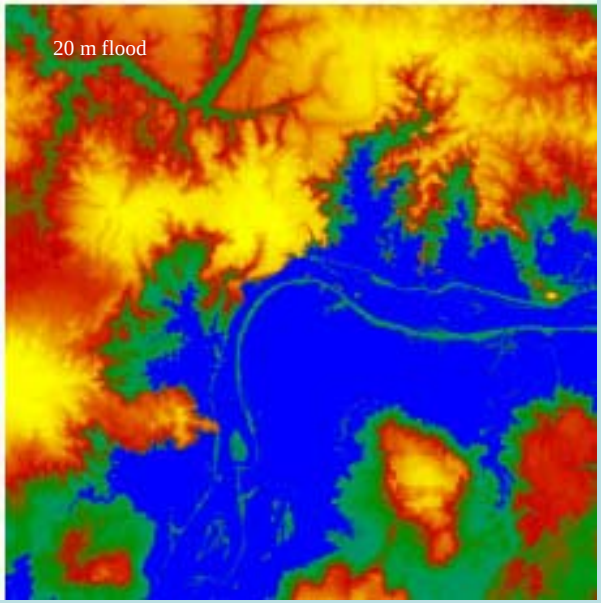
SRTM Tile Of Mekong River Upstream
From Phnom Penh



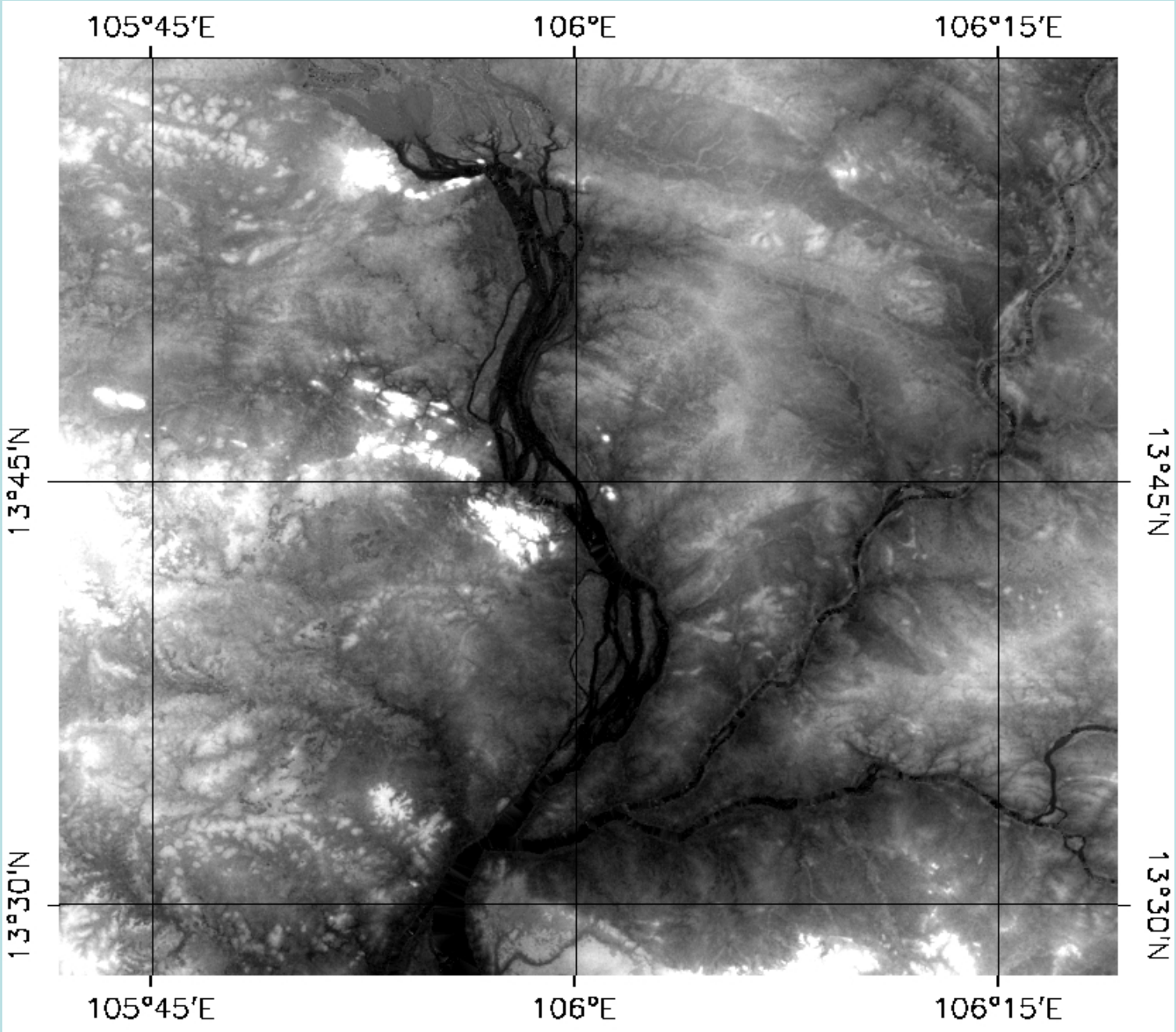


Watershed modelling with ENVI rivertools using SRTM 90 metre data



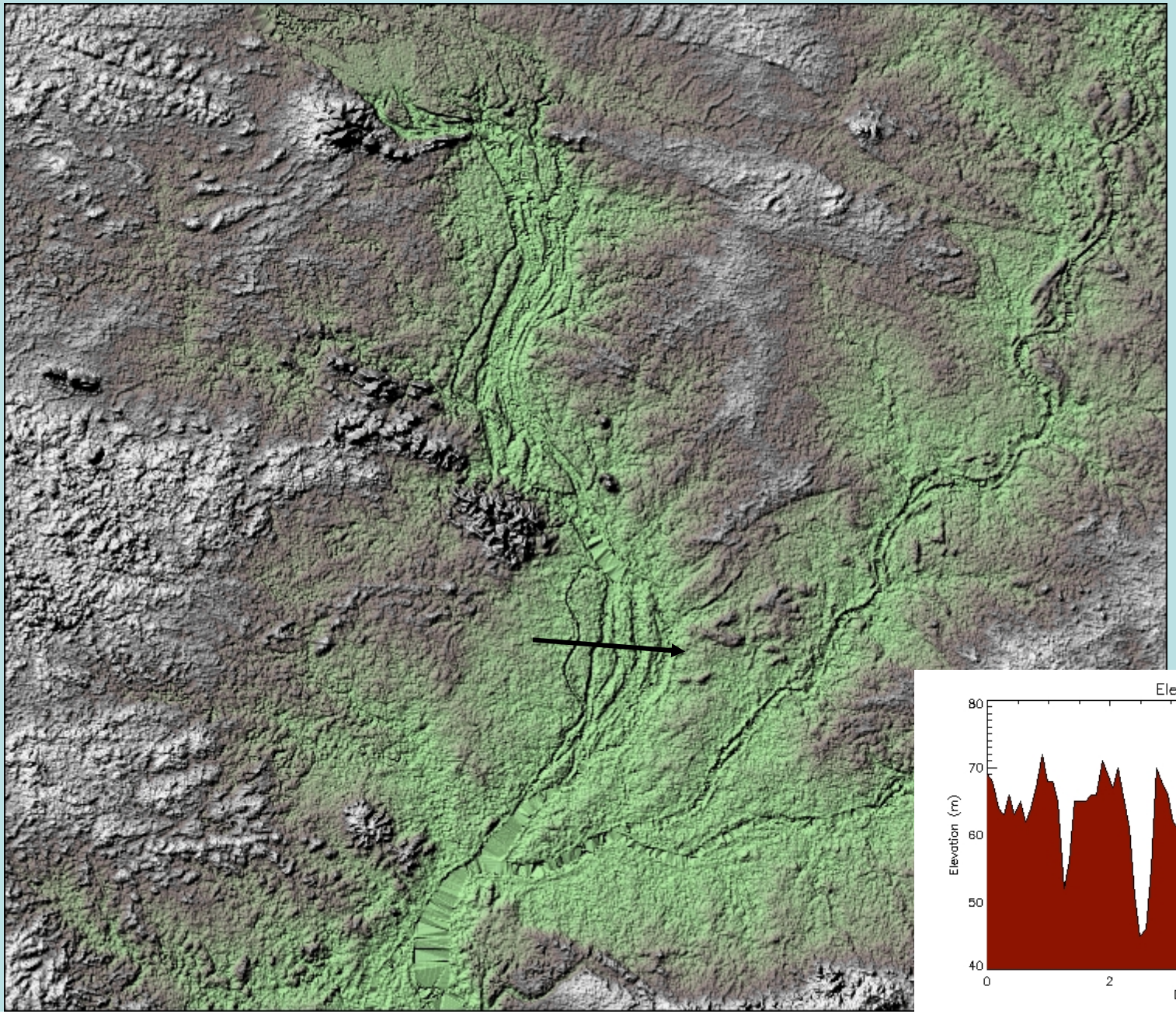


Stoeng Treng - Cambodia



SRTM DEM

Stoeng Treng - Cambodia



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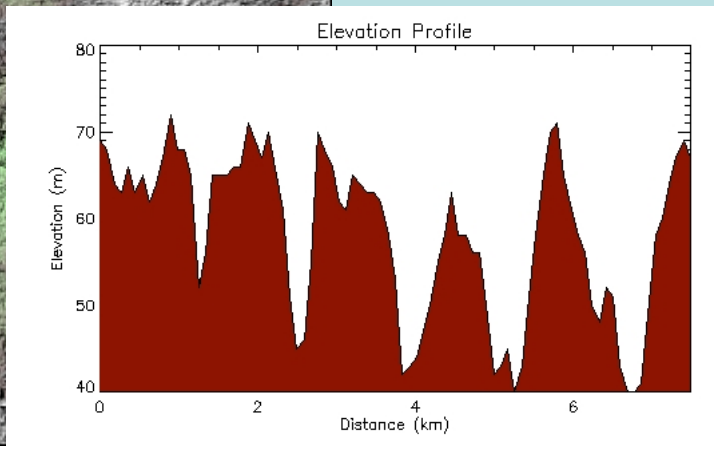
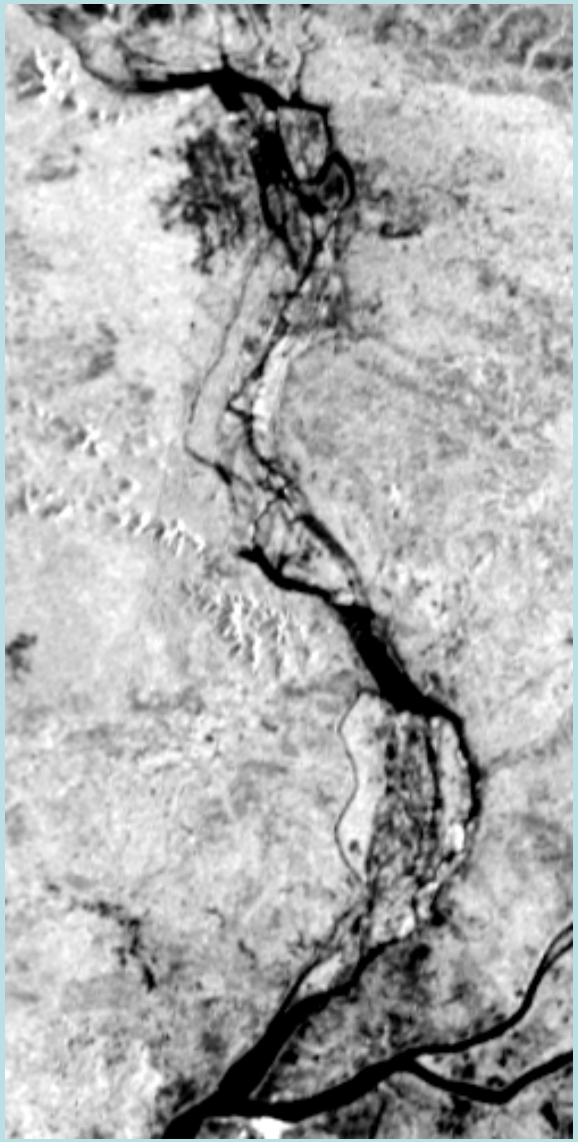


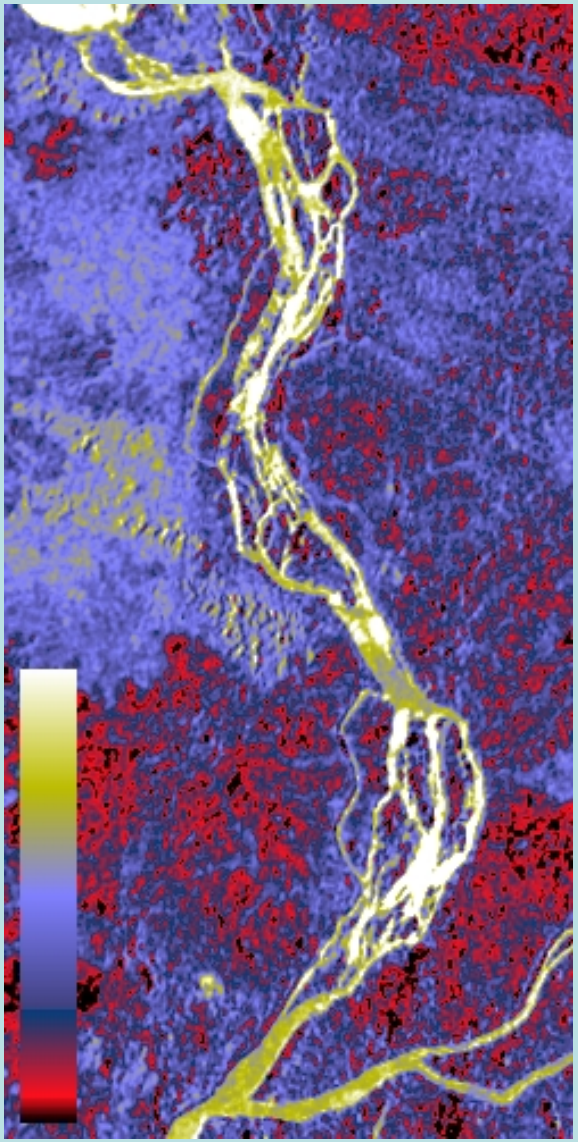
Stoeng Treng – Cambodia

JERS-1 SAR



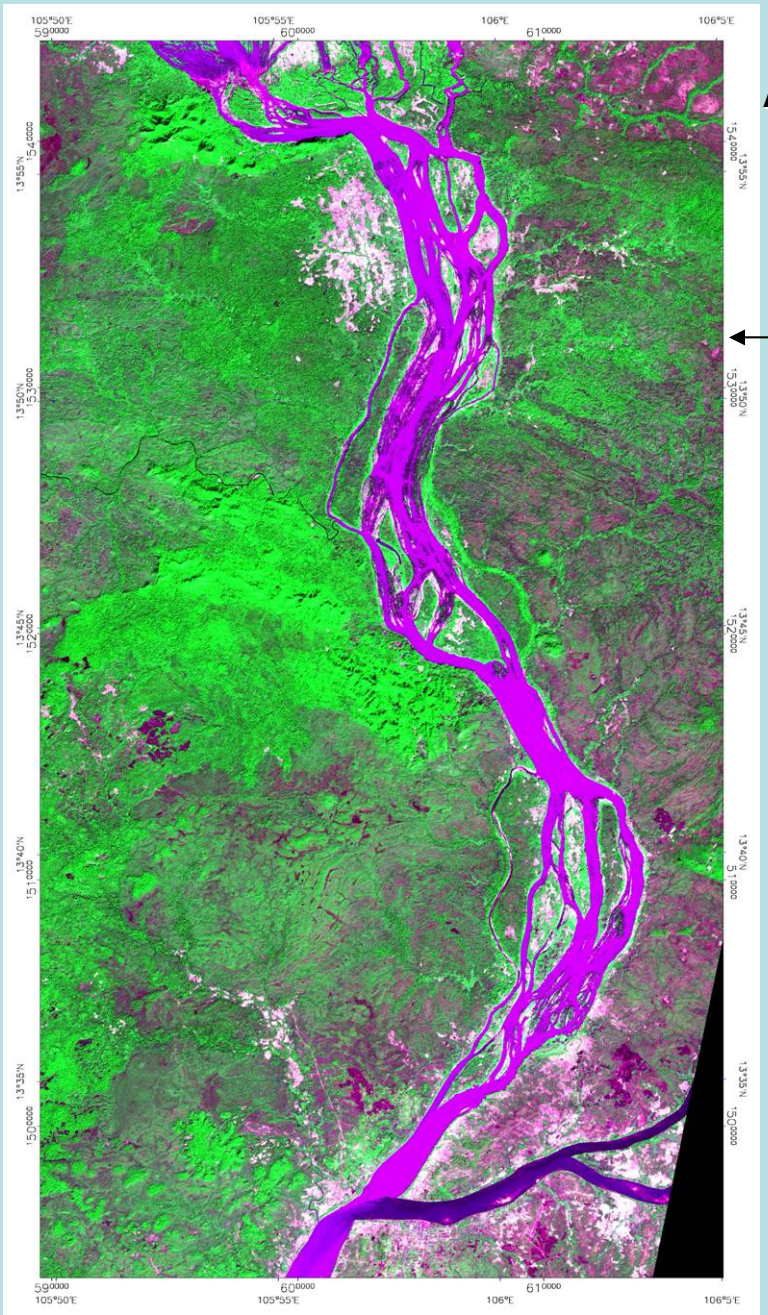
Dry (Jan-Feb 1997)

Wet (August 1998)



Difference

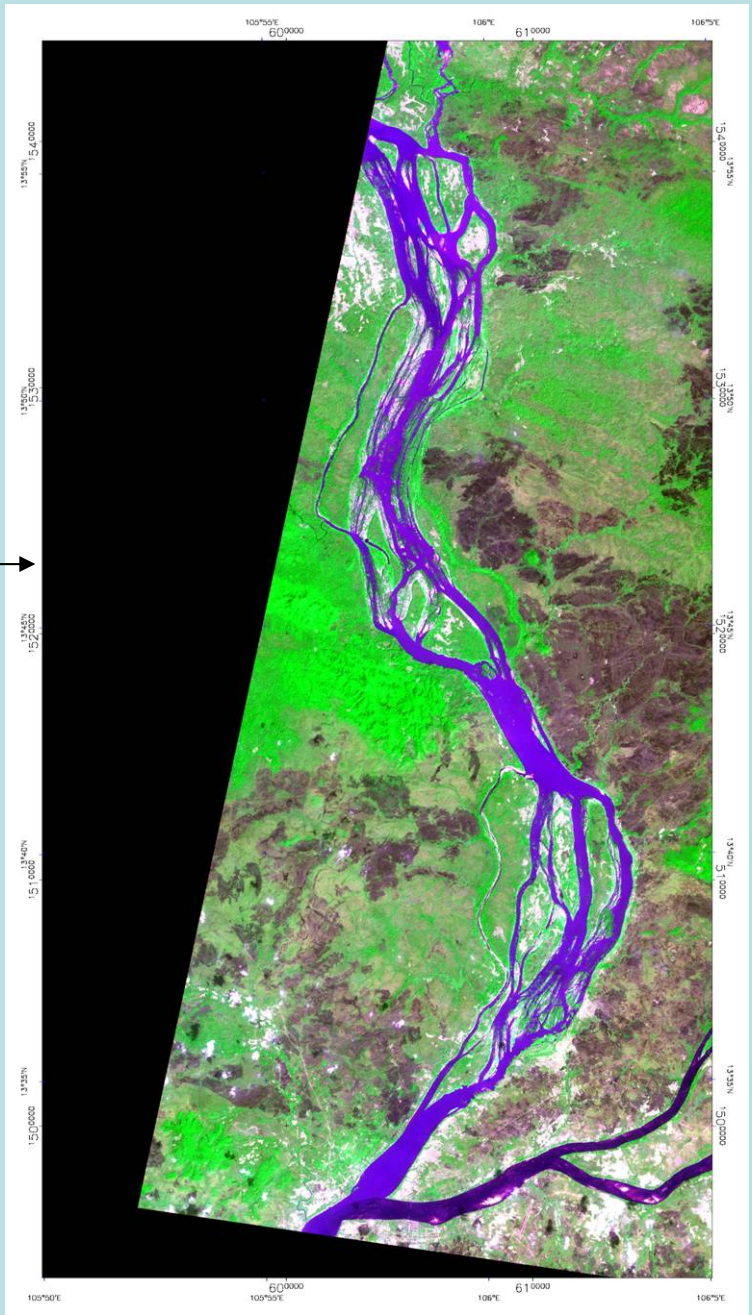
Stoeng Treng - Cambodia



ASTER 2:3:1

12 Jan. 2002

14 Feb. 2002



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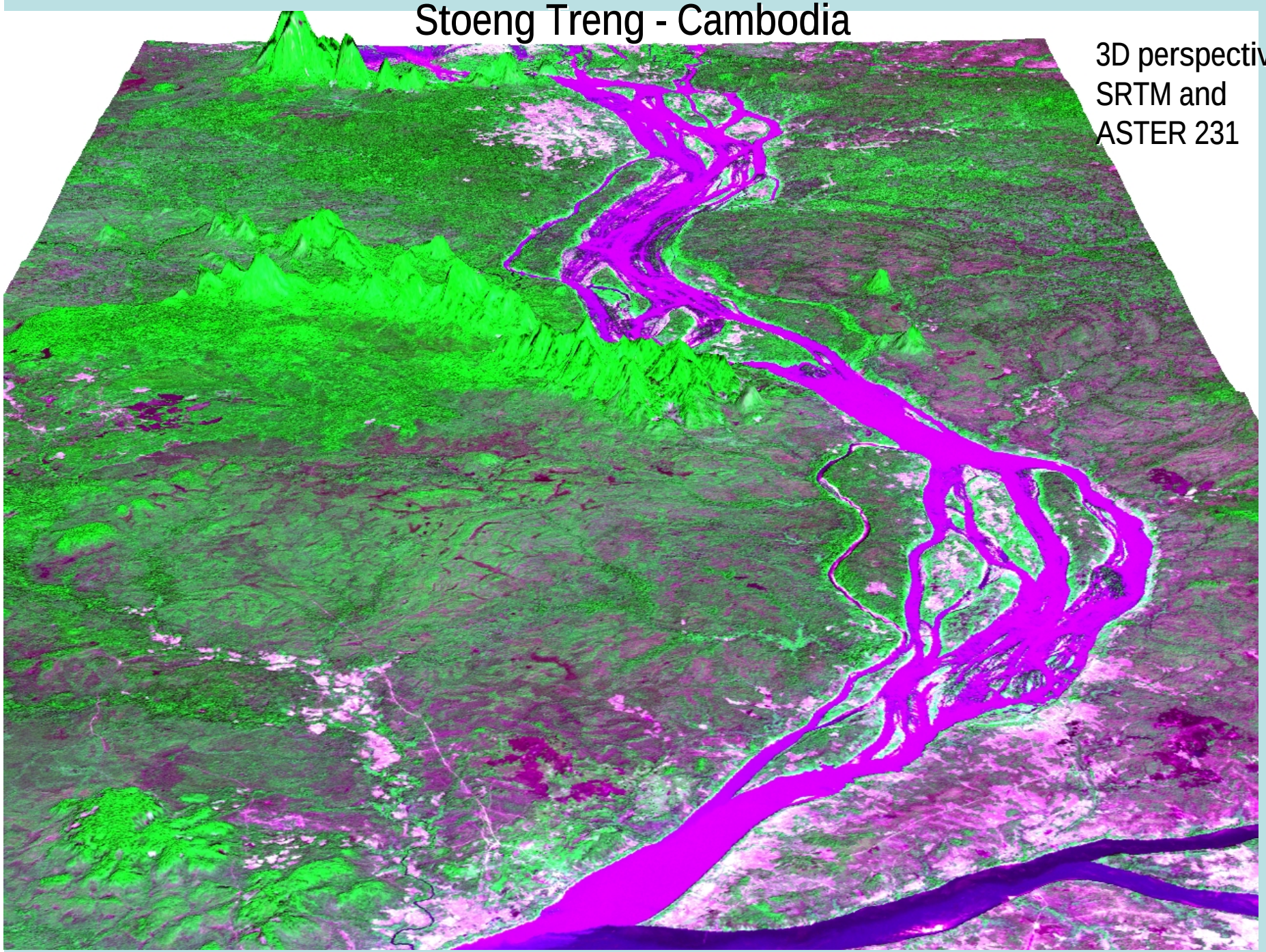
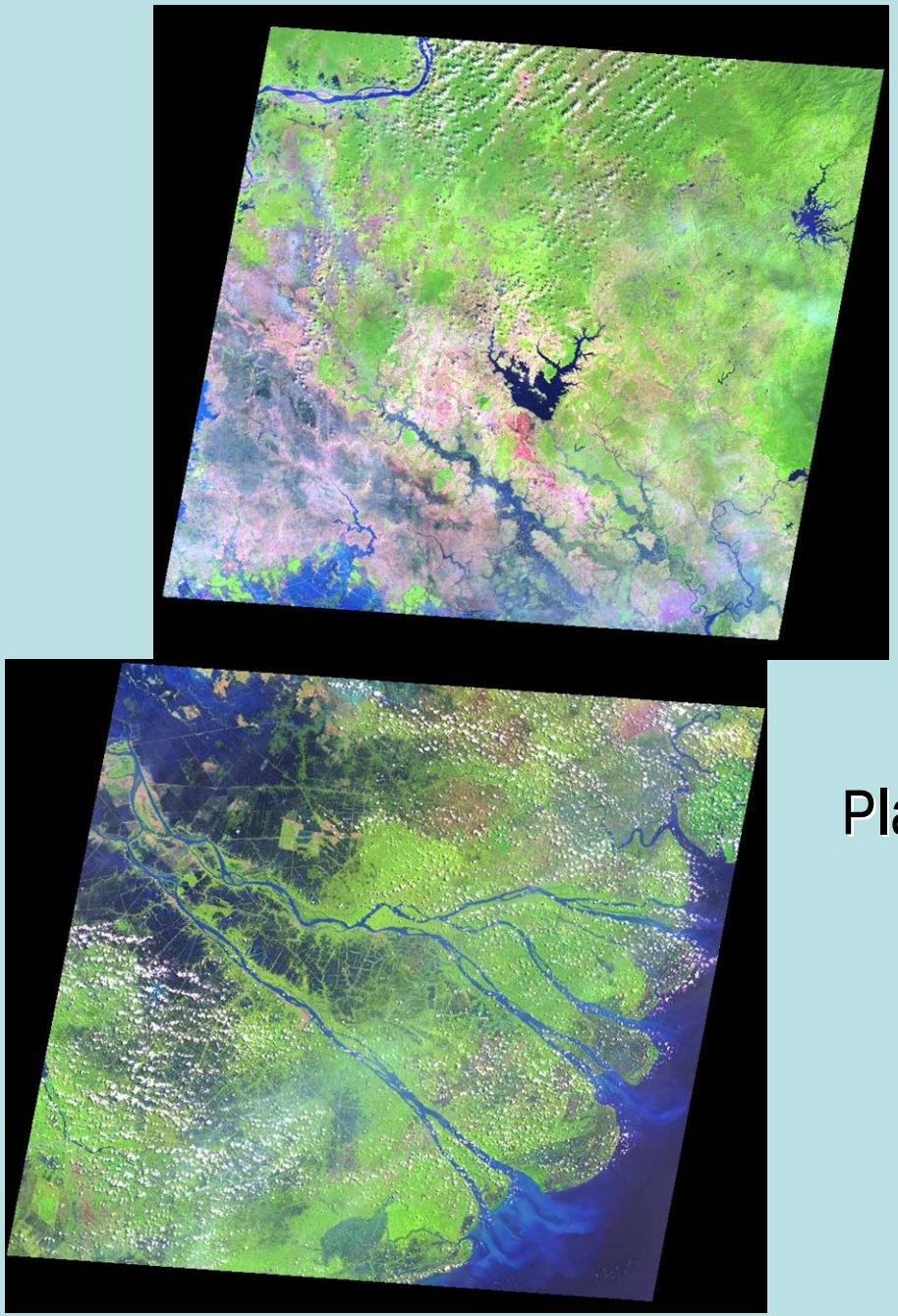


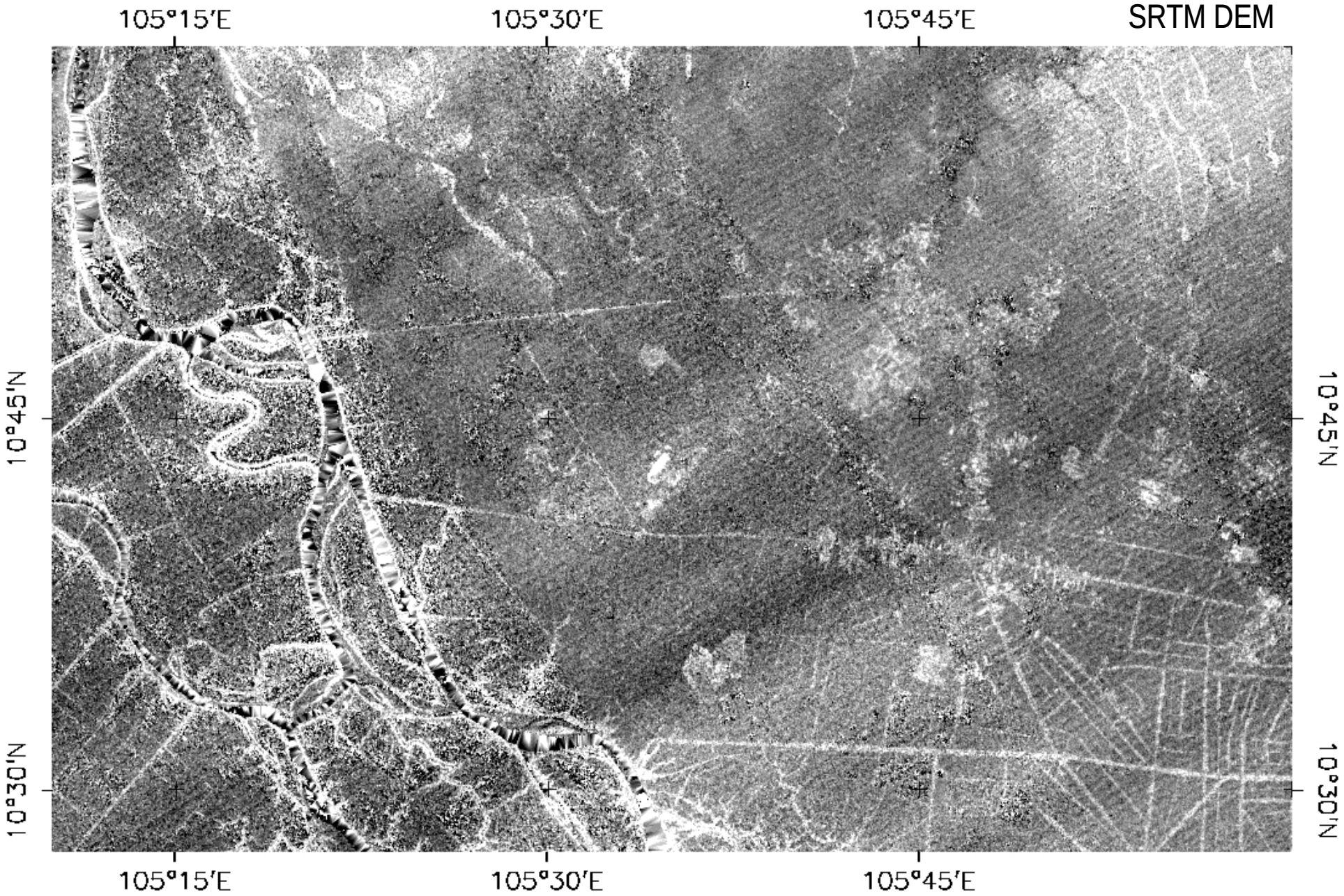
3D perspective:
SRTM and
ASTER 231

Landsat TM



Plain of Reeds

Plain of Reeds, Vietnam



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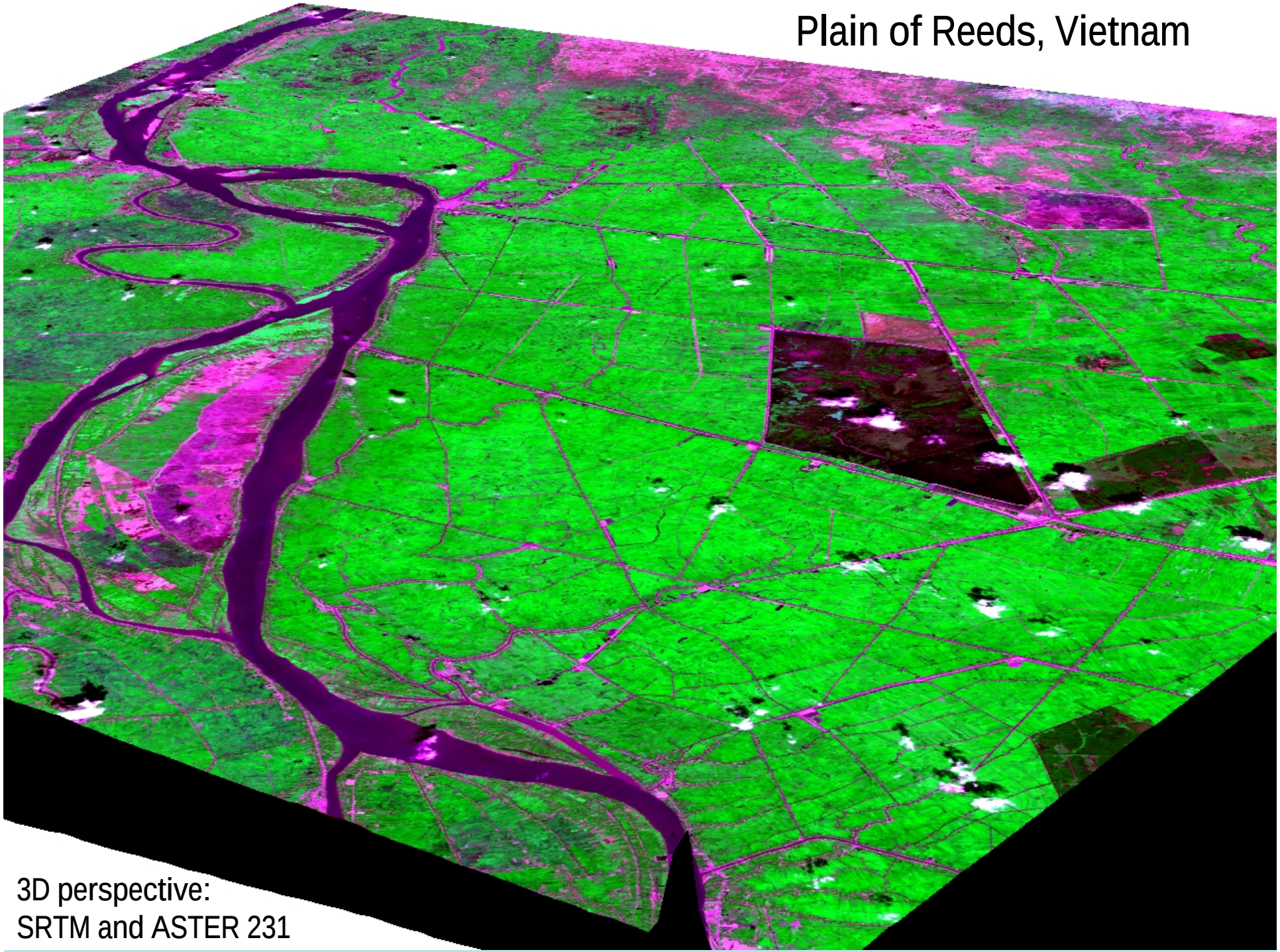
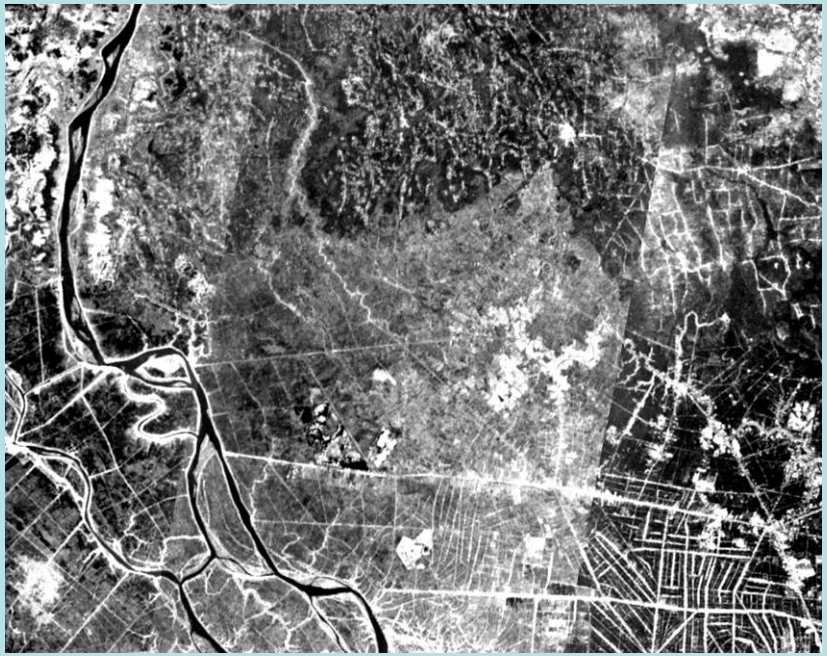


3D perspective:
SRTM and ASTER 231

Plain of Reeds, Vietnam



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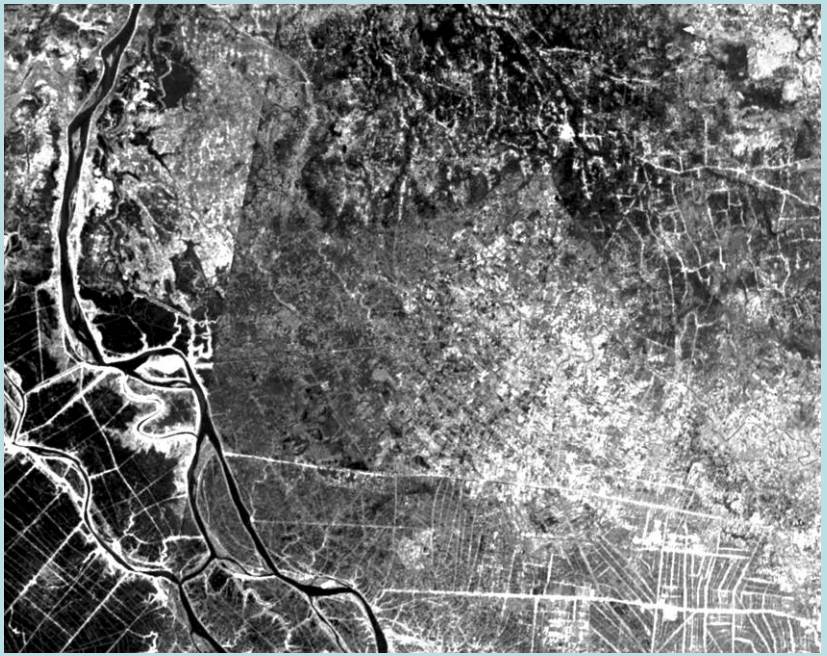


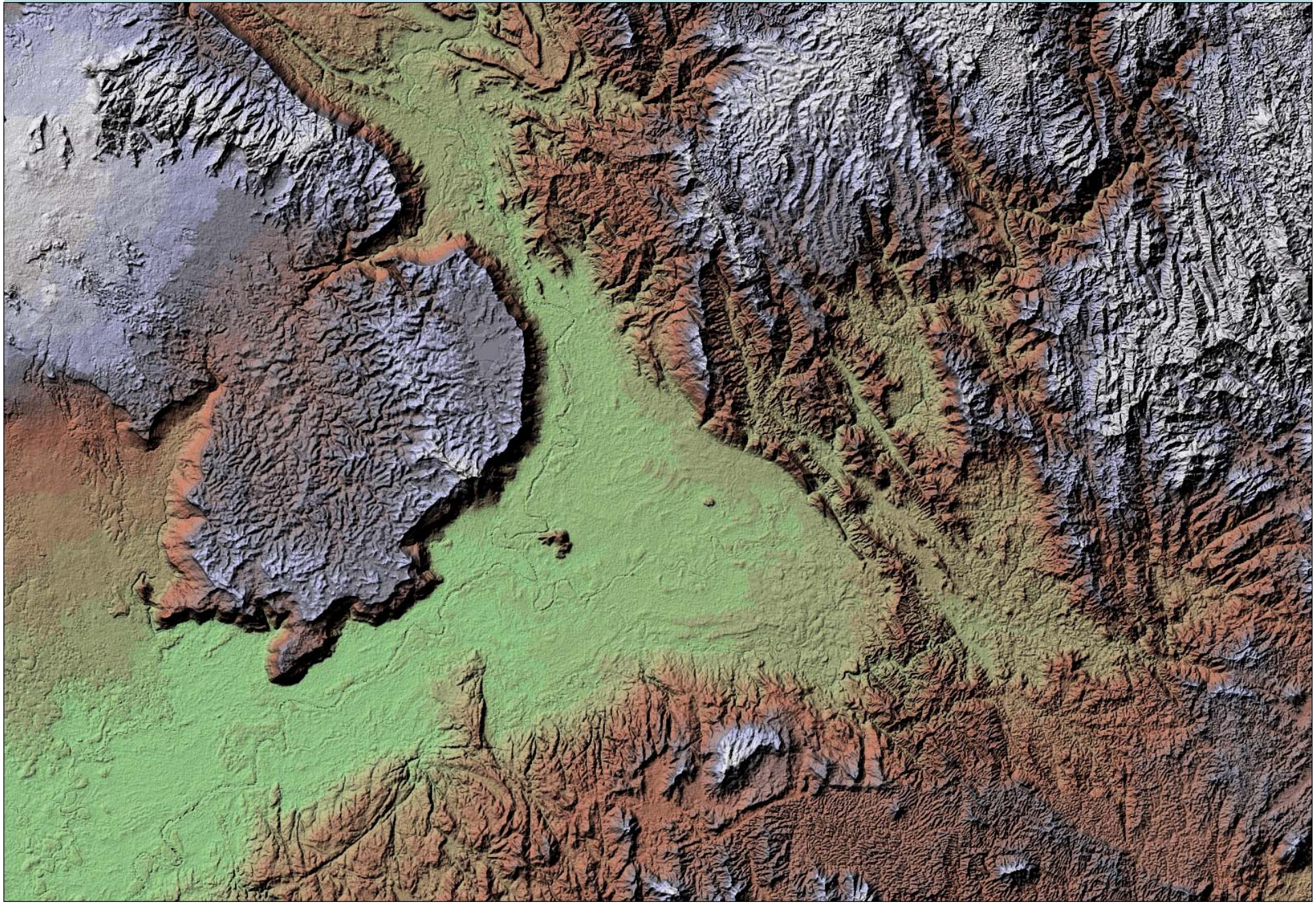
Wet – August 1998

Difference

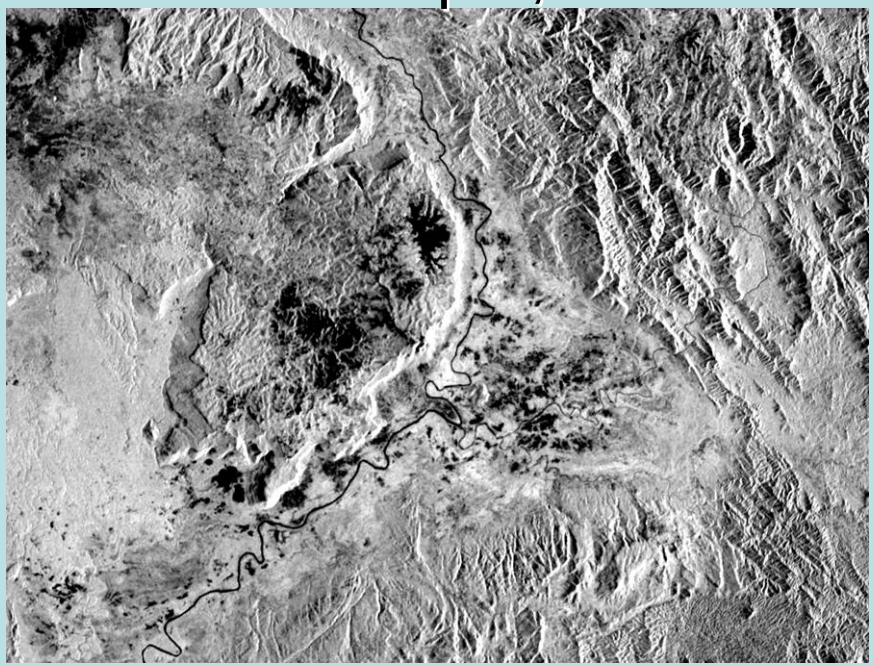
JERS-1 SAR

Attepeu, Lao

SRTM DEM



Attepeu, Lao



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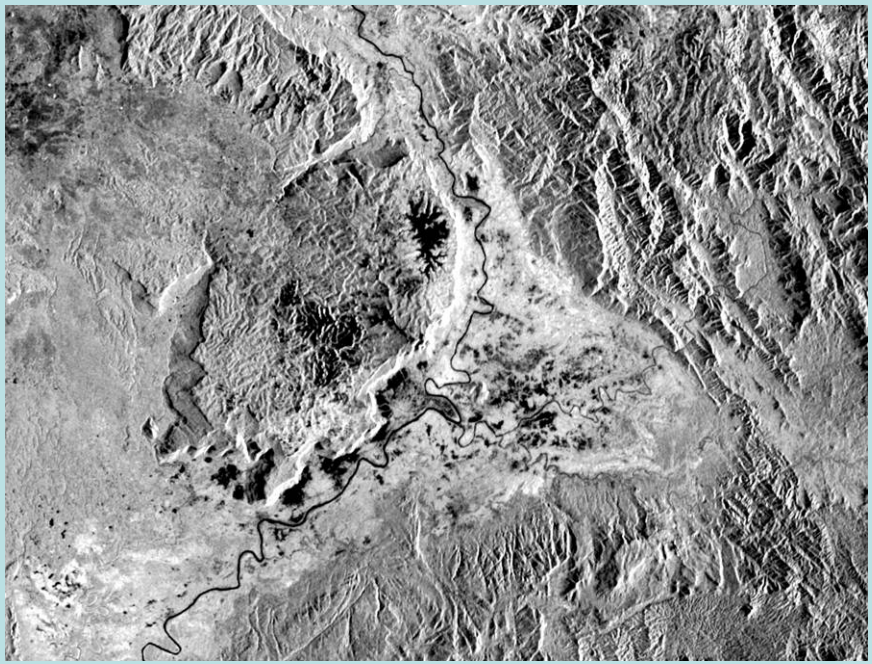

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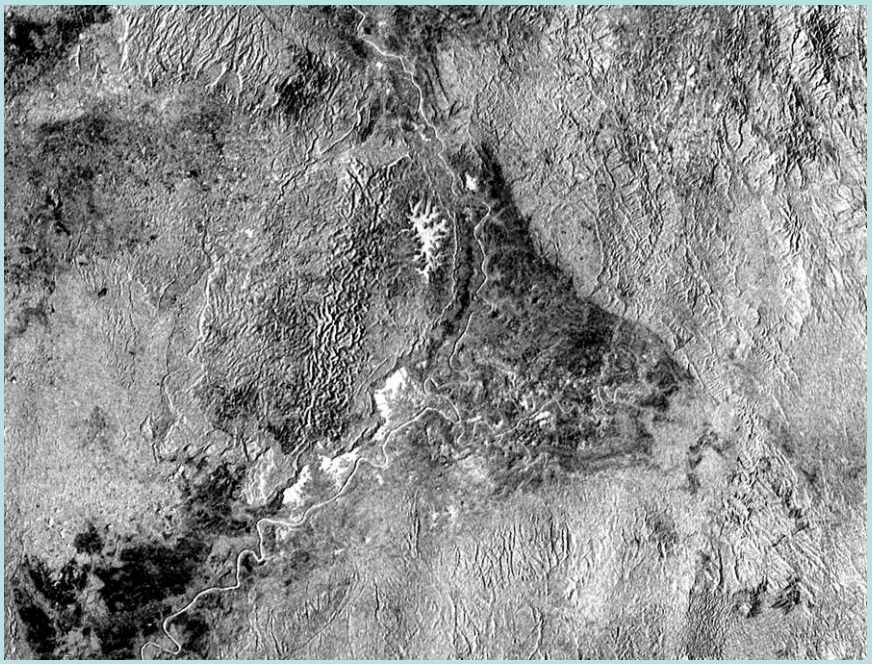


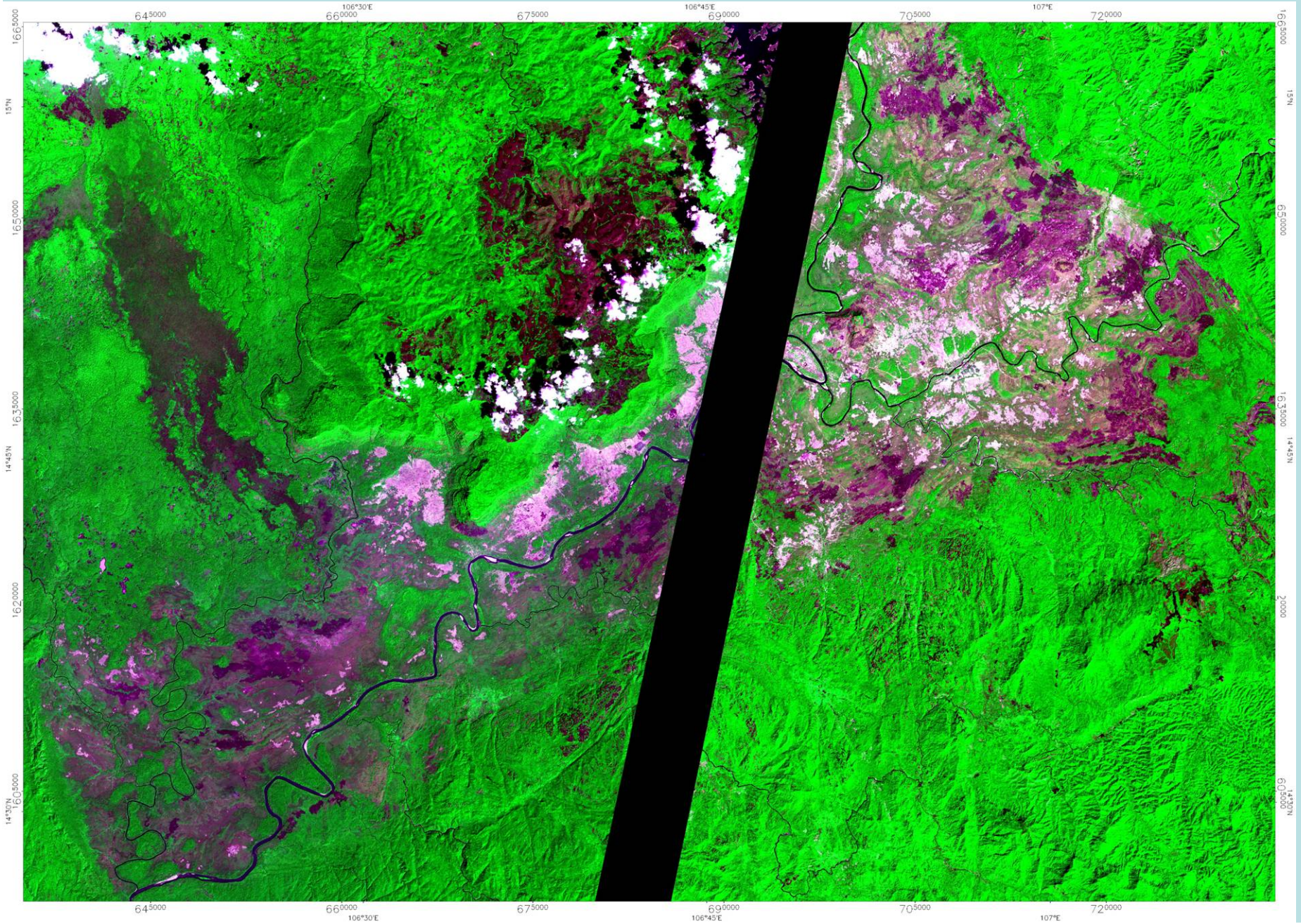
Difference

JERS-1 SAR

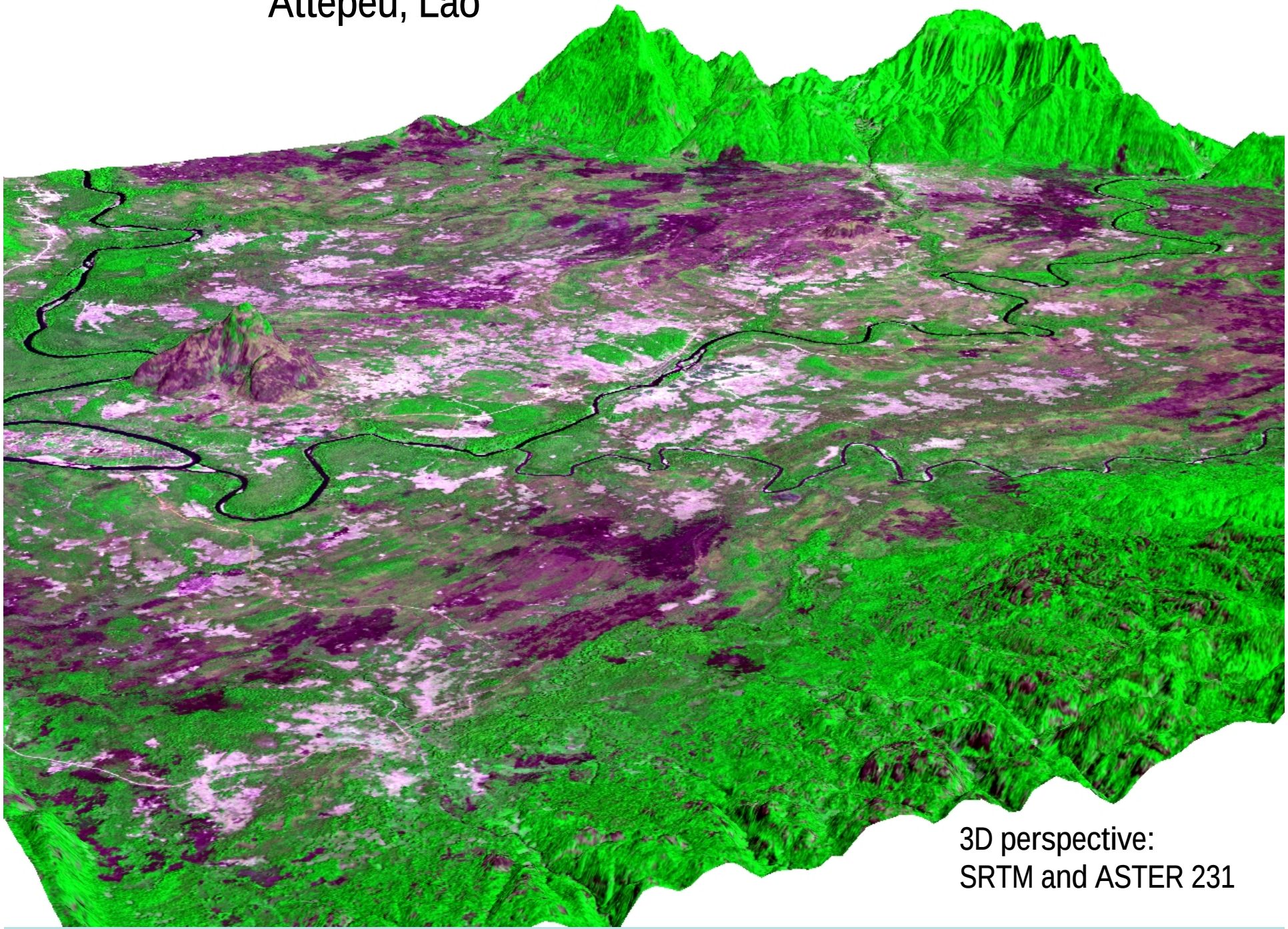
Attepeu, Lao - ASTER 2:3:1

4th February 2002

13th February 2002

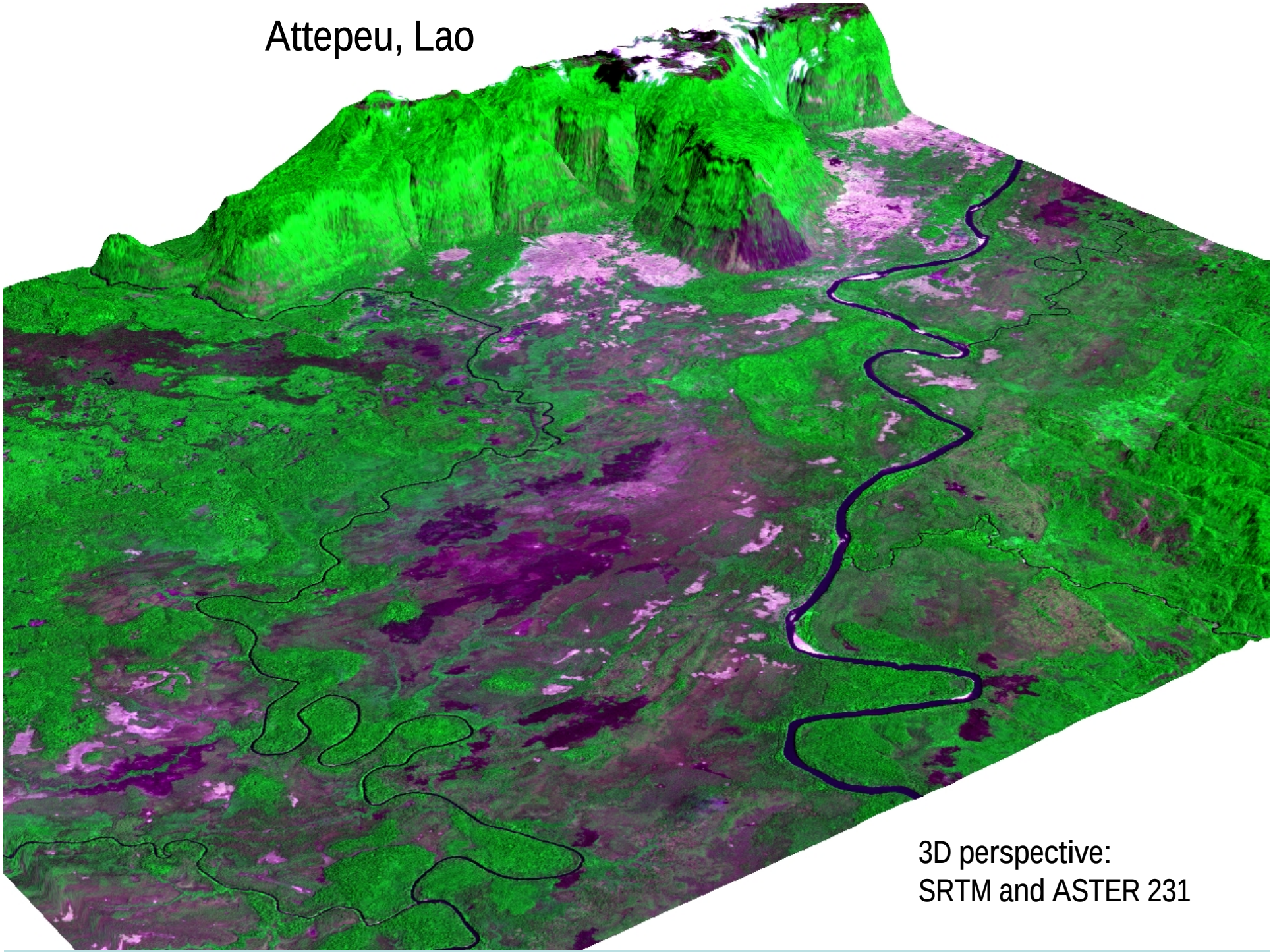


Attepeu, Lao



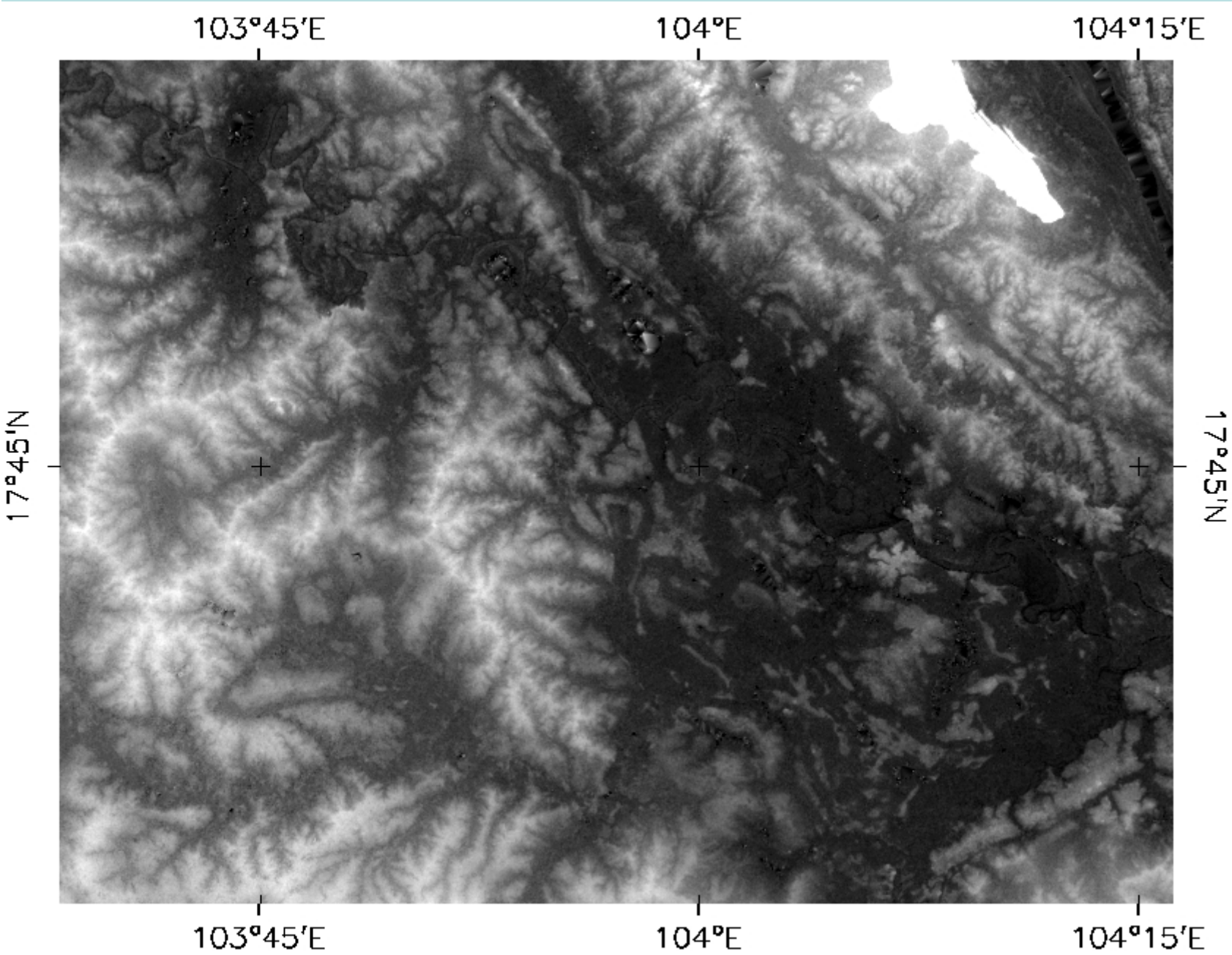
3D perspective:
SRTM and ASTER 231

Attepeu, Lao



3D perspective:
SRTM and ASTER 231

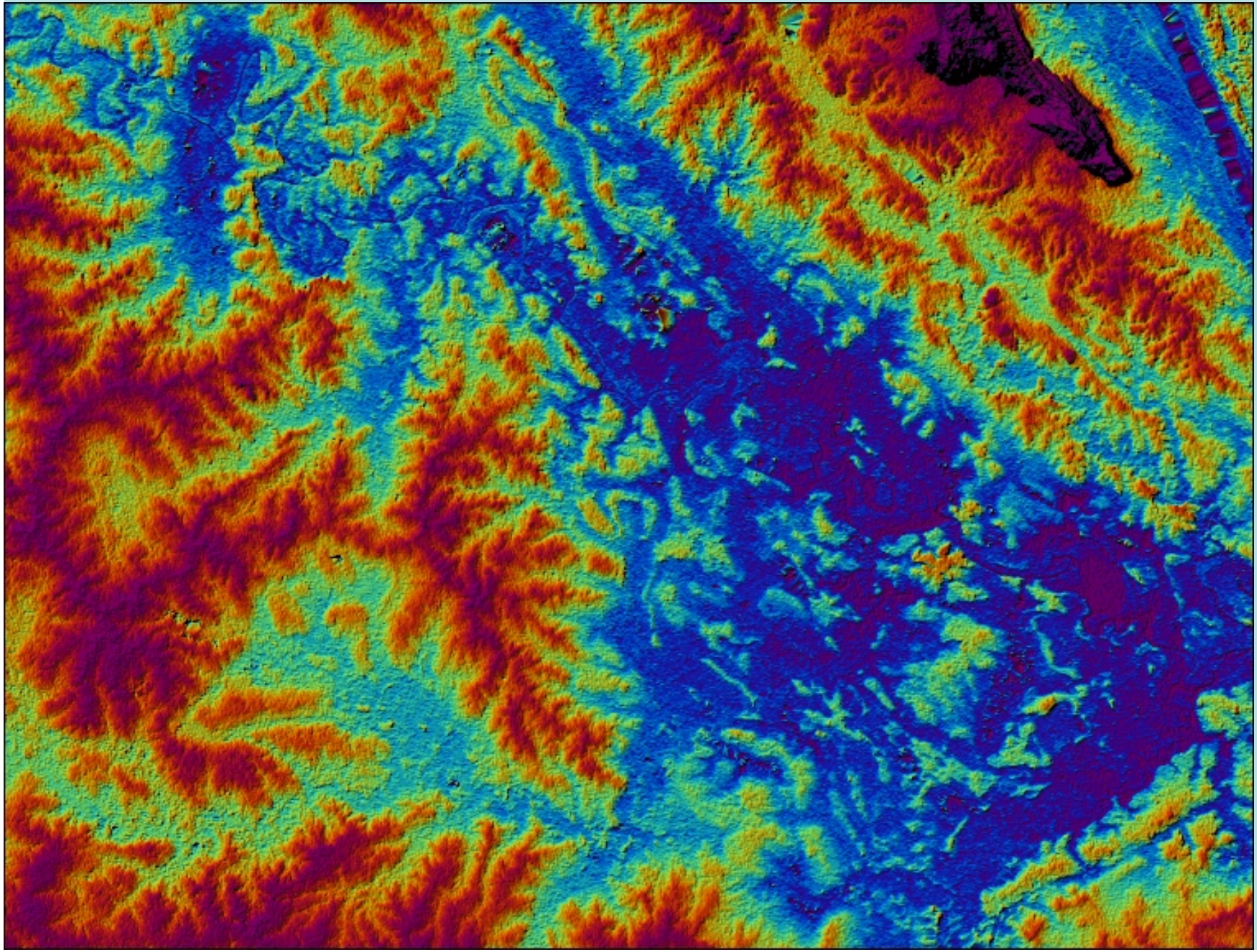
Songkram River Basin - Thailand



SRTM DEM

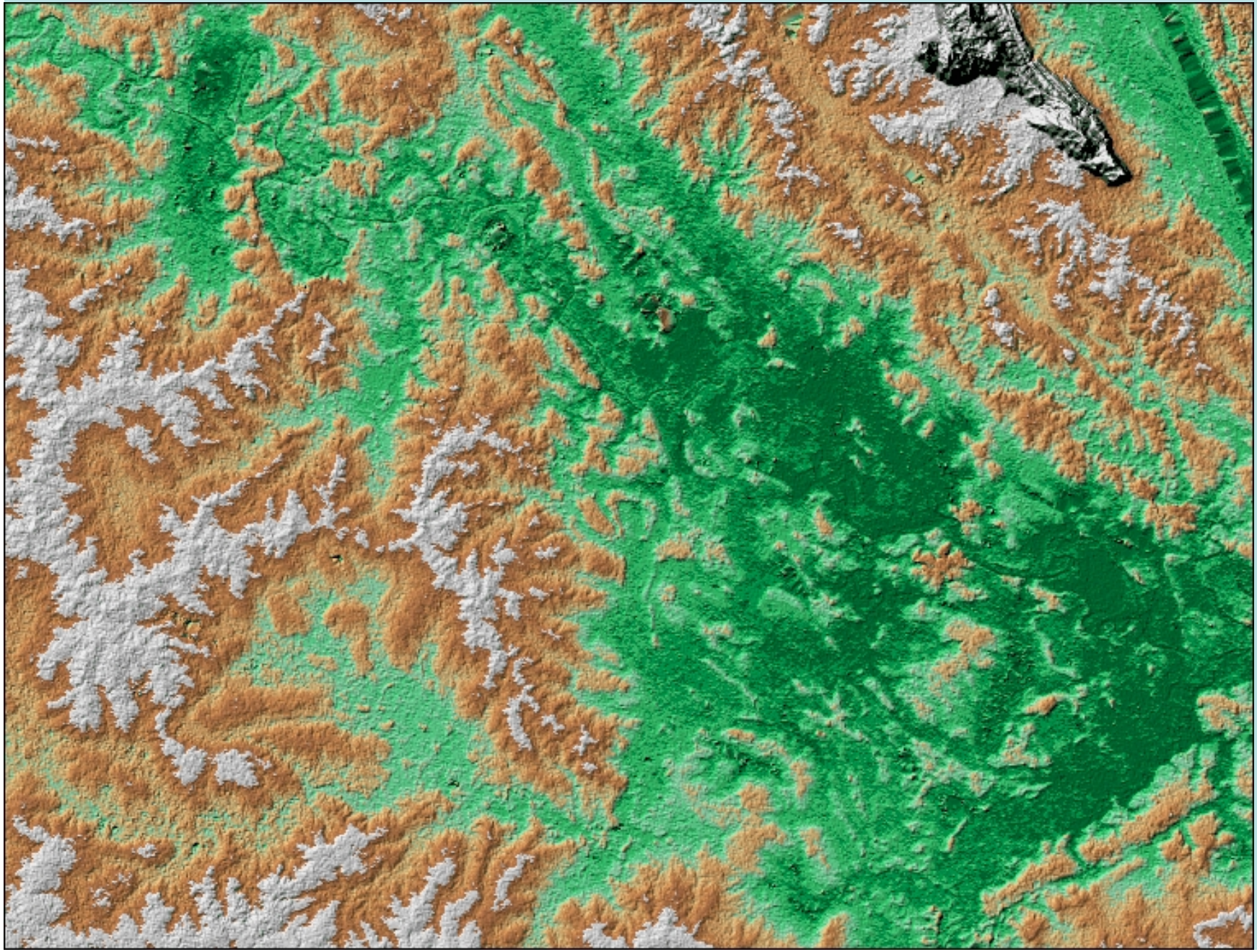
Songkram River Basin - Thailand

SRTM DEM

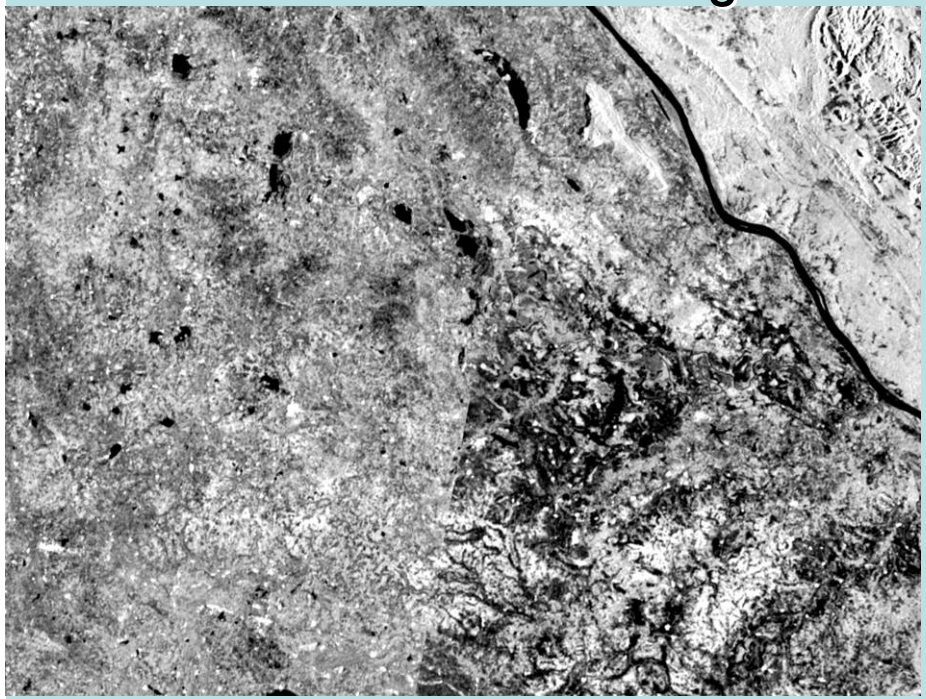


Songkram River Basin - Thailand

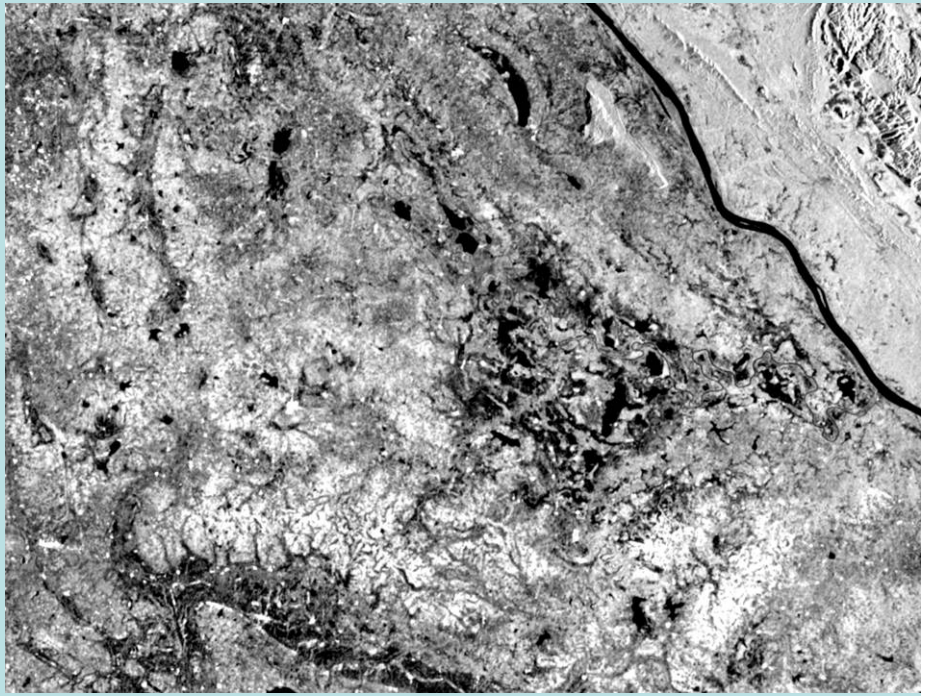
SRTM DEM



Songkram River Basin - Thailand



Dry – Jan-Feb. 1997



Wet – August 1998

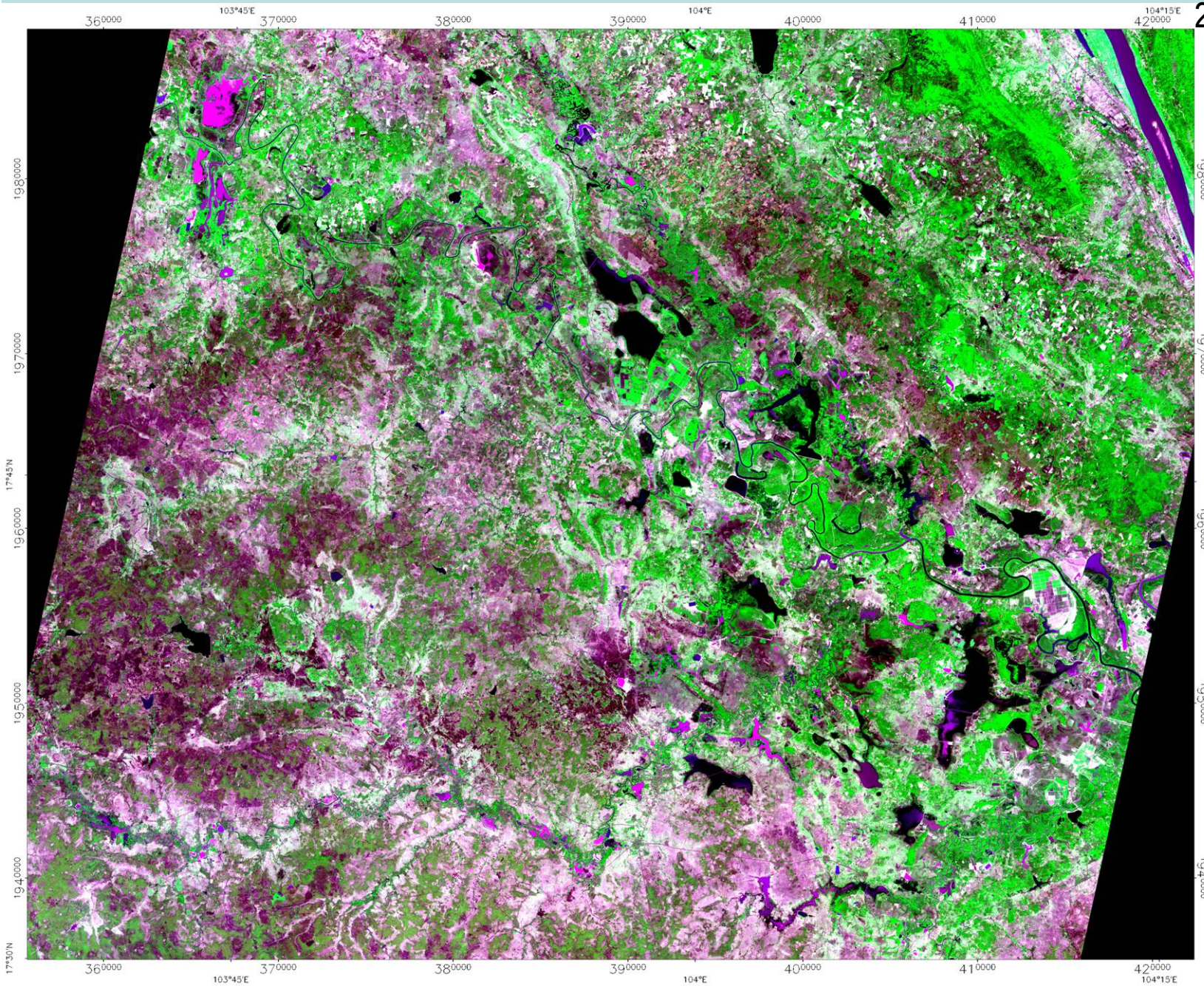
Difference

JERS-1 SAR

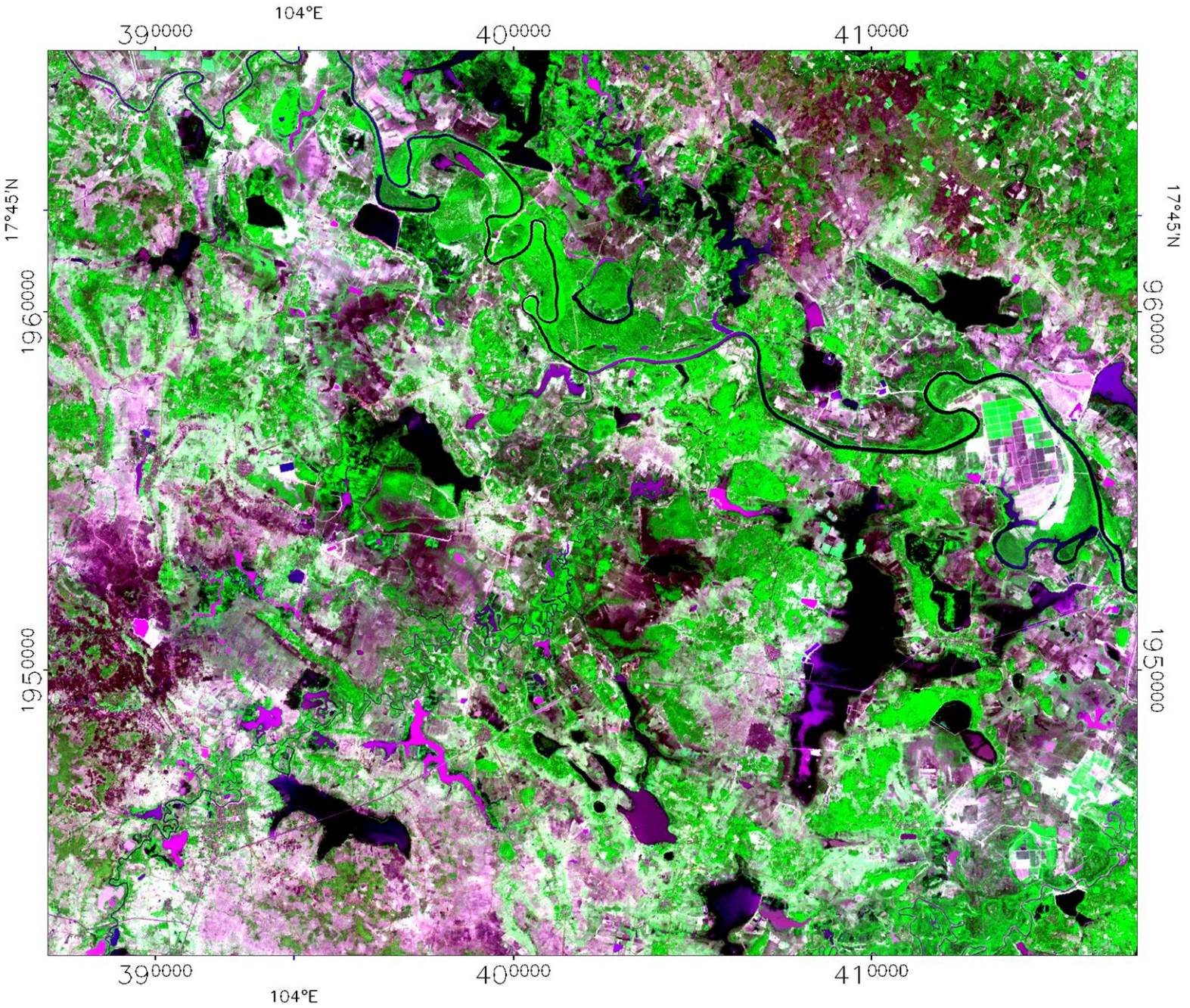
Songkram River Basin - Thailand

ASTER 2:3:1

2nd March 2003



Songkram River Basin - Thailand

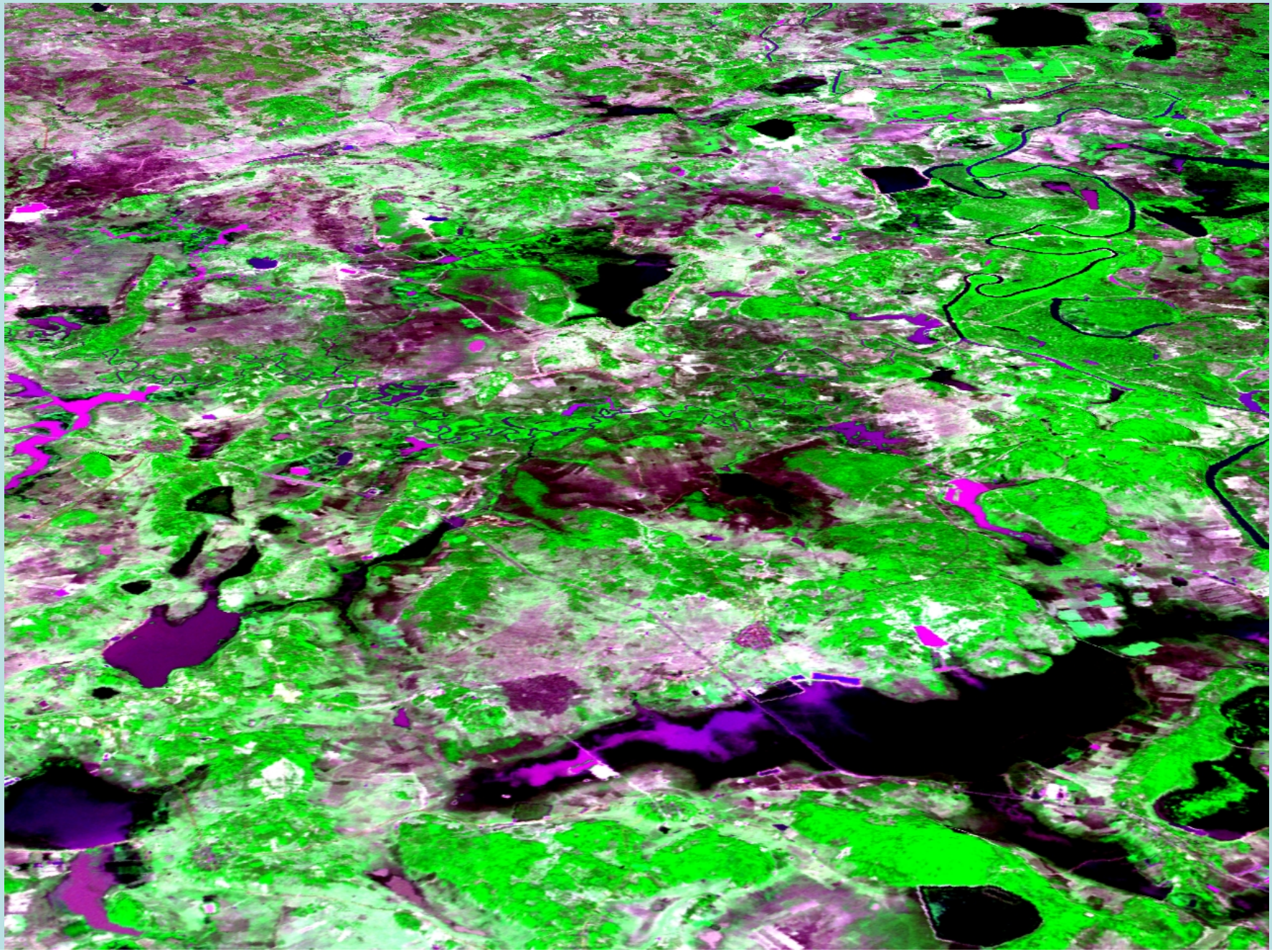


ASTER 2:3:1

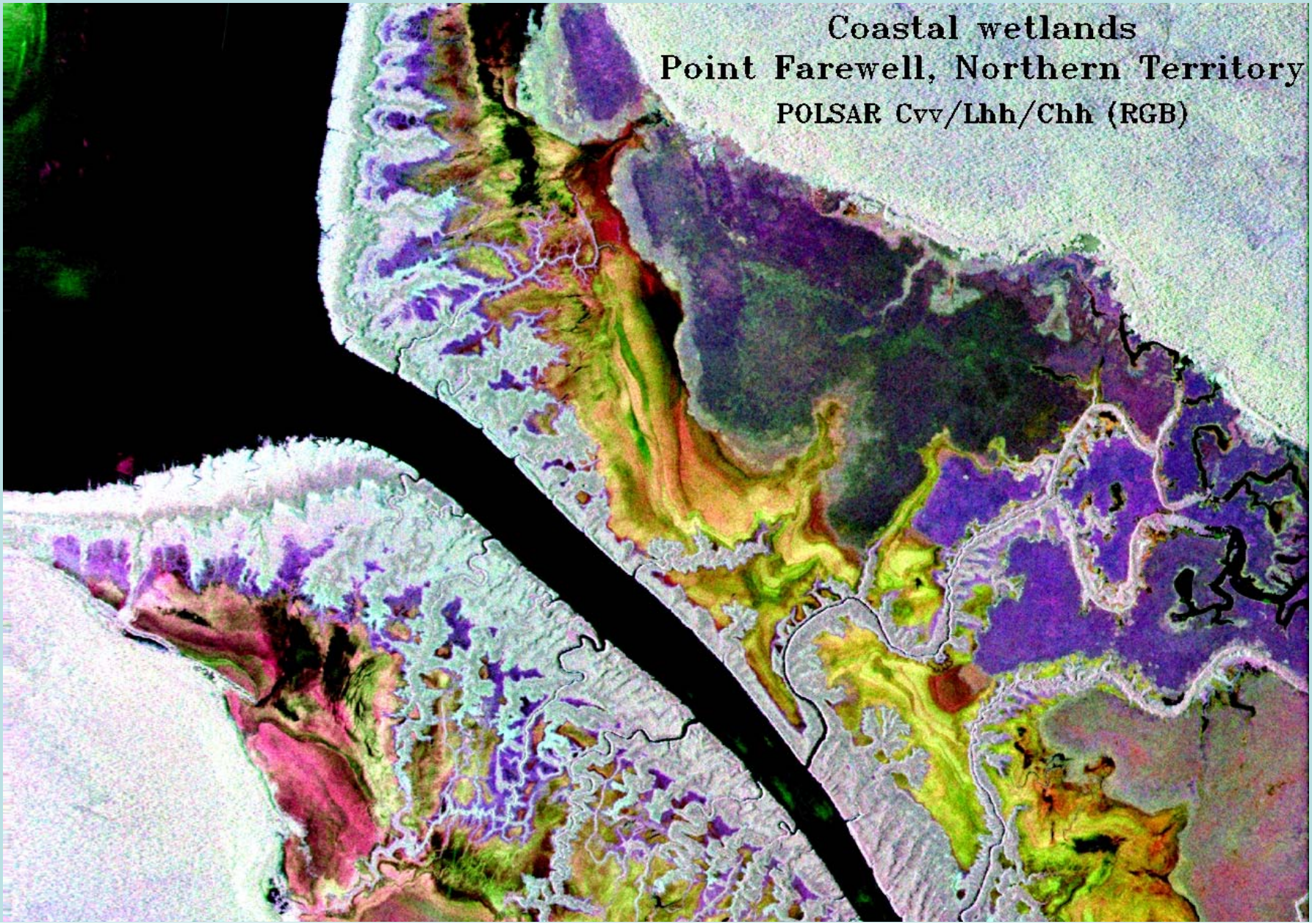
18Jan2004

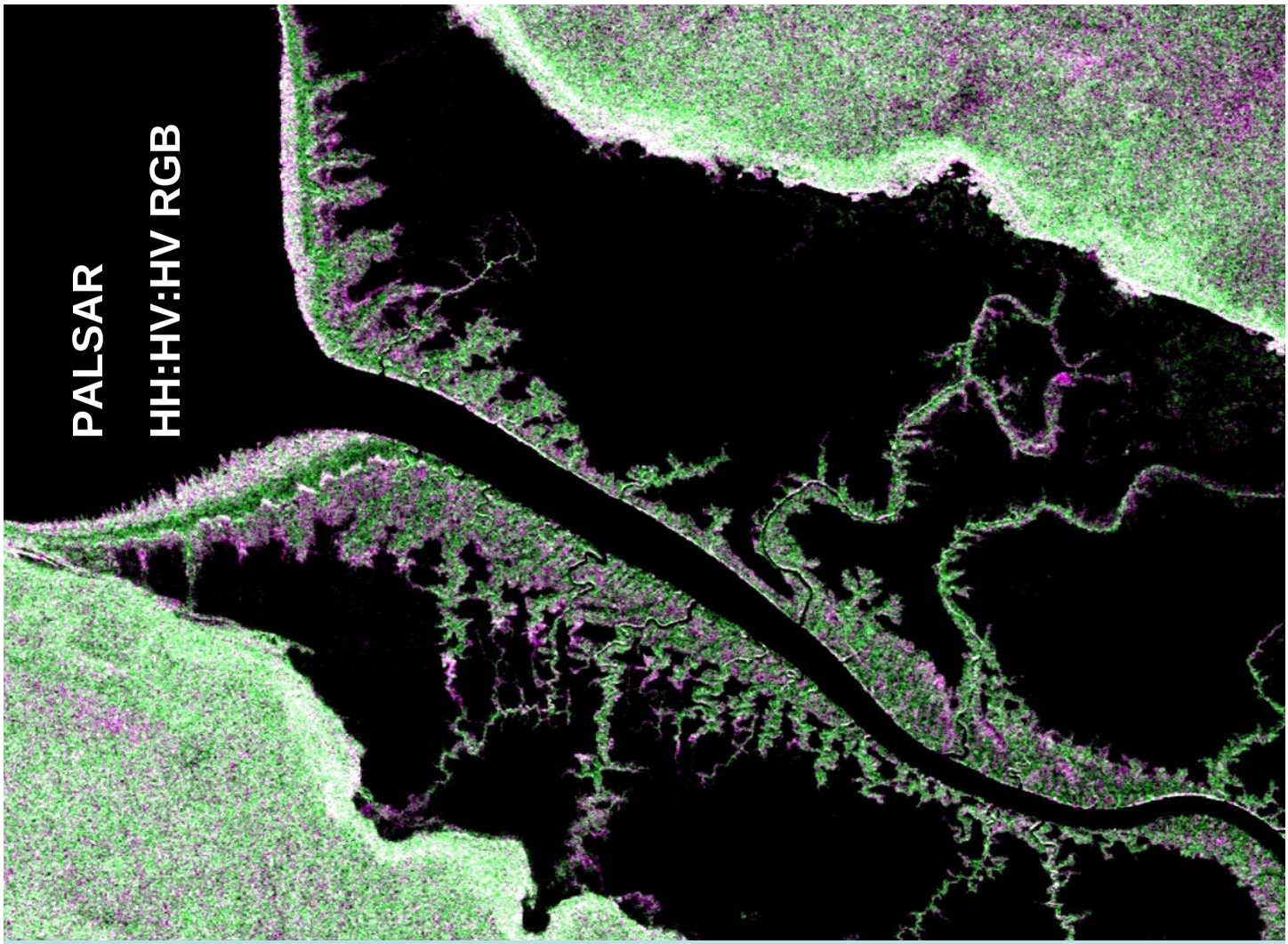
Songkram River Basin - Thailand

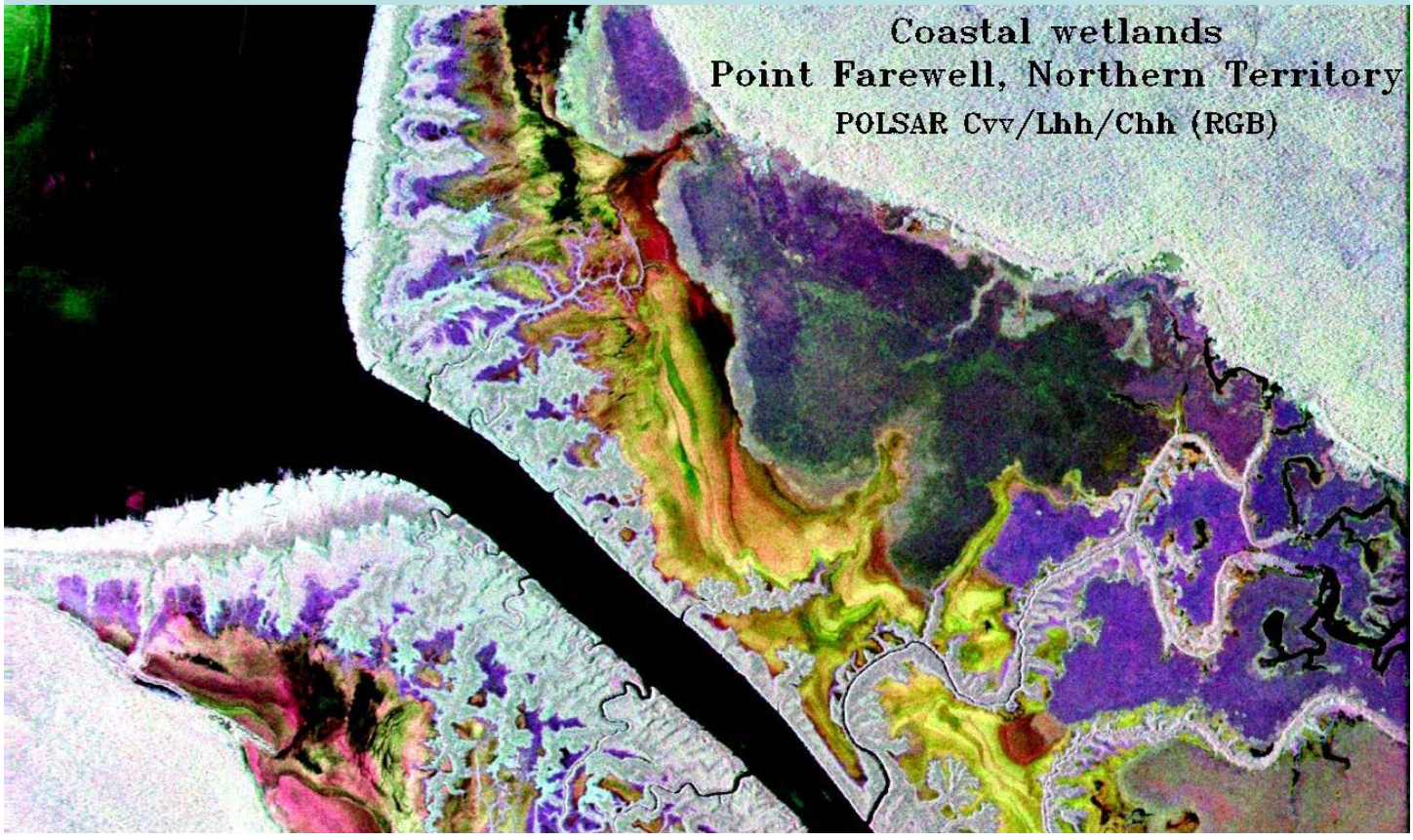
3D perspective: SRTM and ASTER 231



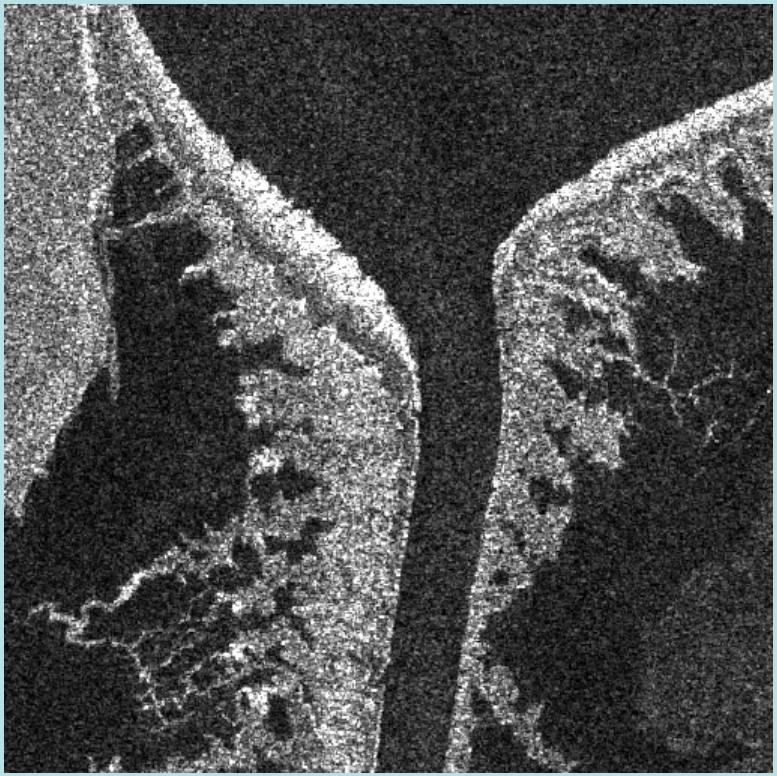
West Alligator River Mangroves

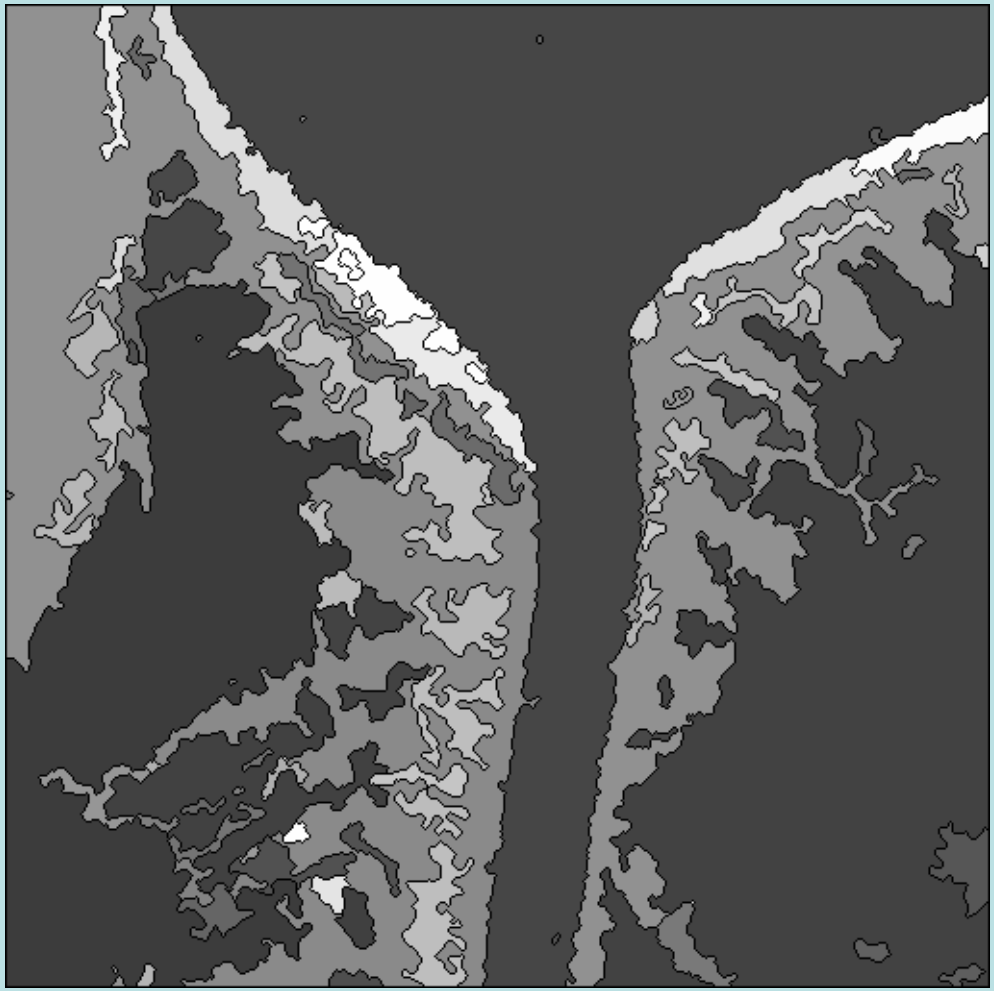



PALSAR
HH:HV:HV RGB

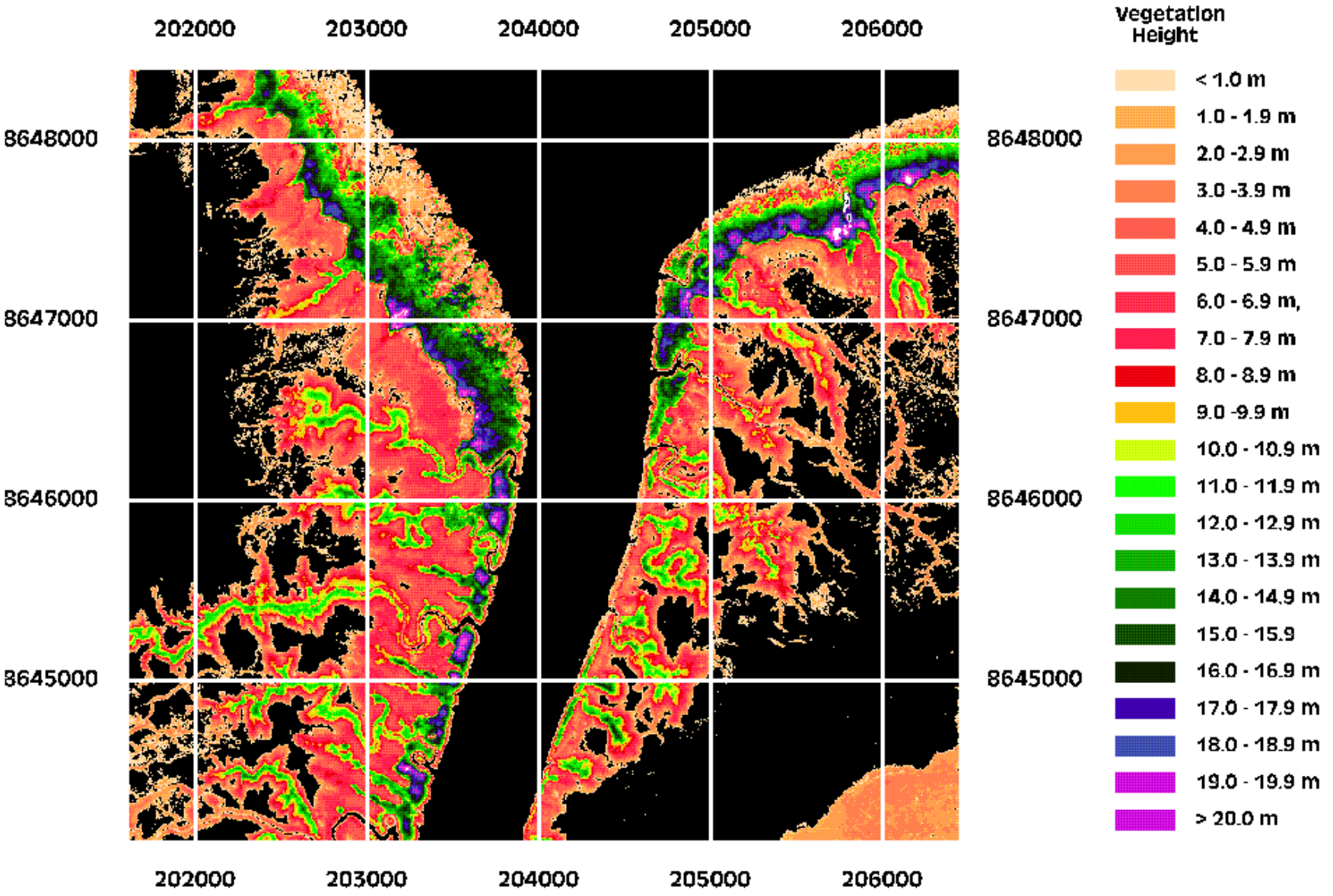

Coastal wetlands
Point Farewell, Northern Territory
POLSAR Cvv/Lhh/Chh (RGB)

Segmentation of JERS-1 SAR Image

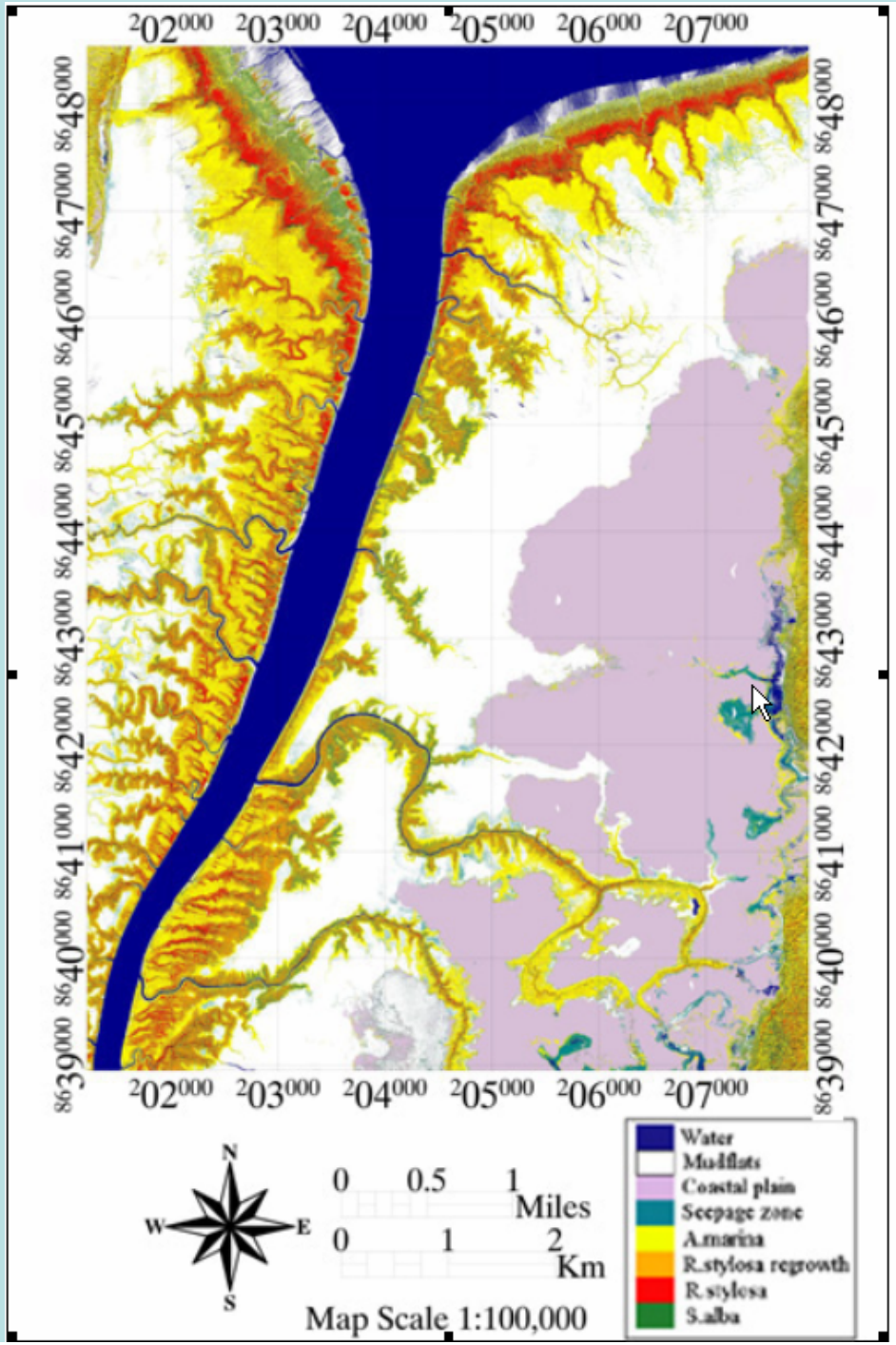


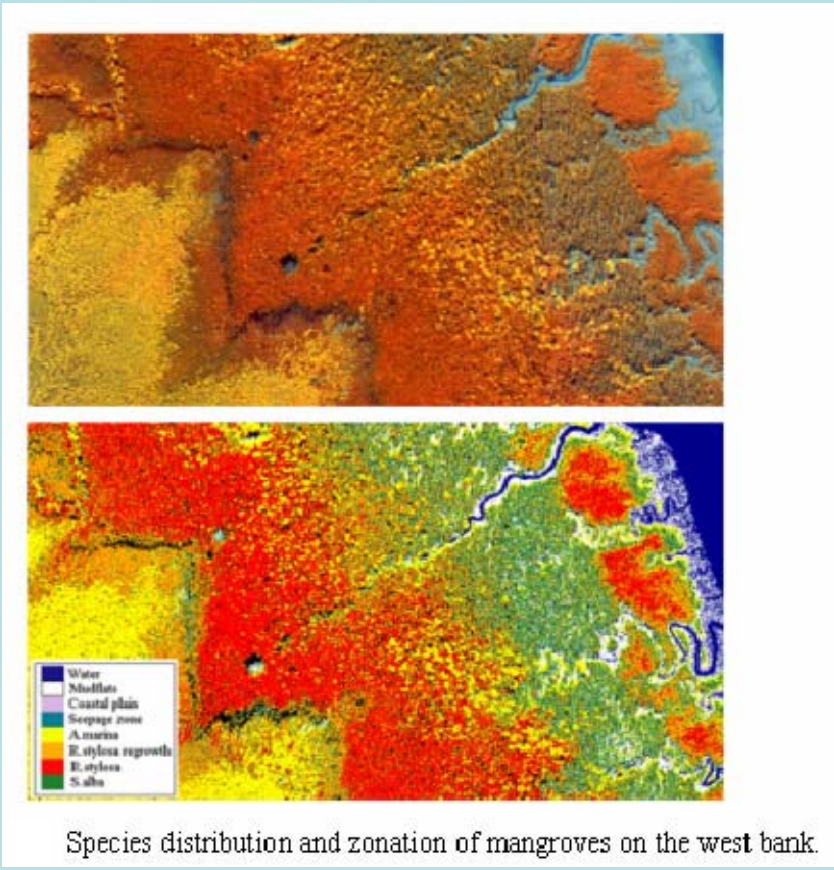


Digital Elevation Model (DEM) derived from Stereo Aerial Photographs



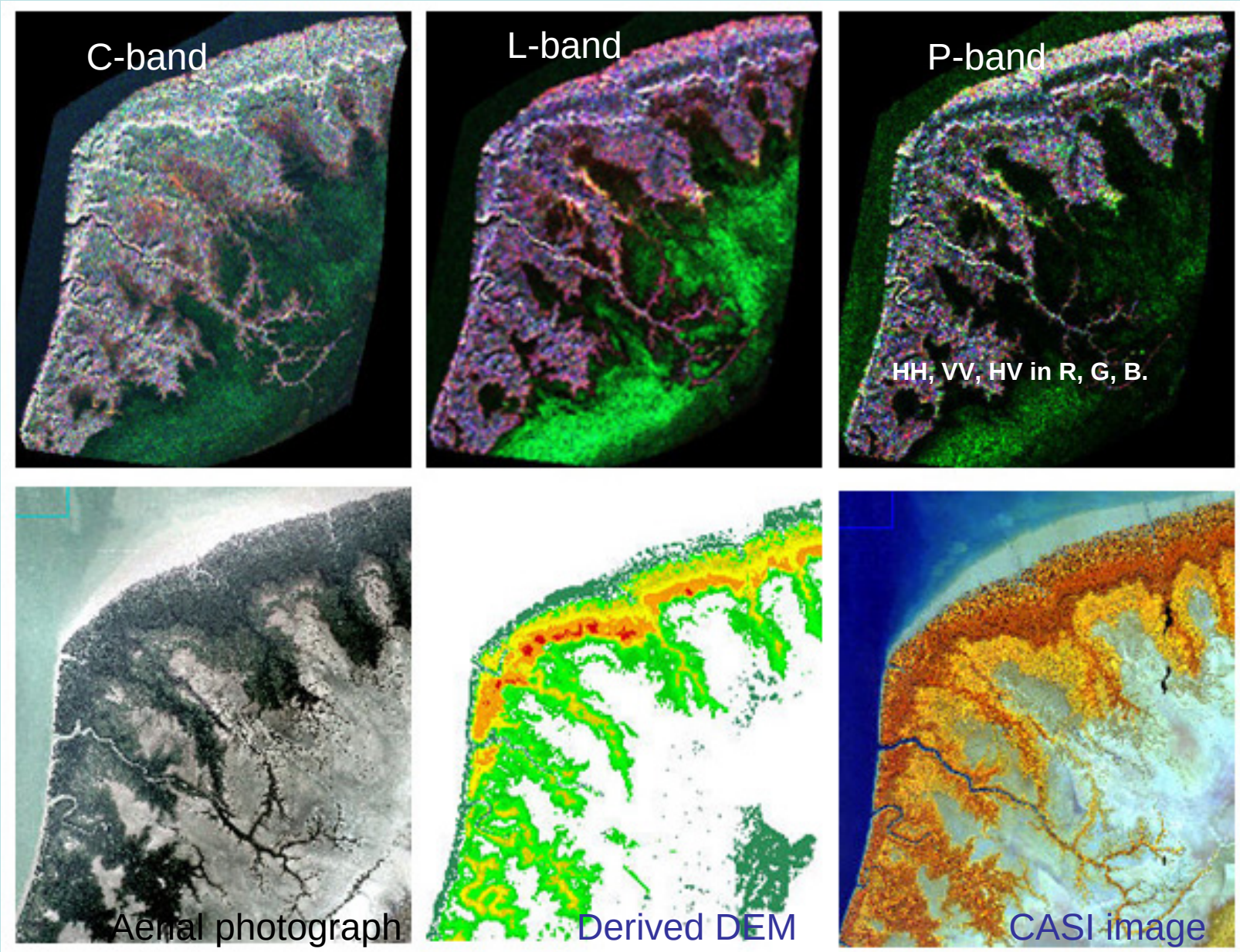
Classification of Mangroves based on CASI data



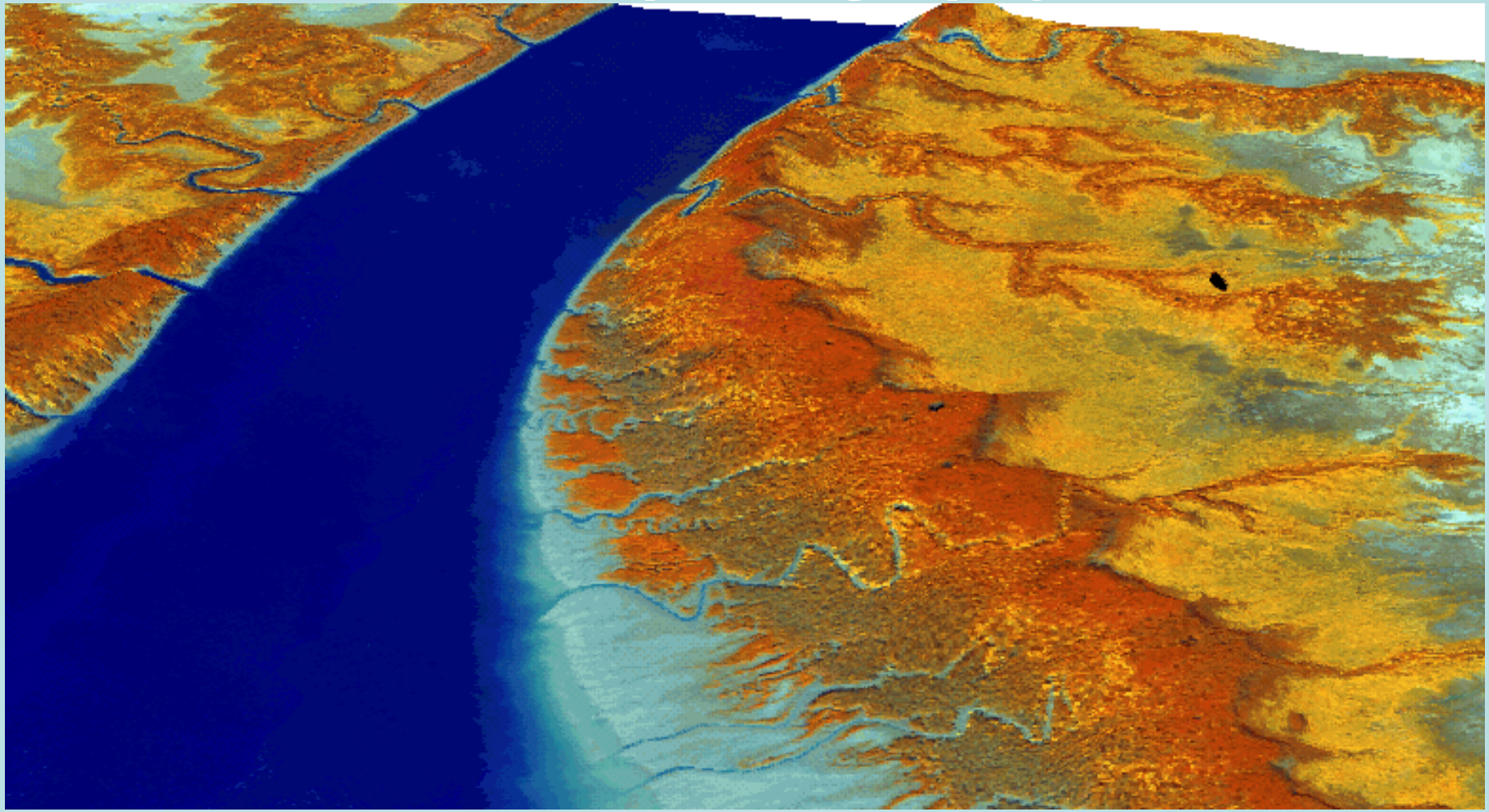


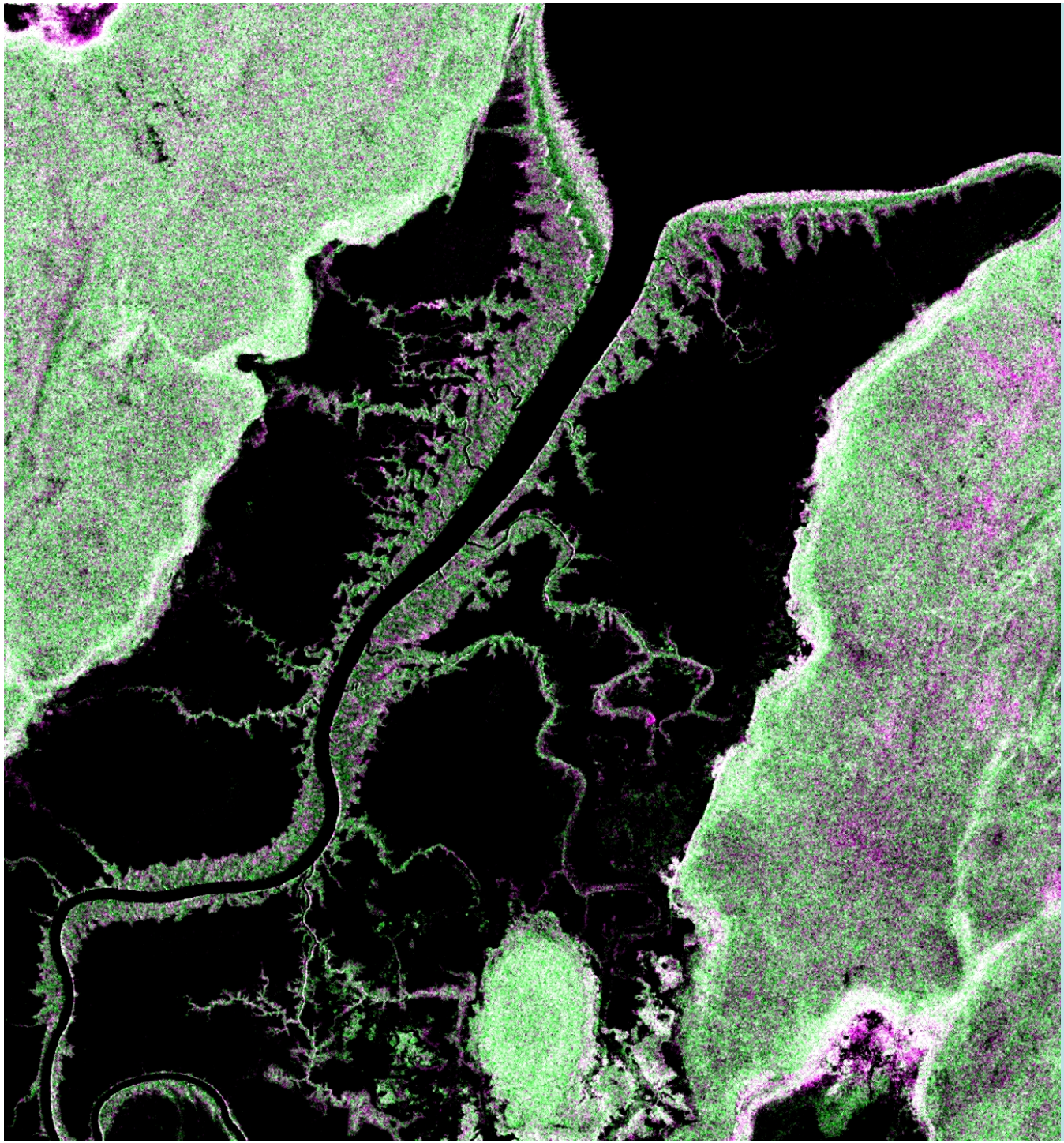
Species distribution and zonation of mangroves on the west bank.

West Alligator River SAR Observations



West Bank: Perspective view combining species information from CASI data and canopy height from stereo photography



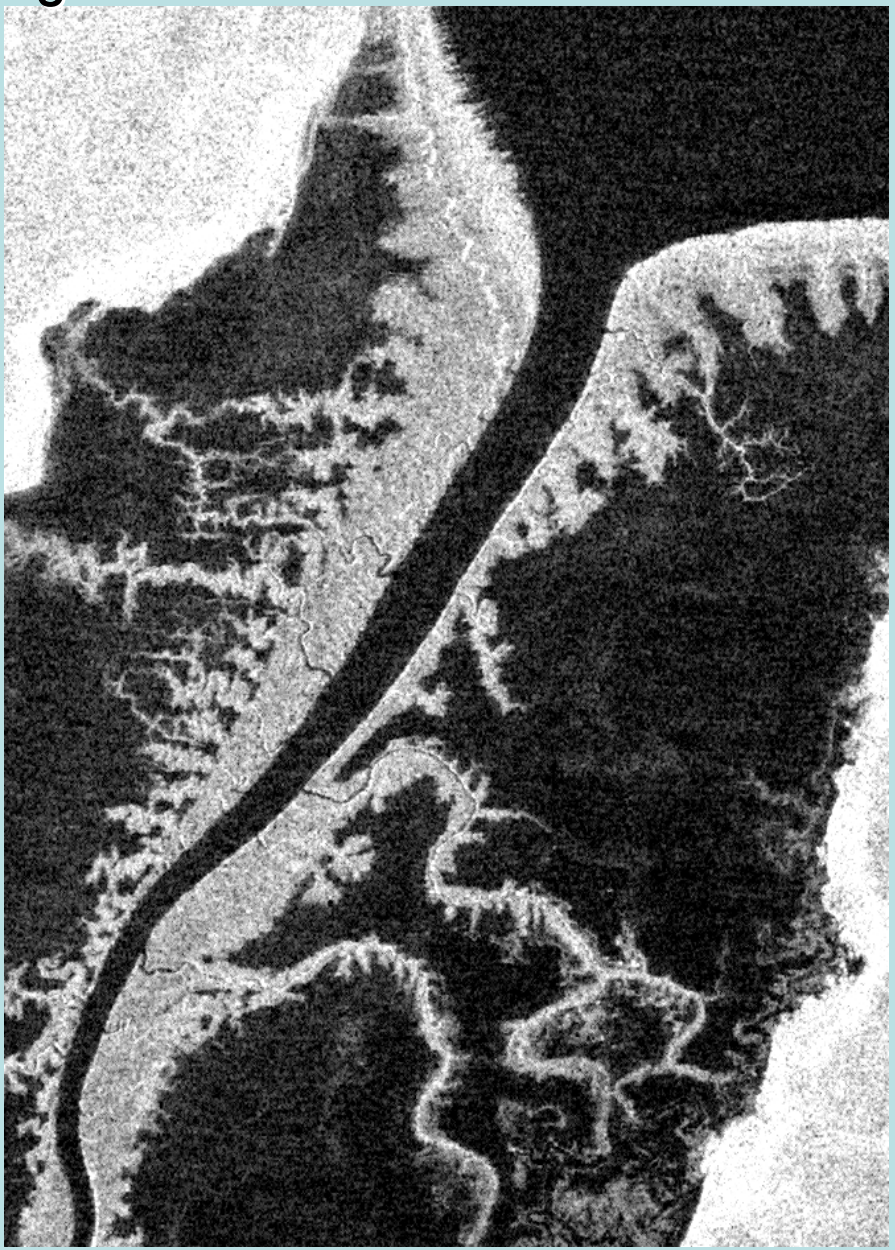


West Alligator

HH:HV:HV RGB

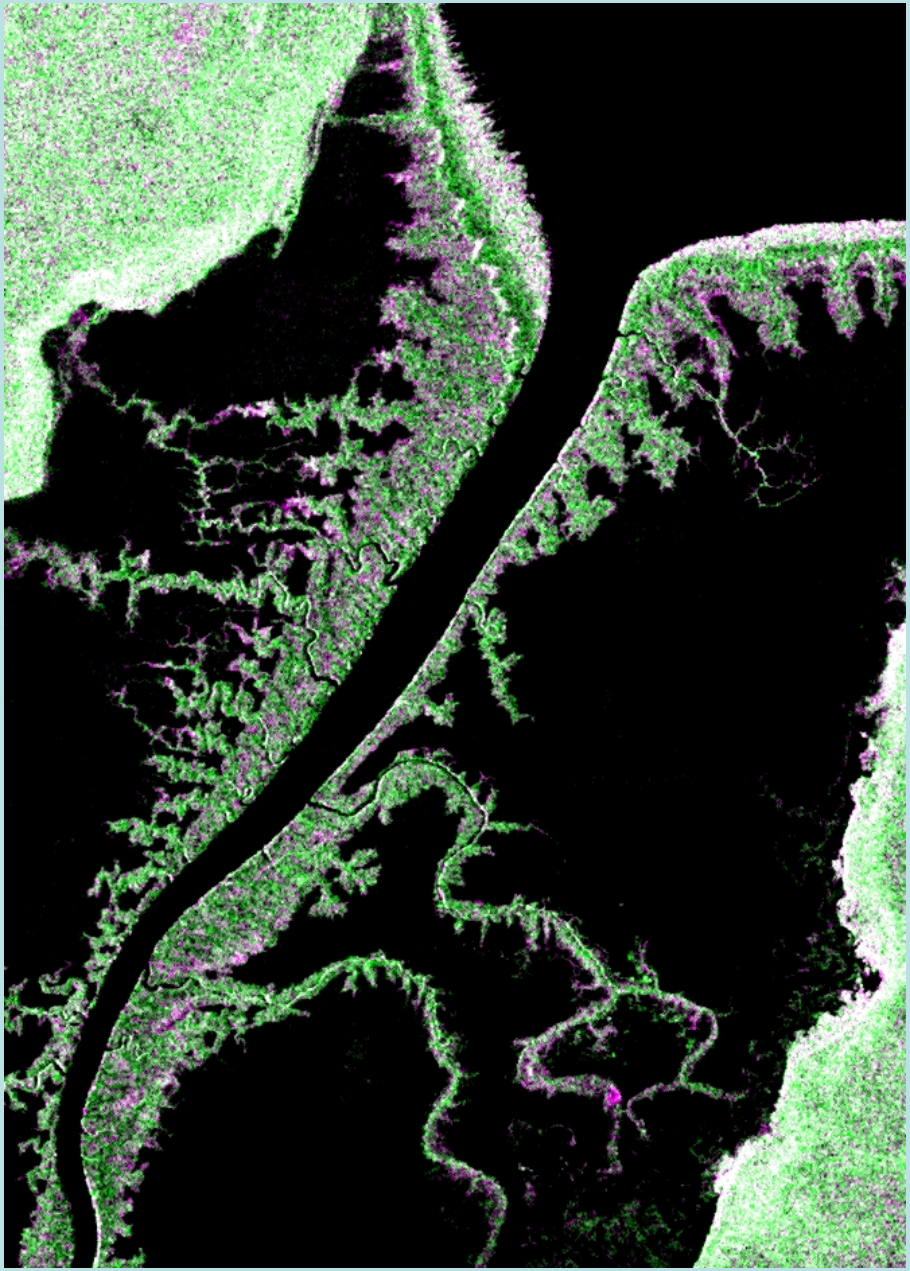
West Alligator

HH

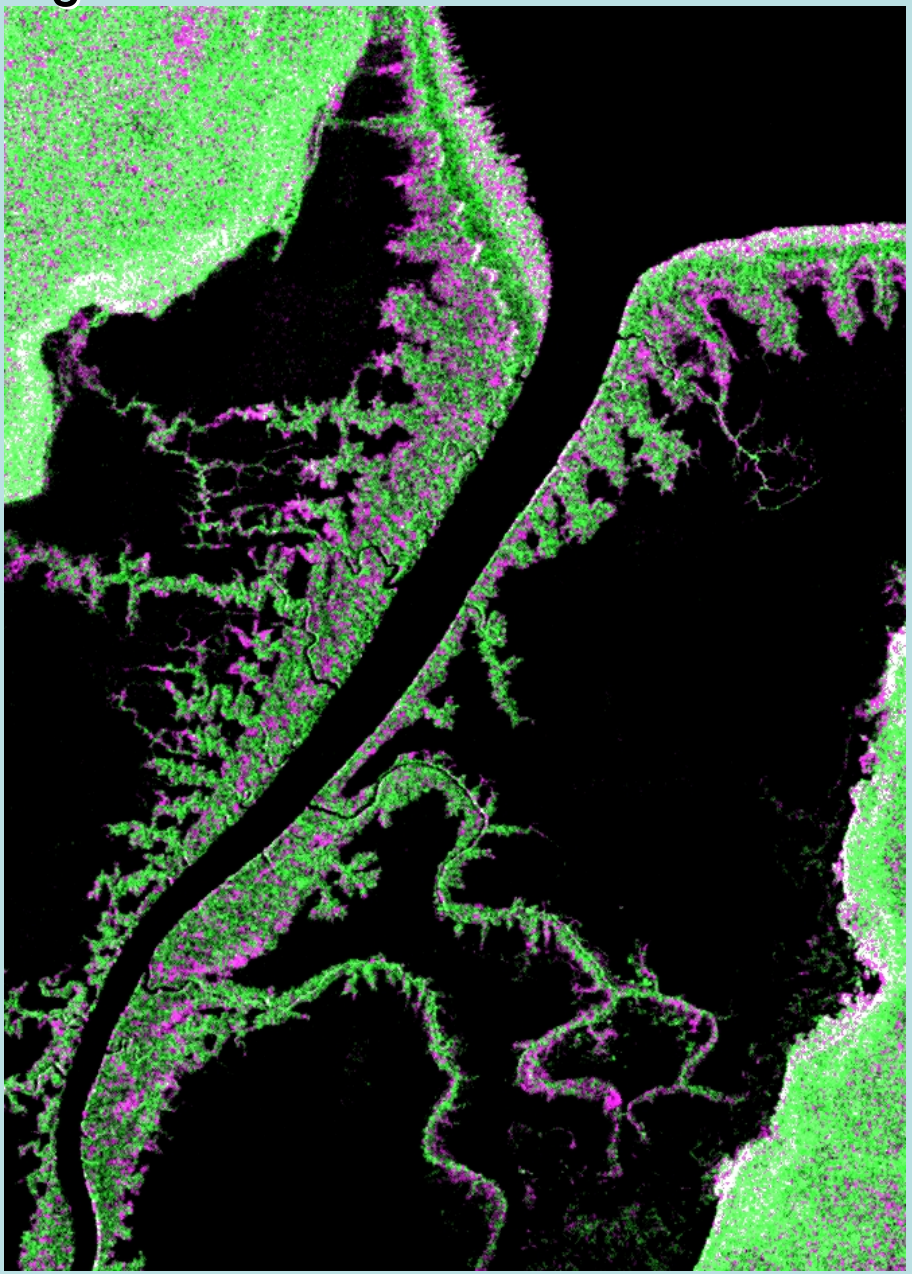


HV

West Alligator



HH / HV / HH

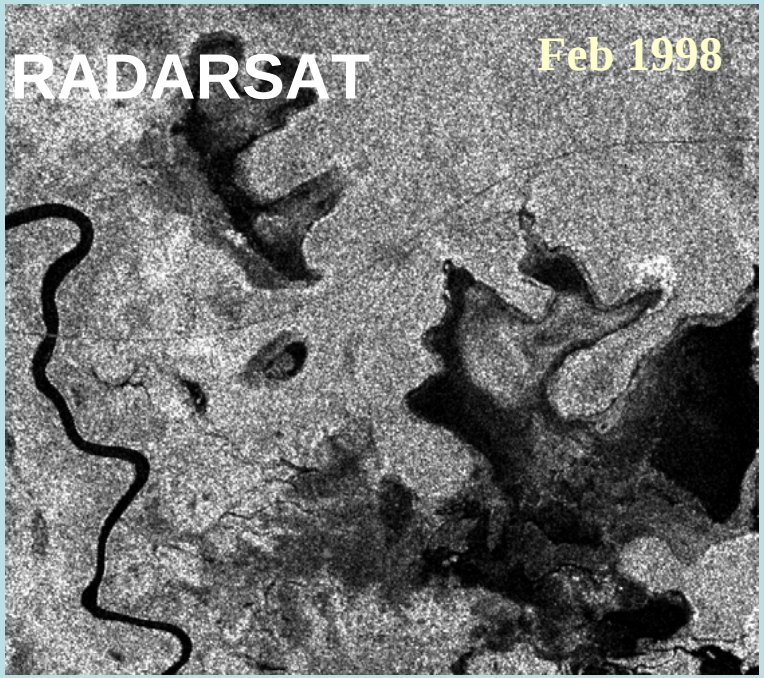


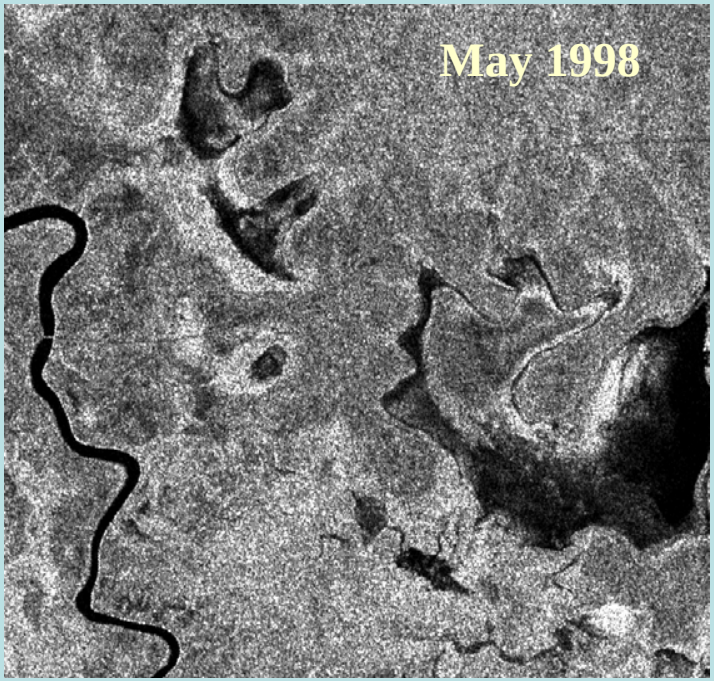
HH / HV / HH saturated colour

South Alligator

HH

HV


RADARSAT
Feb 1998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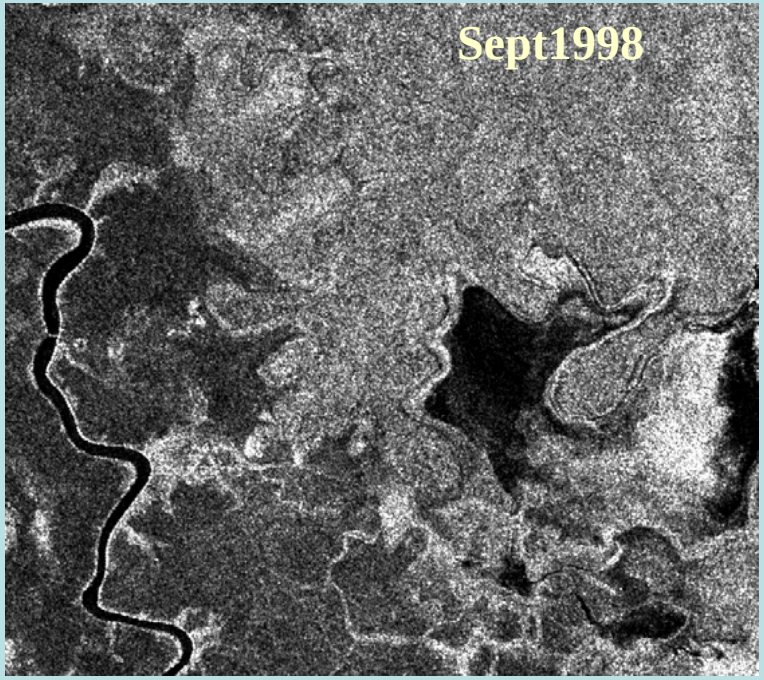
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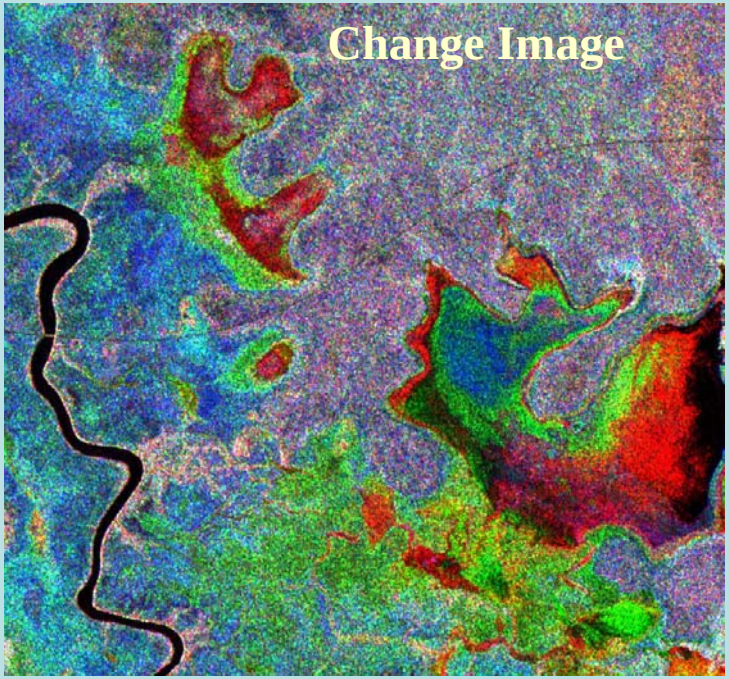
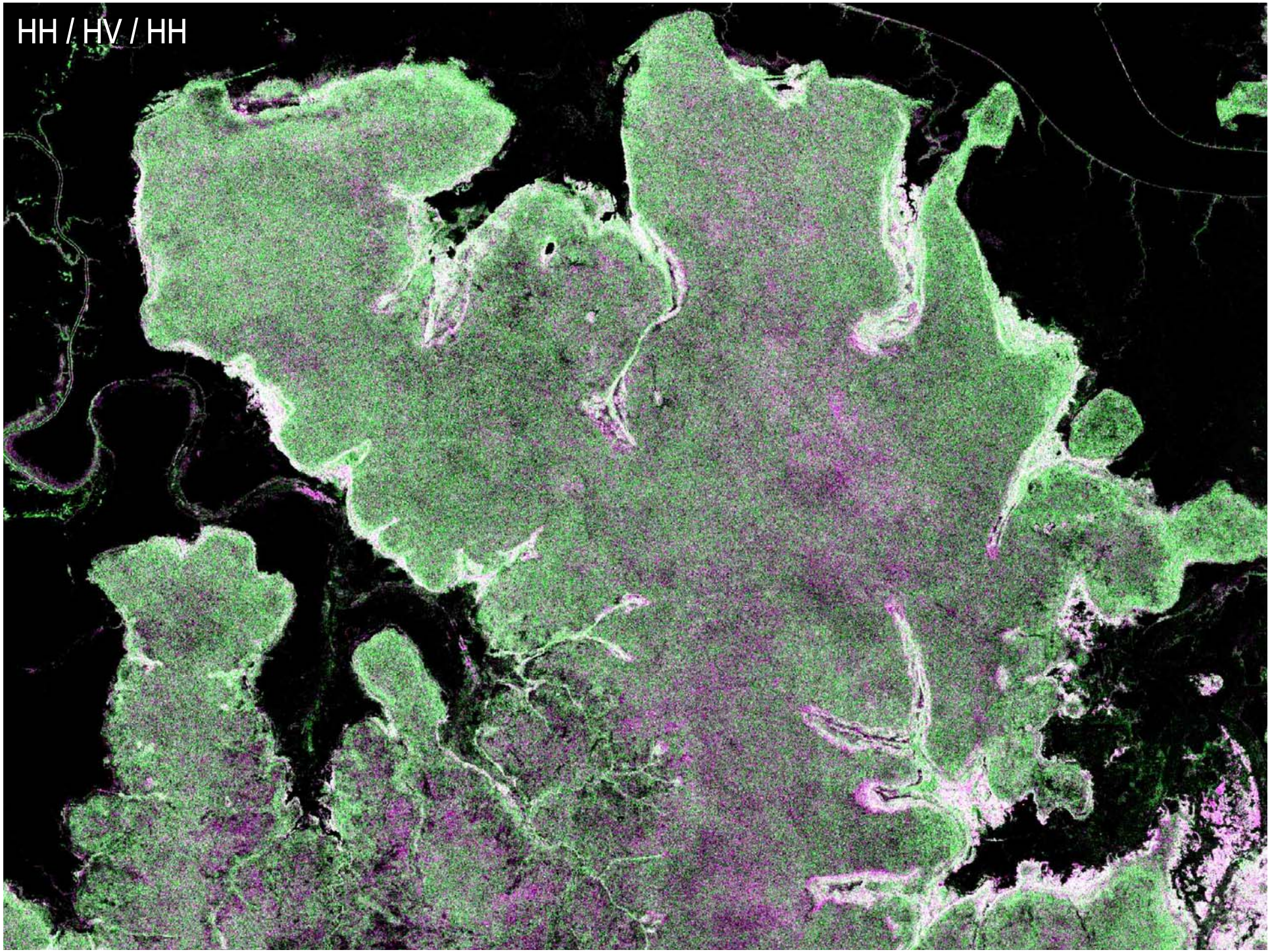

Change Image


HH / HV / HH