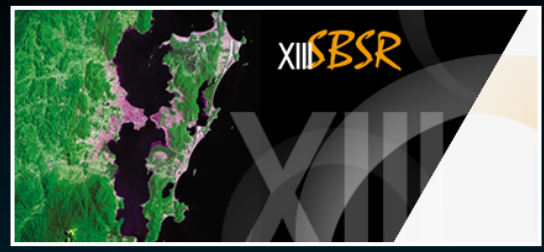

Simulação MAPSAR em Estudos de Sensibilidade Ambiental a Derrames de Óleo na Amazônia

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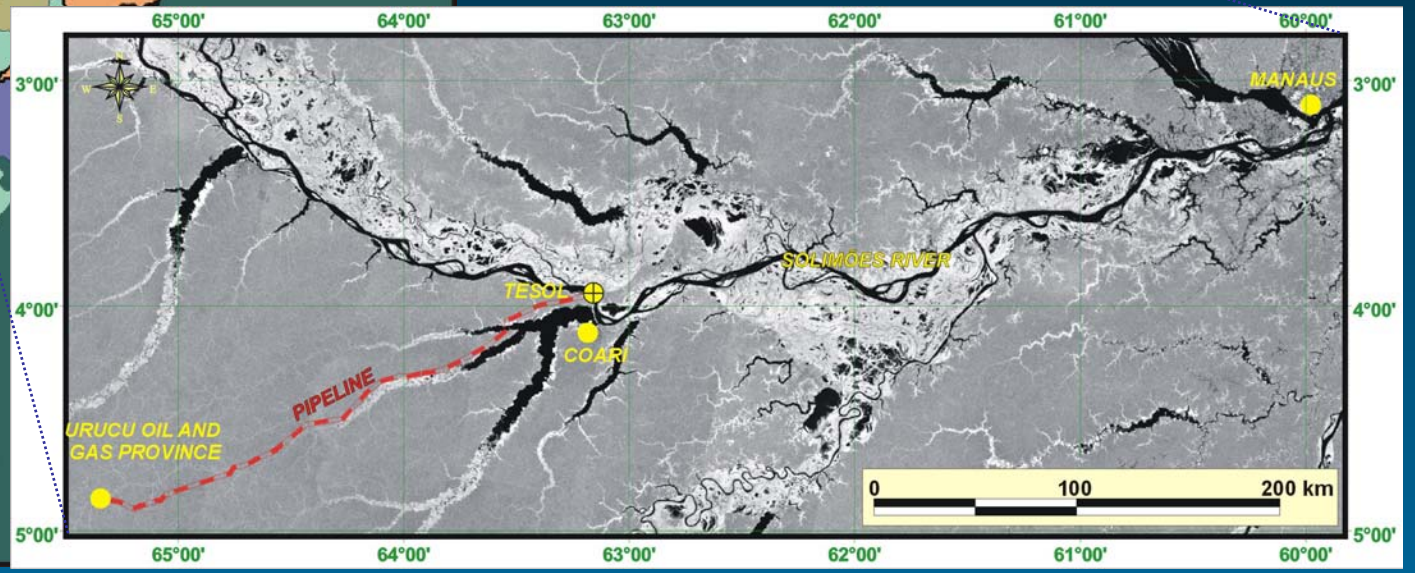
Pedro Walfir M. Souza Filho
(UFPA/CG/LAIT)

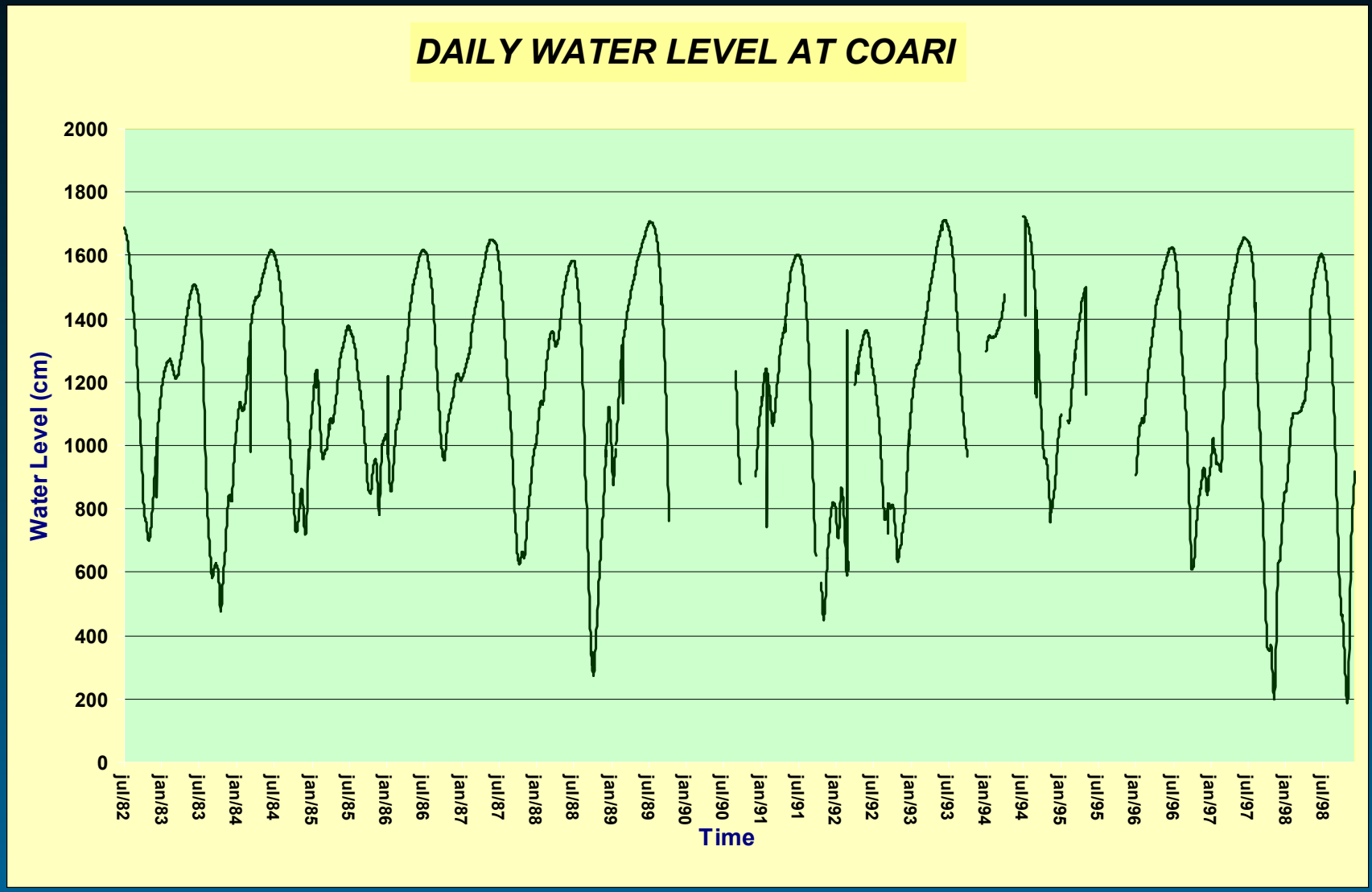
APRIL/2007 – FLORIANÓPOLIS, SC

STUDY AREA

JERS-1 SAR MOSAIC



Water Level at Coari Gauge from July 1982 to December 1998

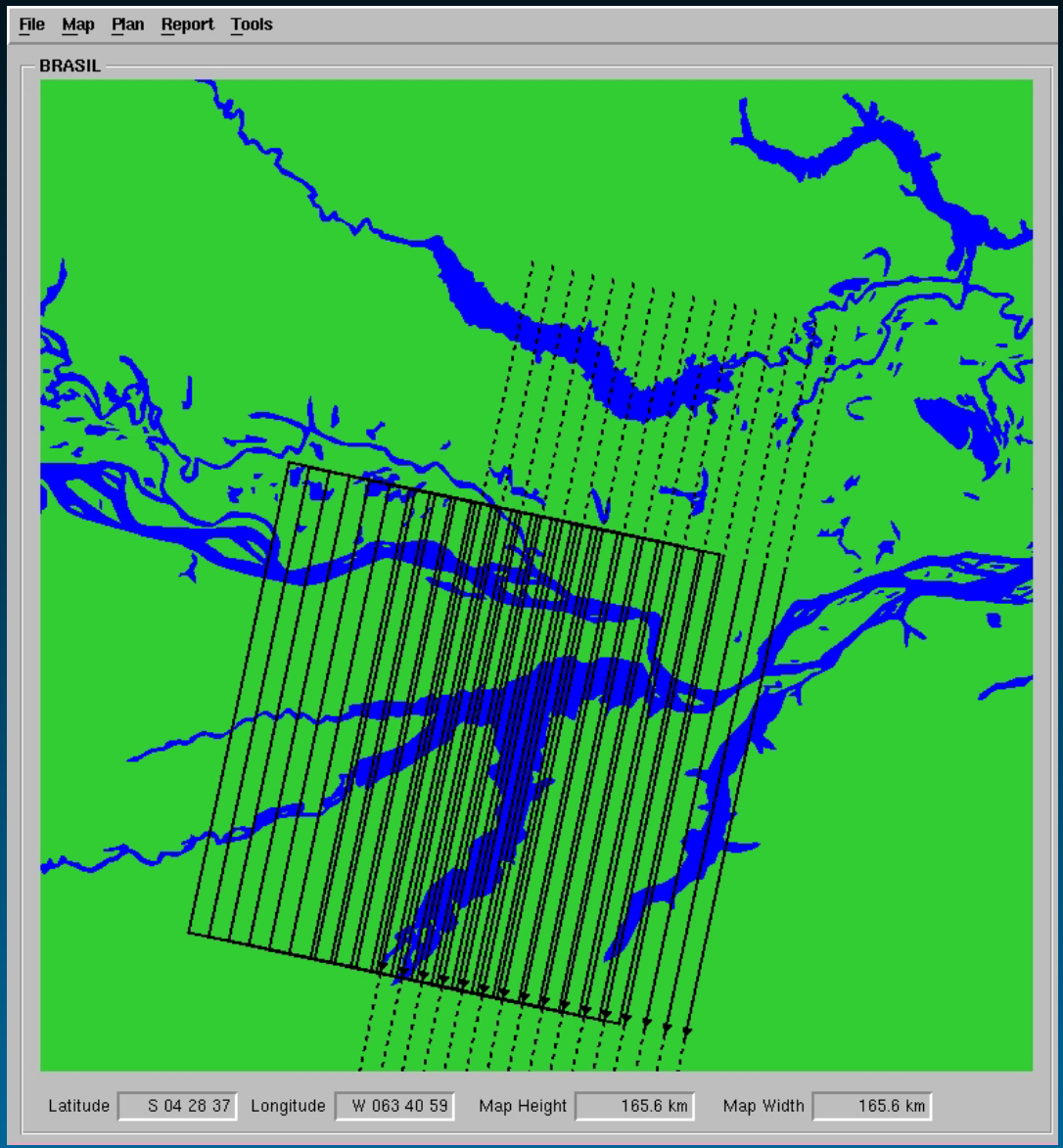


Oil Spill Environmental Sensitivity Index (ESI) for Fluvial Regions of Amazonia*

ESI RANKING	HABITATS
1	Manmade structures
2	Exposed rocky platform or outcrop
3	Rapid / waterfall
4	Scarp / cliff
5	Exposed sand / gravel beach or bank
6	Sheltered sand / gravel beach or bank
7	Exposed mud beach or bank
8	Sheltered mud beach or bank
9	Confluence of rivers and lakes
10a	Aquatic vegetation bank (macrophytes)
10b	Flooded vegetation (igapós, várzea, chavascal, campo)

*based on field surveys and previous studies

ACQUISITION PLAN OF R99SAR DATA OVER COARI REGION



- DATE ACQUISITION:
  - 01/June/2006
    (High flood season)

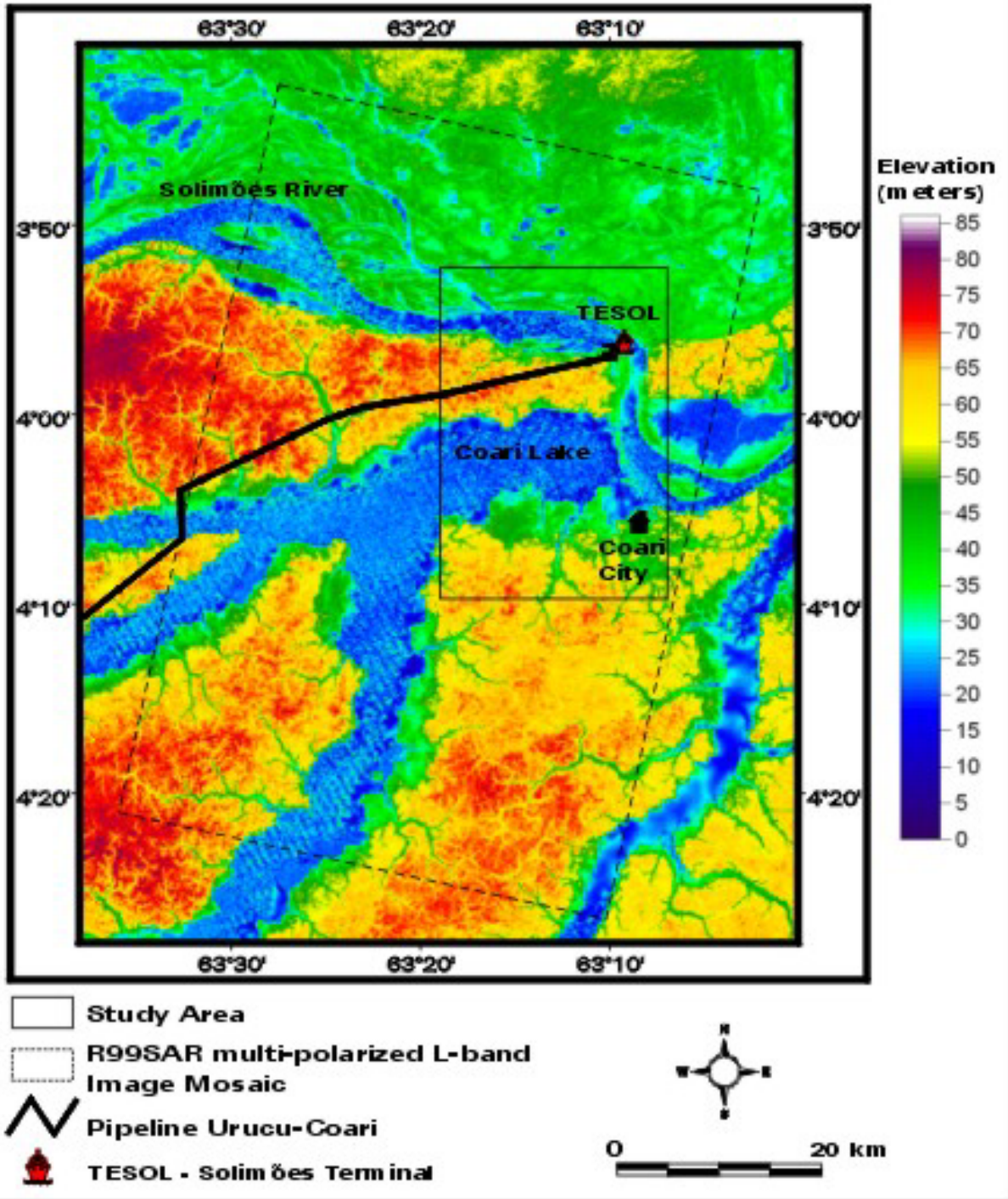
- 16 DESCENDING STRIPS

- BAND ACQUISITIONS
  - L Band - Quad-pol
  - X band – Single-pol

- INCIDENCE ANGLE
  (for each strip)
  - 39.57º (near range)
  - 70.99º (far range)

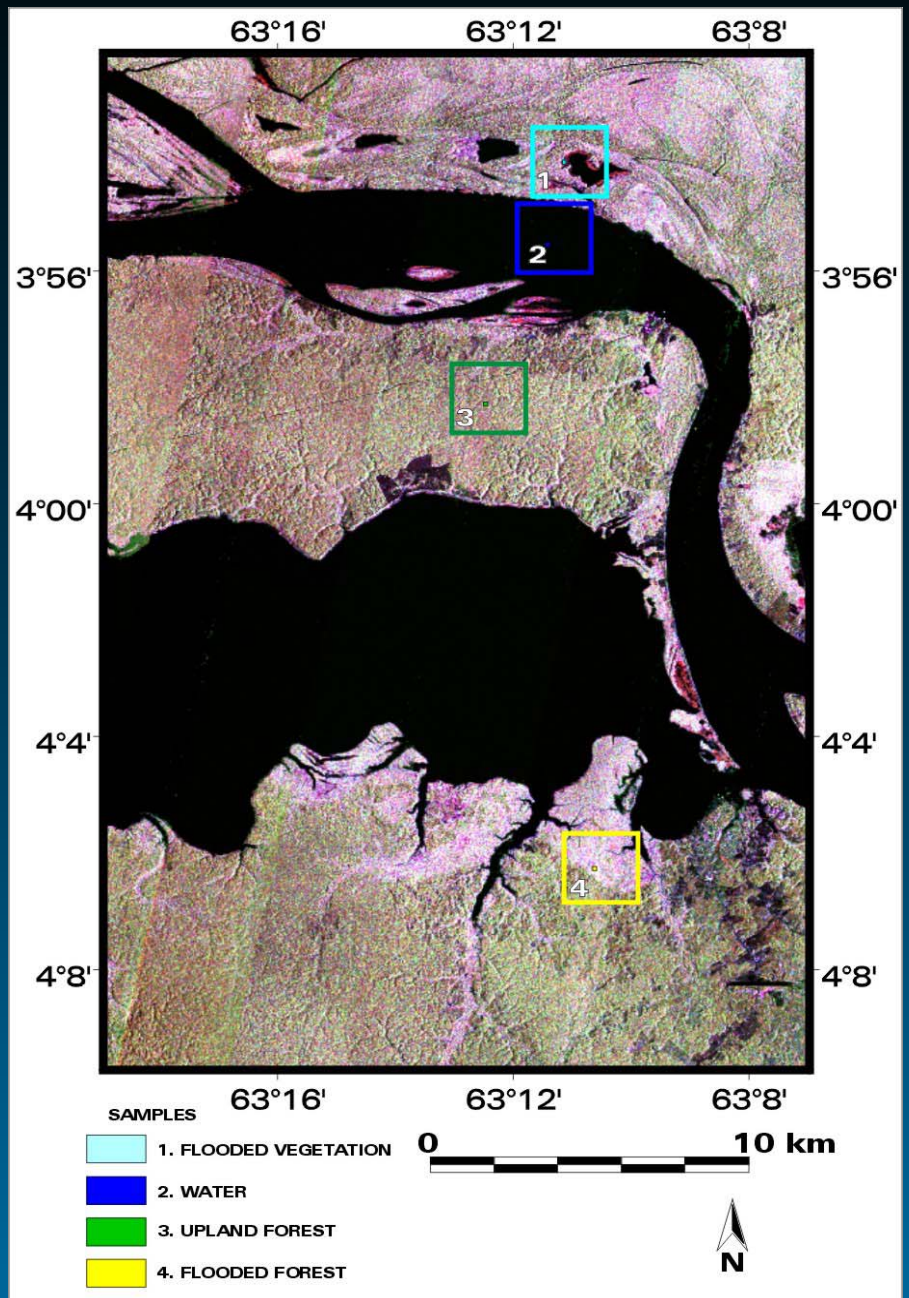
- SWATH WIDTH: 20 km

- GROUND RESOLUTION:
  6 m.



R99SAR L-band Mosaic Over SRTM Data

R99SAR L-band MOSAIC MAPSAR



- **Multi-polarized images used: R(HH) G(HV) B(VV)**

- Acquisition date:
  01 JUNE 2005
  (high flood)

- Incidence angle used interval of each strip:
  - 39.57º Near range
  - 45.00º Far Range

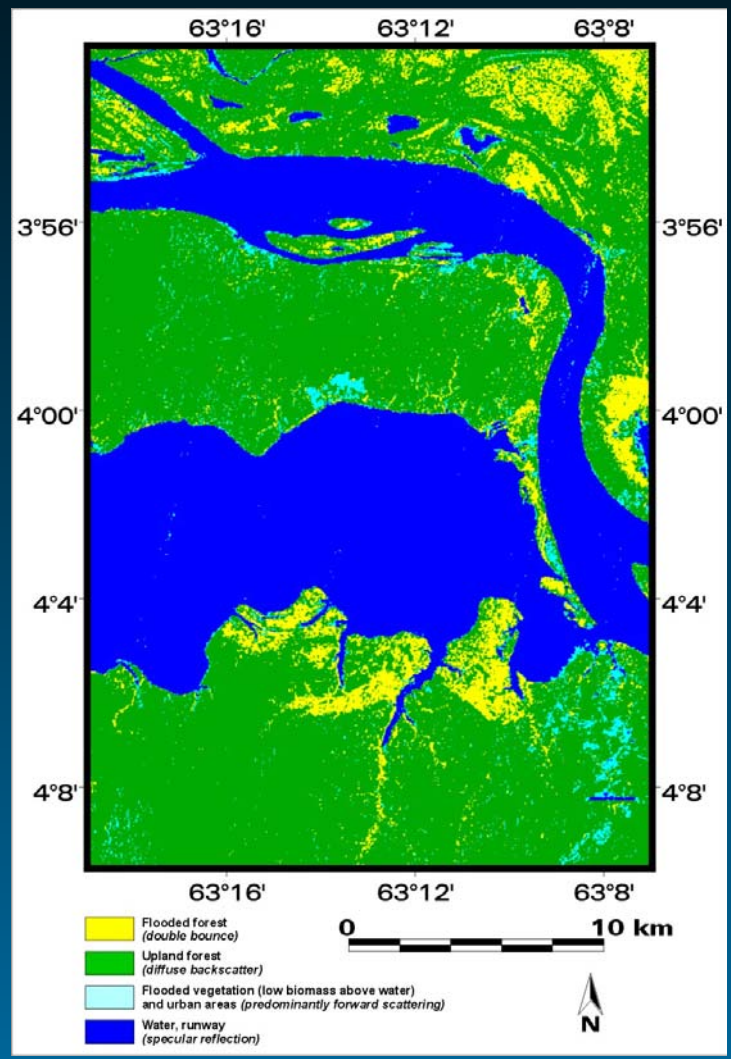
- This corresponds to an average of 4 km of each strip used to compose the mosaic;

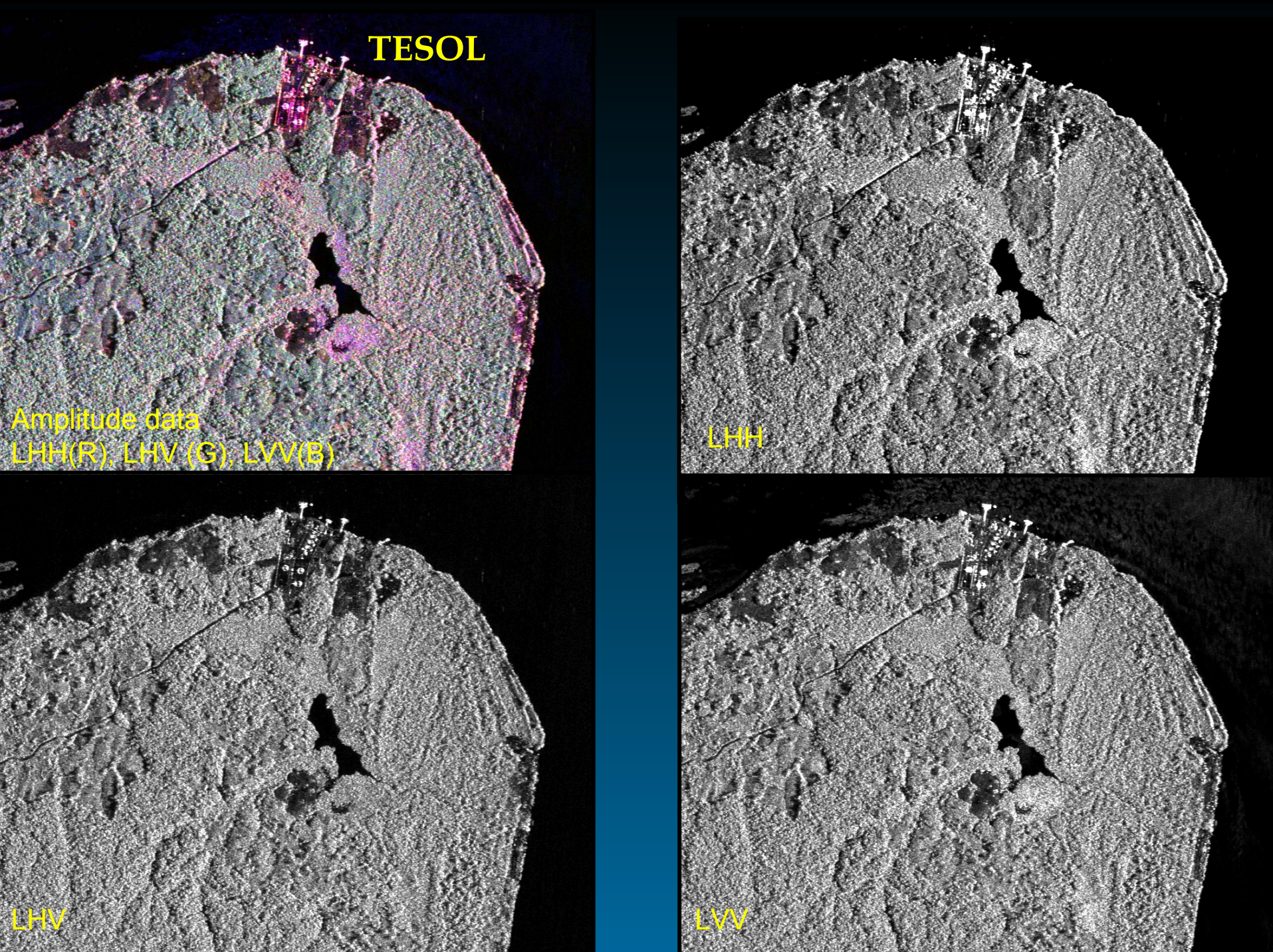
- Resolution resampled to 10 meters;

R99SAR L-band MOSAIC MAPSAR

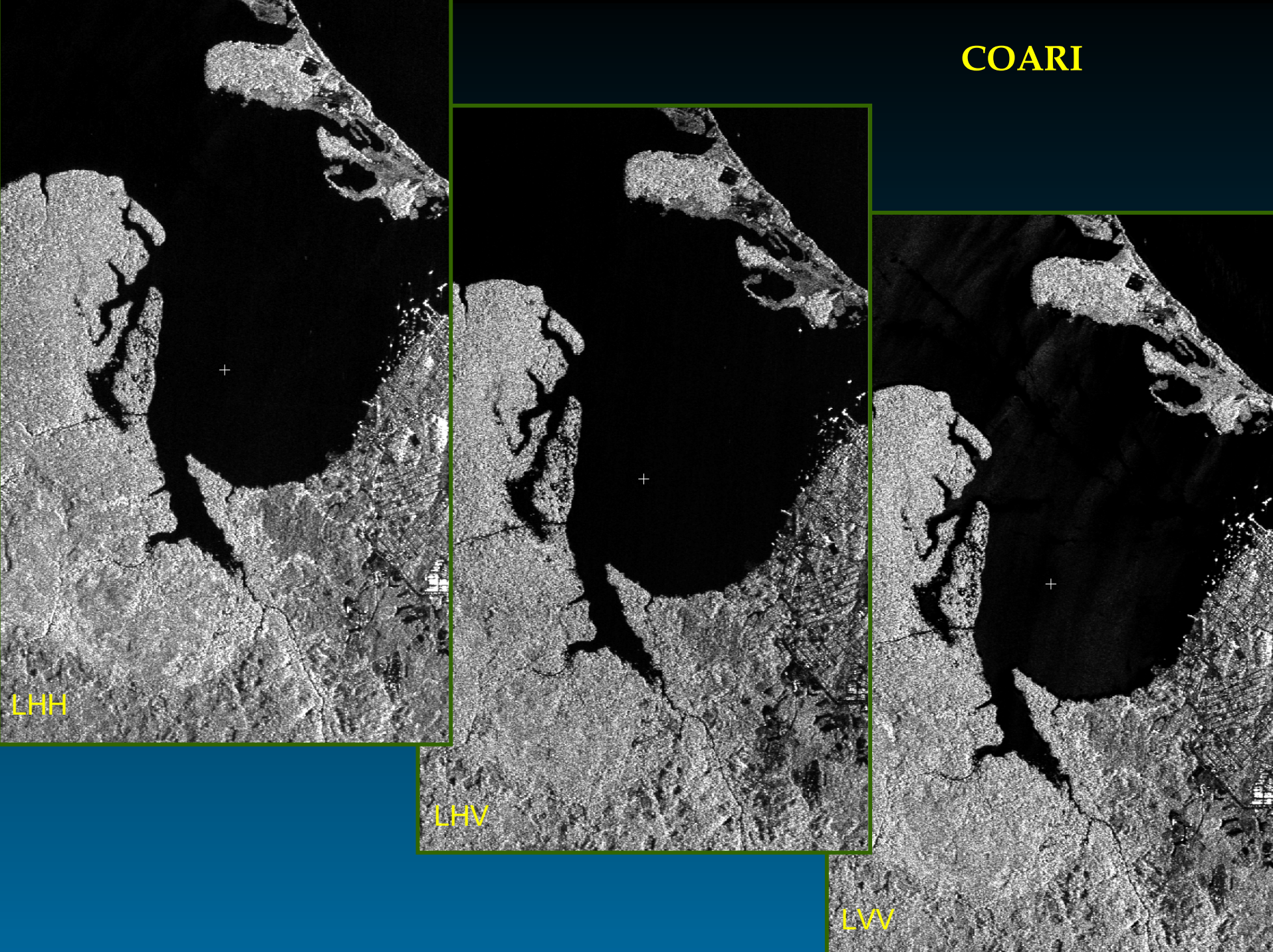
HH+HV USTC

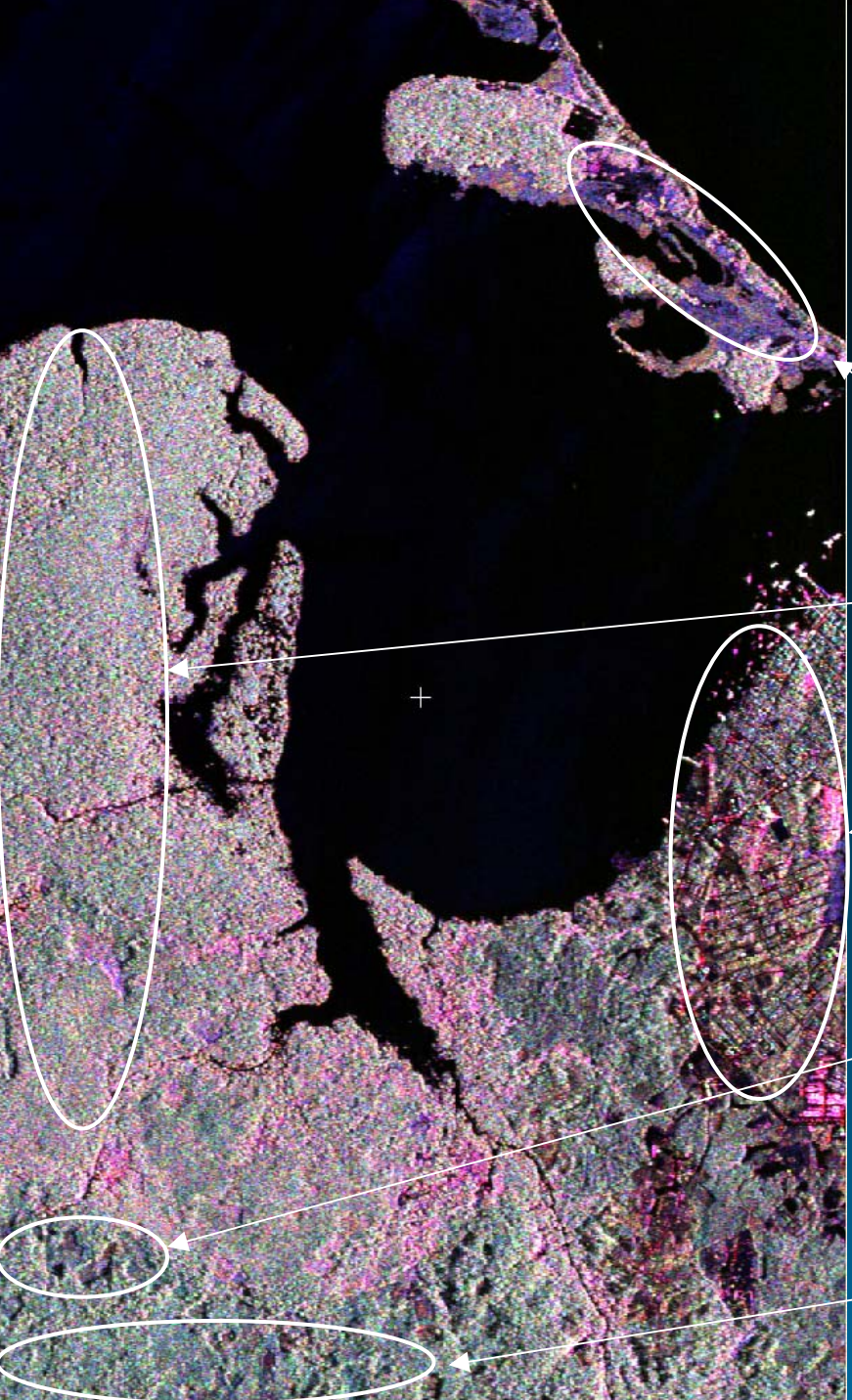
% PIXELS / CLASS (HH+HV)	WATER	FLOODED VEGETATION	UPLAND FOREST	FLOODED FOREST
WATER	100	0	0	0
FLOODED VEGETATION	0	98.3	1.7	0
UPLAND FOREST	0	0	100	0
FLOODED FOREST	0	0	0	100




TESOL
Amplitude data
LHH(R), LHV (G), LVV(B)
LHH
LHV
LVV

COARI





COARI

Amplitude data
LHH(R), LHV (G), LVV(B)

Flooded Vegetation

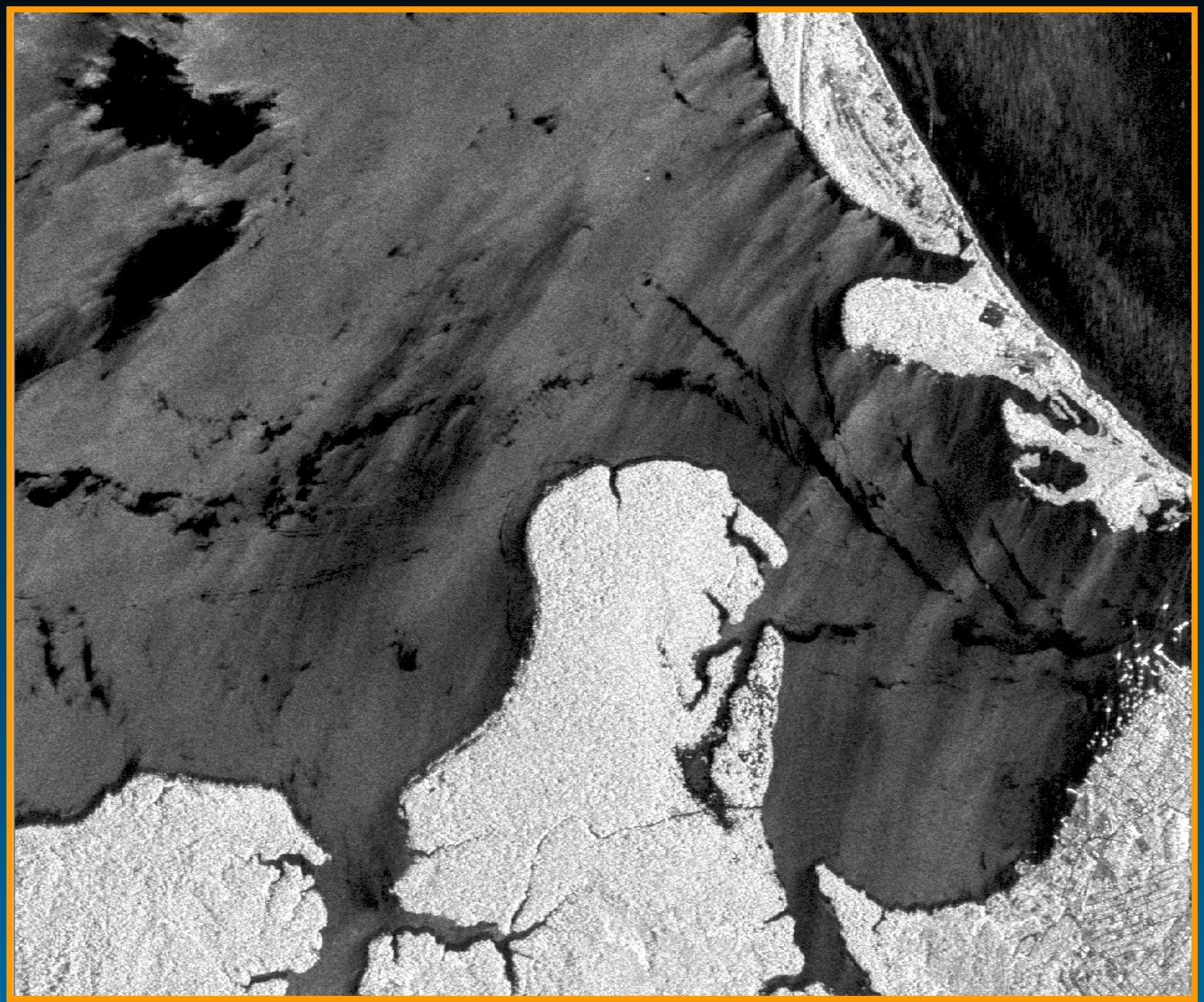
Flooded Forest

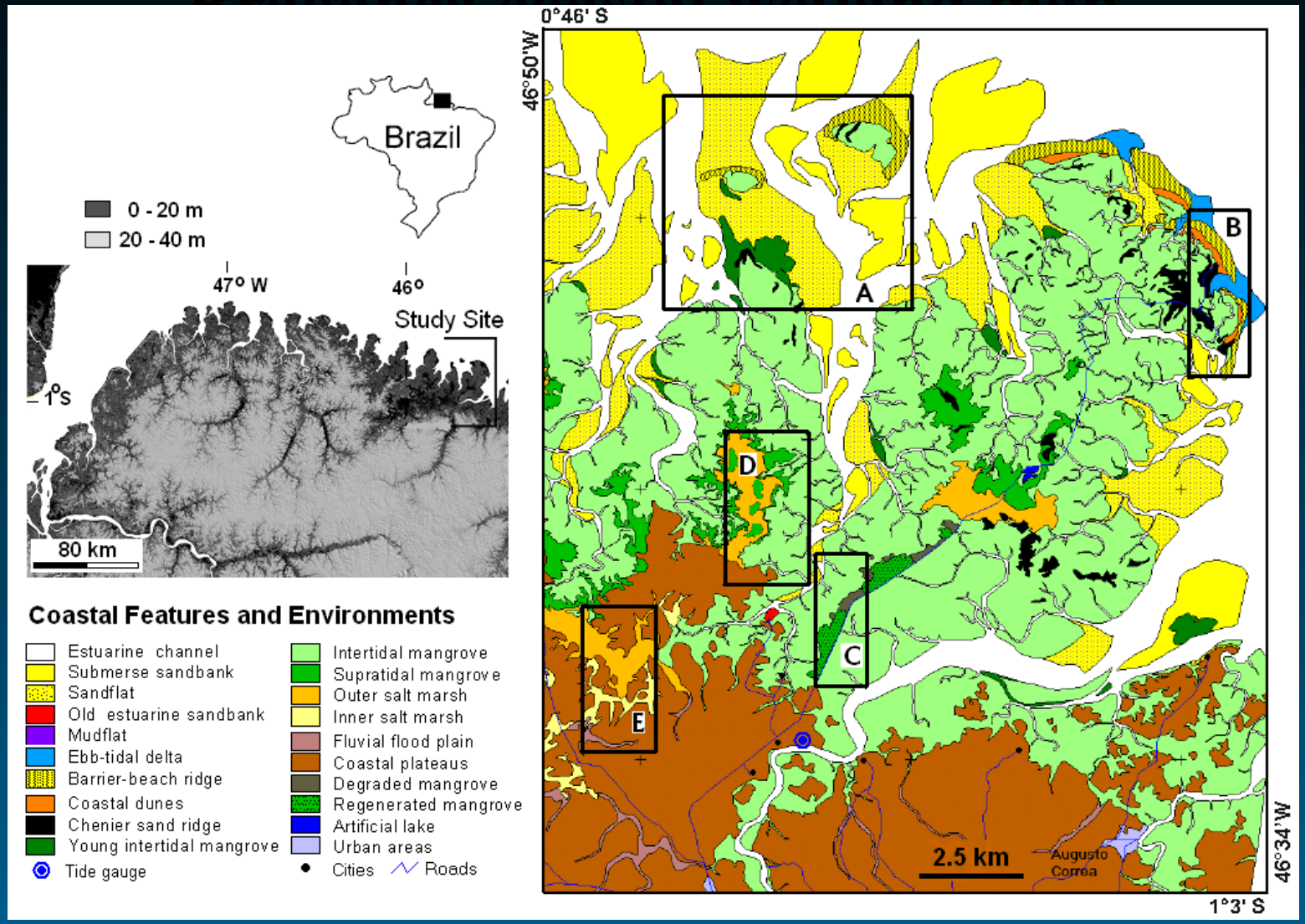
Urban Areas

Clear-cut Areas

Upland Forest

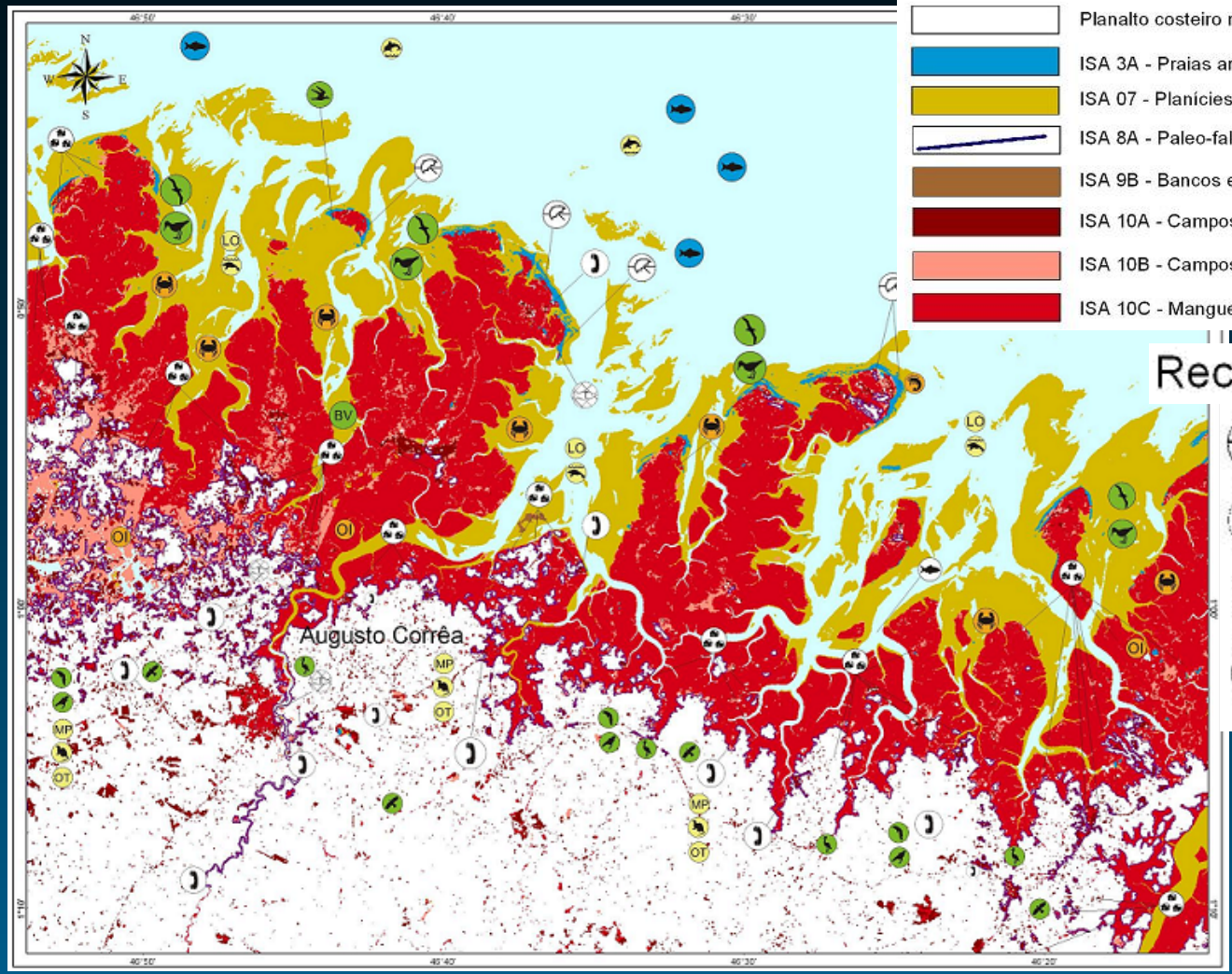
Contrast-streched LVV: oil spill detection in Coari Lake





Souza Filho and Paradella, 2002

Mapa de sensibilidade ambiental ao derramamento de óleo



Classificação dos Habitates Costeiros

- Planalto costeiro não sujeito a derramamento de Óleo
- ISA 3A - Praias arenosas com granulometria fina
- ISA 07 - Planícies de marés expostas
- ISA 8A - Paleo-falésias esculpidas em sedimentos permeáveis
- ISA 9B - Bancos e planicies de marés lamosas
- ISA 10A - Campos herbaceous salinos
- ISA 10B - Campos herbaceous doces
- ISA 10C - Manguezais de intermará

Recursos Sócioeconômicos

- Praias Arenosas
- Serviço Telefônico
- Terminal de desembarque de pescado
- Localidades e /ou residencias rurais

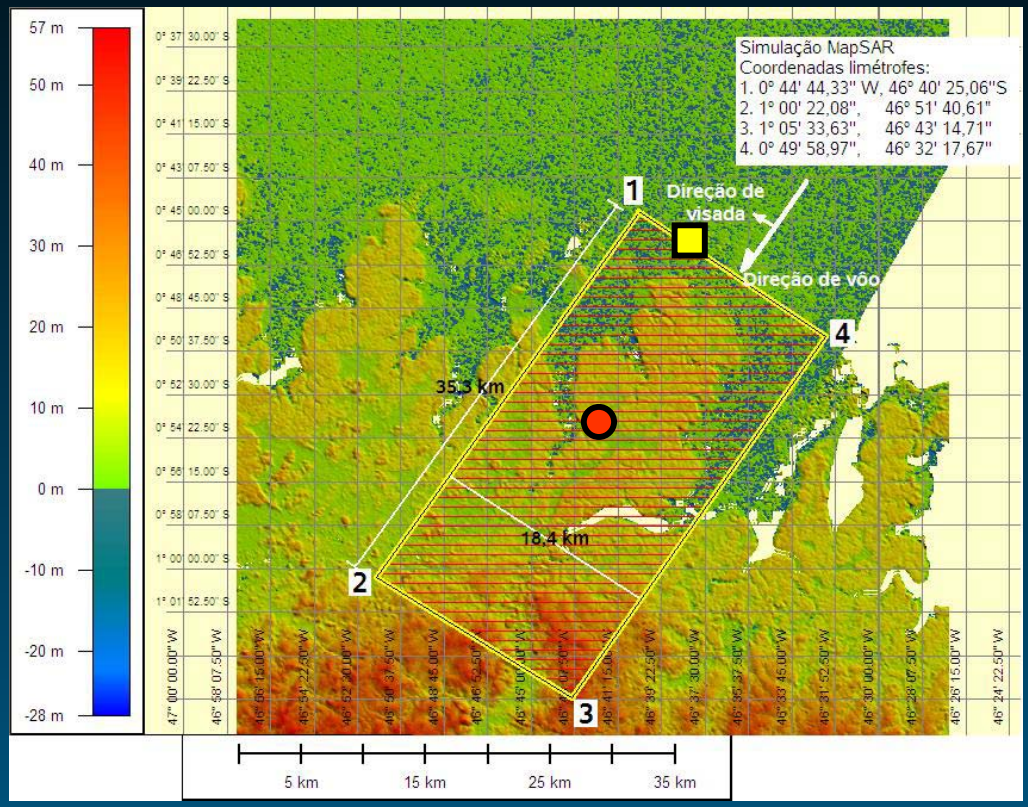
- MP — Mamiferos primatas
- Mamiferos terrestres - roedores
- OT — Outros mamiferos terrestres

Peixes

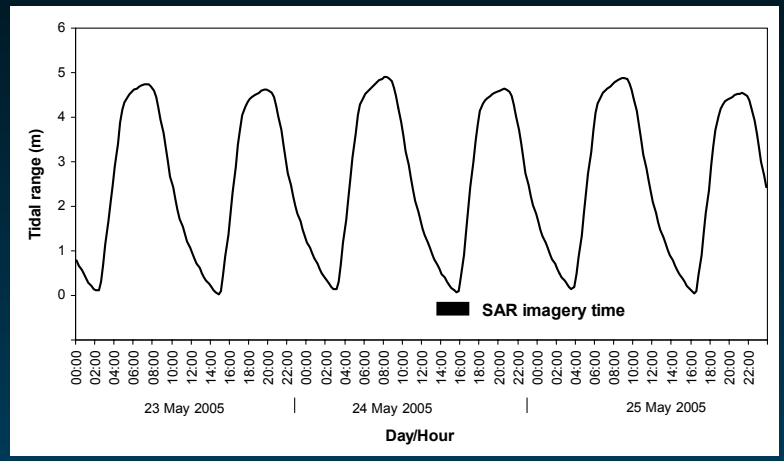
- Peixes
- OI — Outros invertebrados

LAIT

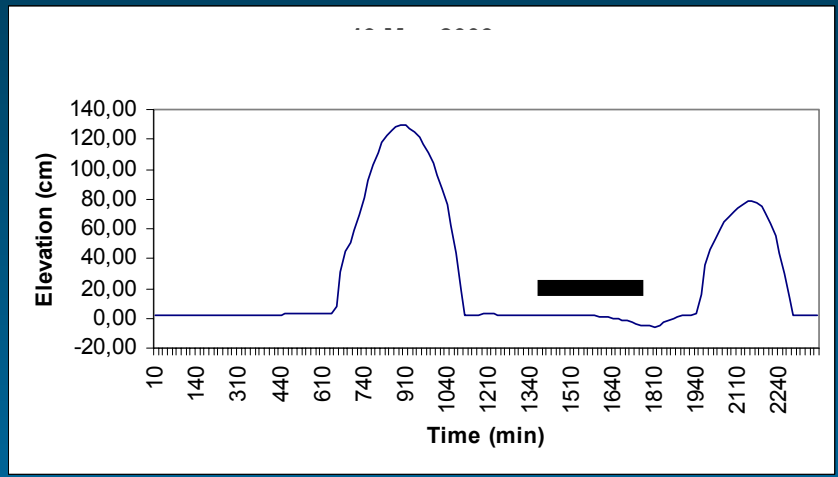
Remotely Sensed Area



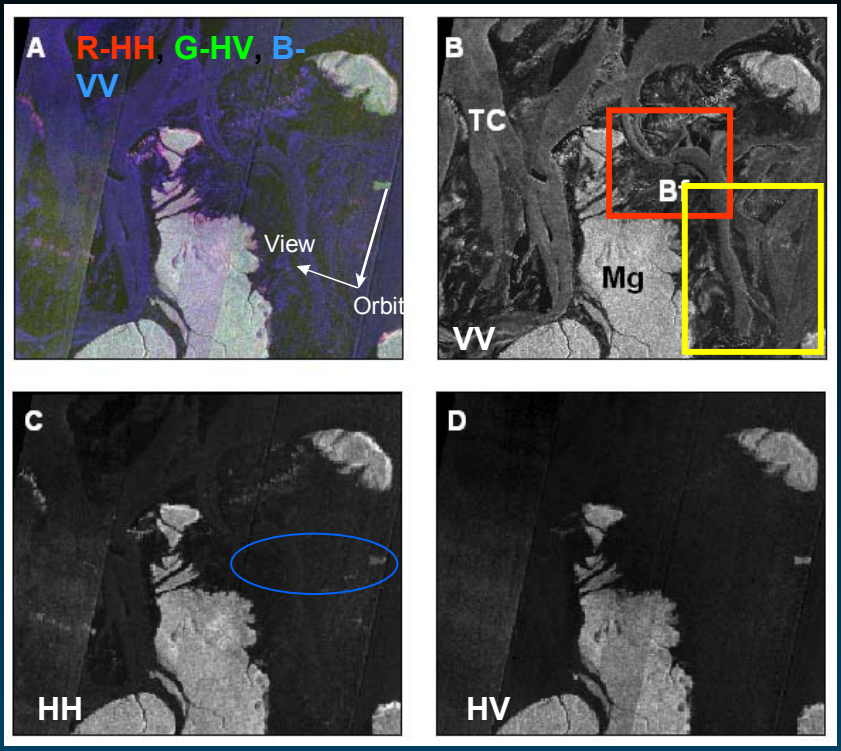
Tide estuarine condition during SAR acquisition data



Tide mangrove condition during SAR acquisition data



A) *Taperaçu intertidal sandflat*



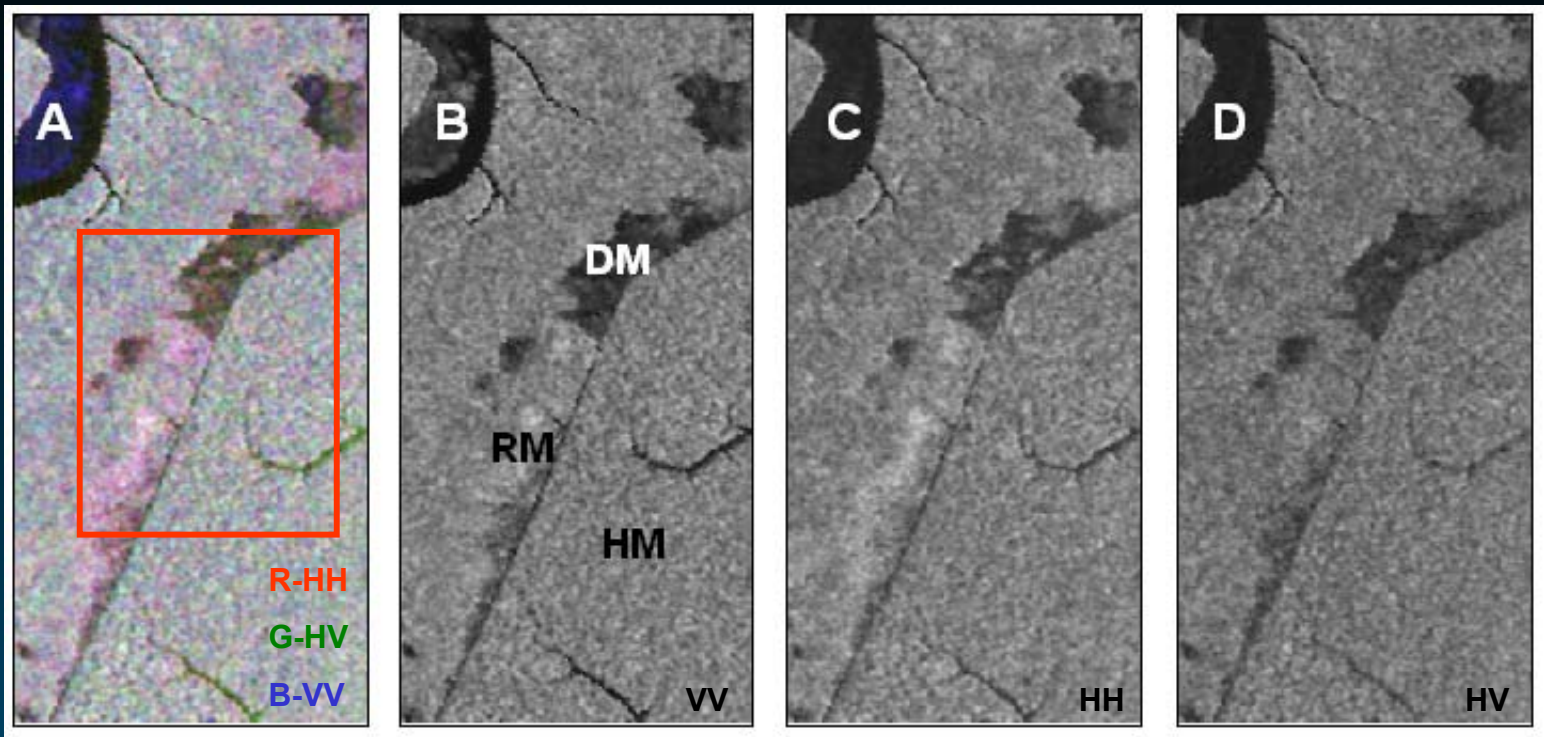
*Shallow water bedform structures are well pronounced only in VV-pol.

*HV-pol. reveals the boundary between mangrove and tidal sandflat.

*HH-pol. reveals man-made structures to trap fishes over sandy bars.

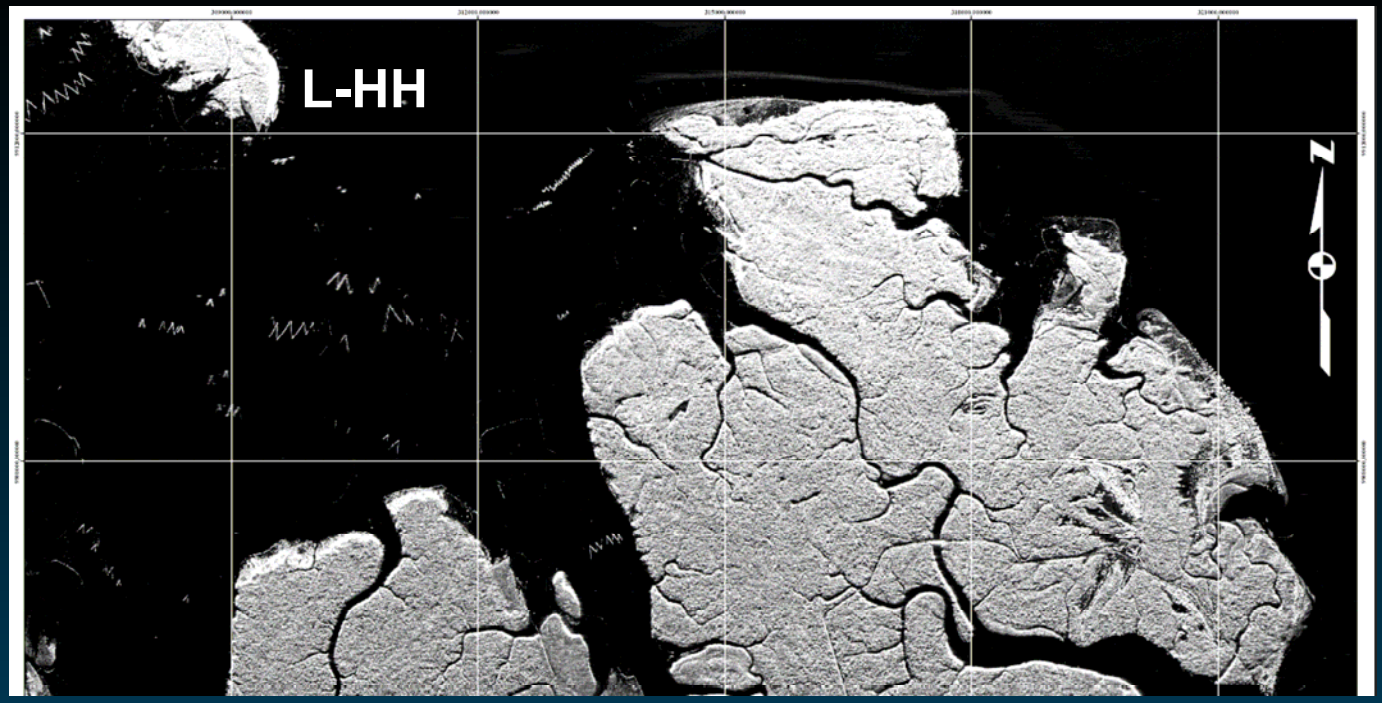
*R-HH, G-VV, B-VV composite images reveals that VV-polarization is capable of recognizing shallow water morphology (in blue color), while man-made structure is perceptible in HH-pol.

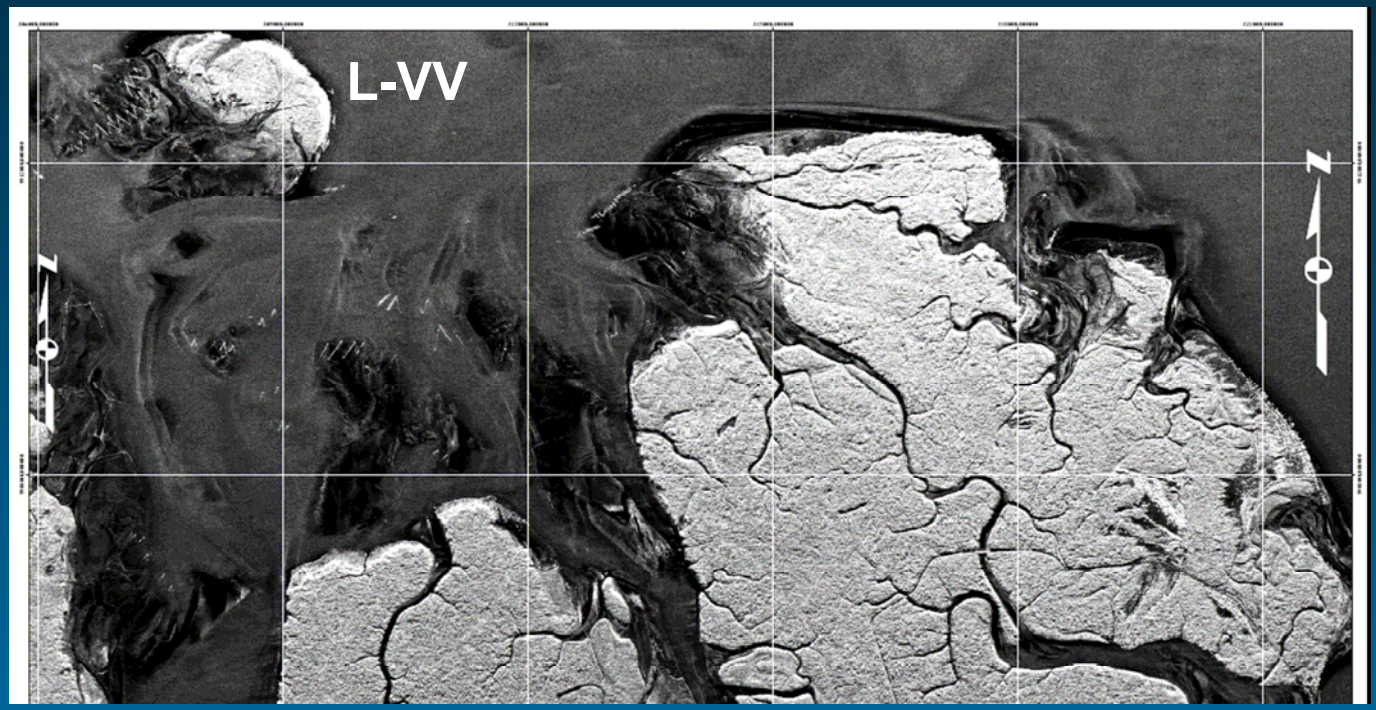
C) Intertidal Mangrove areas



*In the regenerating mangrove area, HH-polarization presents the best contrast between all mangrove stages. Double-bounce scattering between trunks and ground is present for the younger trees.

*The multi-polarized composite image reveals some strong contrast between different mangrove stage - healthy mangrove forest, regenerating mangrove and deforested area.


L-HH


L-VV