Seagrass Mapping in Lap An lagoon, Viet Nam by Using ALOS AVNIR - 2 Data

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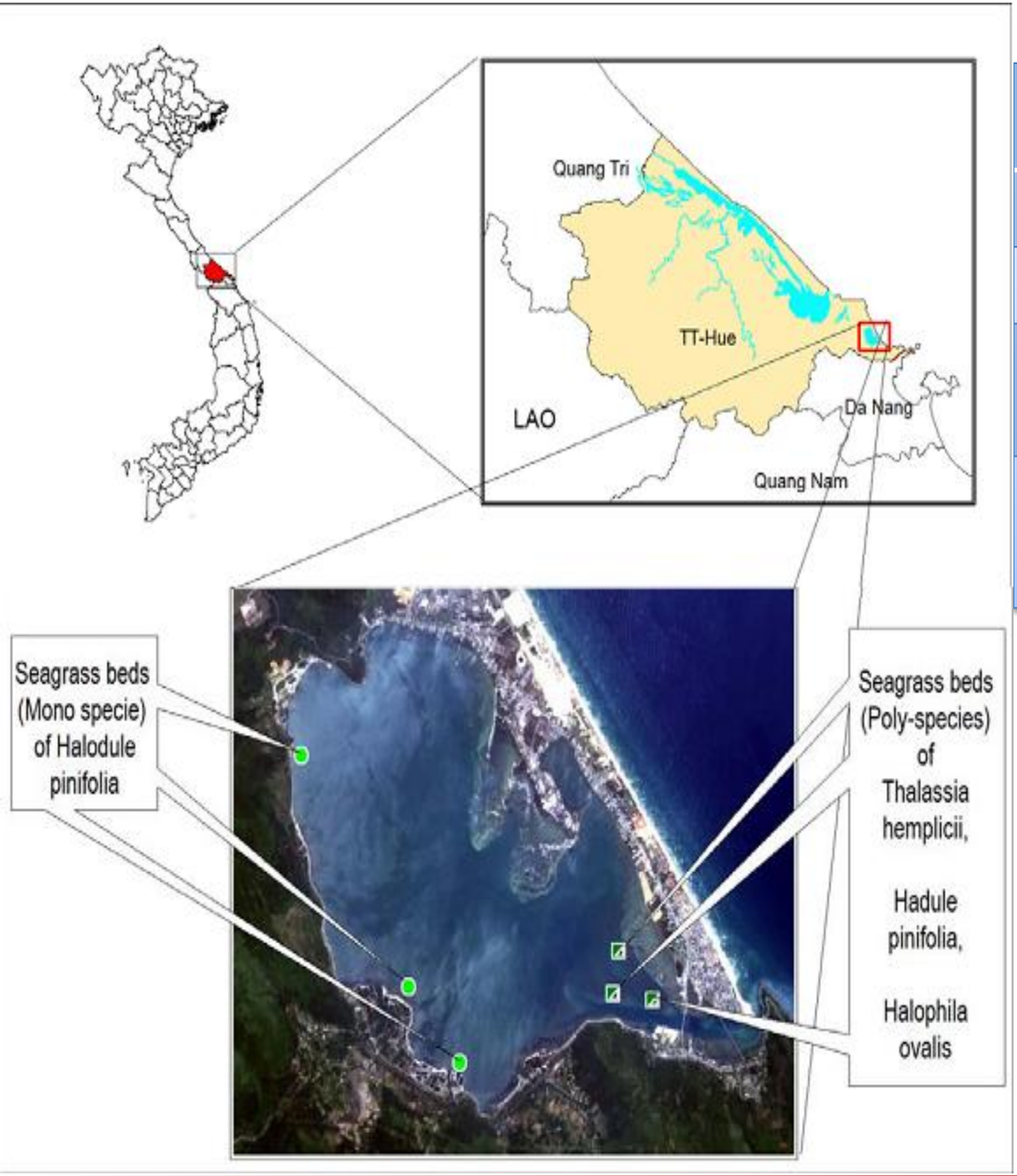
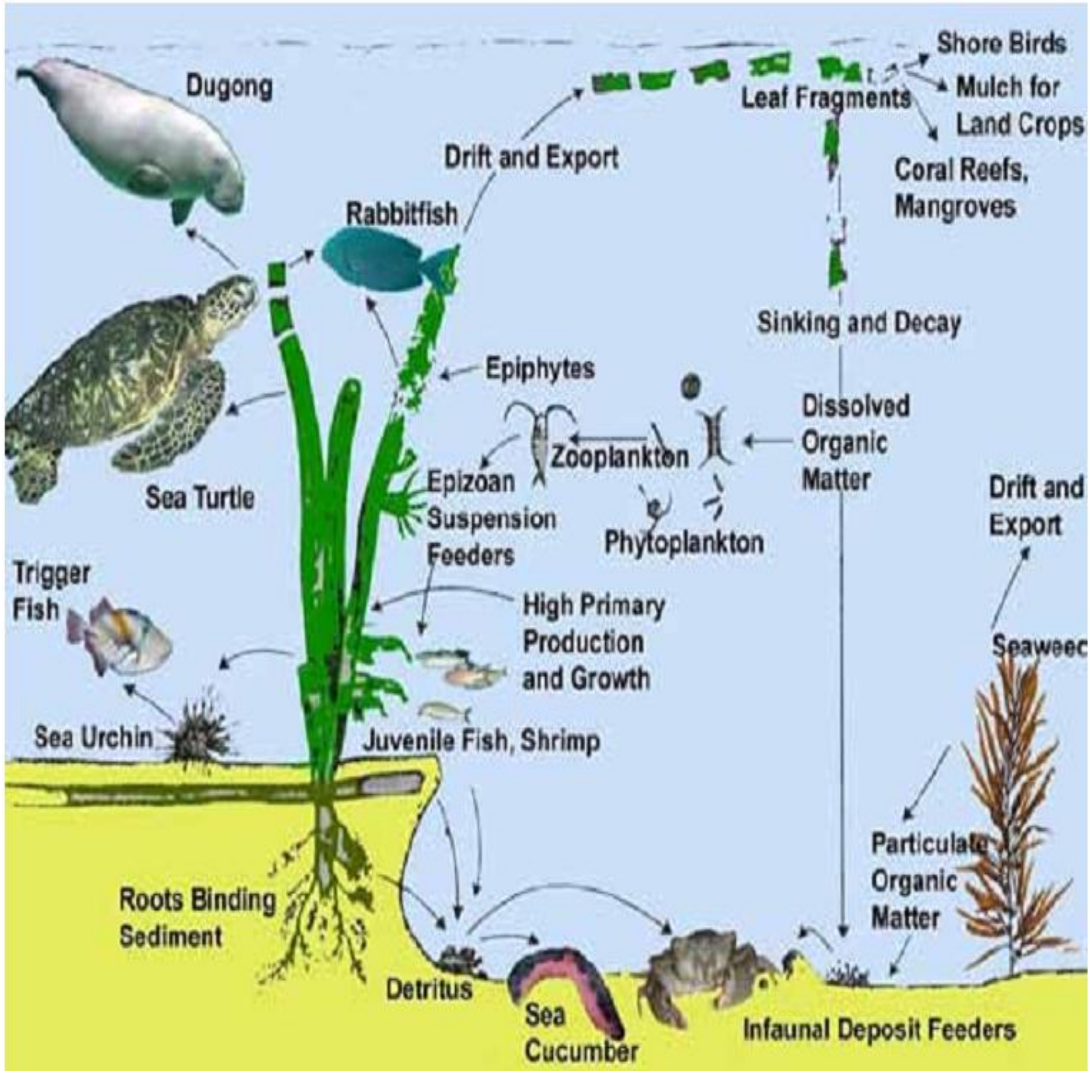


GDP per capita (2010)	1,150
Population (2010)	1,090,879
Services (2010)	45,2 %
Industry – construction (2010)	39,7 %
Agriculture – Forestry – Fisheries (2010)	15,1 %

- **Semi-enclosed lagoon.**
- **Area: 15 km^2.**
- **Interact to the sea via the estuary (6-10 m in depth).**
- **The mangrove and seagrass.**
- **Be important for the livelihood.**
- **High biomass.**

The role of seagrass in the lagoon ecosystem:

- Foodstuff for animals.
- Dissipate the erosion process.
- Clarify the water.
- The shelter for small fish; the sanctuary for marine animals.



Causes of lagoon environmental degradation

(1) Oyster culture; (2), (3): Lime production; (4), (5): Aquaculture

1. Background (cont.)

Degradation of seagrass species in Lap An lagoon

Thalassia hemprichii

Halophila ovalis

Halodule pinifolia

- The necessity of mapping and monitoring
  - Be essential for understanding the extend, condition and temporal change of seagrass beds → management and sustainable use.
  - Interpret the temporal variation of seagrass bed.
- Remote sensing:
  - Advantage: Cost-effective tool for wide-area estimation of seagrass bed.
  - Disadvantage: Problems of seagrass mapping:
    - Underwater.
    - Deep and turbid water in Lap An lagoon.
    - Small sized species.

1. Background (cont.)

Summary of related papers review

Authors	Category	Contents
T. Sagawa (2010); D. Yang (2011); V. Pasqualini (2005); T. Komatsu (2011); M. Hashim (2001); Peneva (2005).	Application of Remote Sensing for seagrass mapping	1. Landsat 2. SPOT 3. ALOS AVINIR 2 4. Quickbird, Ikonos 5. Aerial photograph
Lizenga (1978,1981); T.Sagawa (2010); D. Patrick (2008); Zainal (1993); Ackleson (1997); V. Pasqualini (2005); D. Yang (2011)	Improvement of algorithm	1. Water column correction 2. Bio-optical modeling 3. Distinctive or depth classification; visual interpretation 4. Image fusion 5. Seagrass index: NDVI (Normalized Different Vegetation Index), LAI (Leaf Area Index)
C. M. Duarte (2002); S. L. Williams (1999); B. M. Gillanders (2001)	Ecology of seagrass	1. Shallow coastal area 2. Patch size variation 3. Seagrass distribution in different depth.
Disadvantages	1. Underwater: attenuation of light intensiveness by scattering, absorbing process. 2. Turbid water in the tropical coastal zone. 3. Small size of the seagrass patches. 4. Environmental degradation: more detritus, sediment in the water. 5. Empirical classification (mixed pixels, spectral confusion...)	

2. Objective

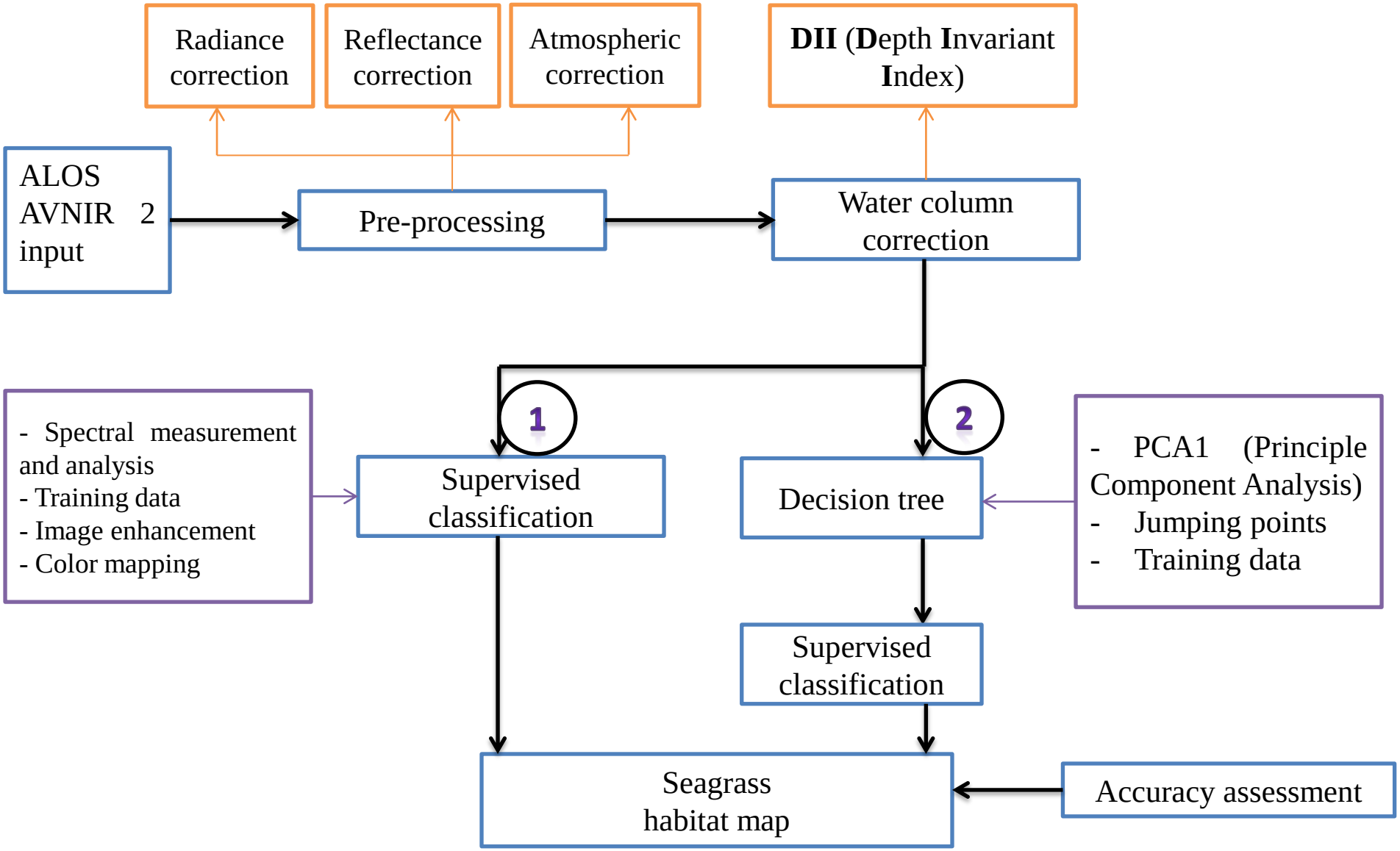
Overall objective

1. Mapping of the seagrass bed.
2. Propose the seagrass-based sanctuaries in Lap An lagoon.

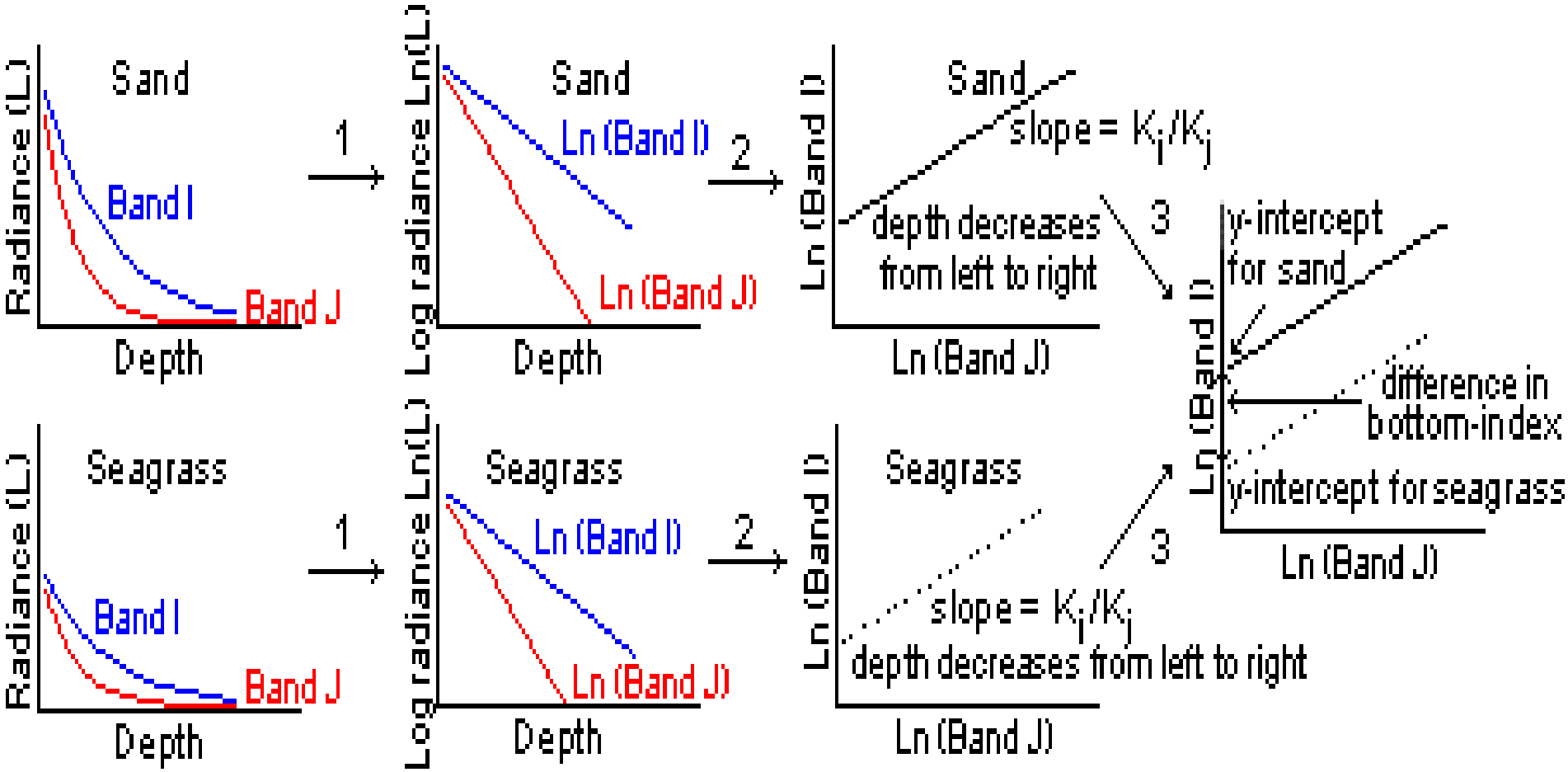
Sub-objectives

1. Remove the noise of atmospheric and water column from remote sensing image.
2. Spectral measurement and analysis of soil and seagrass in the lagoon.
3. Detect the threshold values of habitats (seagrass, soil, mud) in Lap An lagoon.
4. Ecological characteristics in relation with seagrass distribution in Lap An lagoon.

3. Methodology



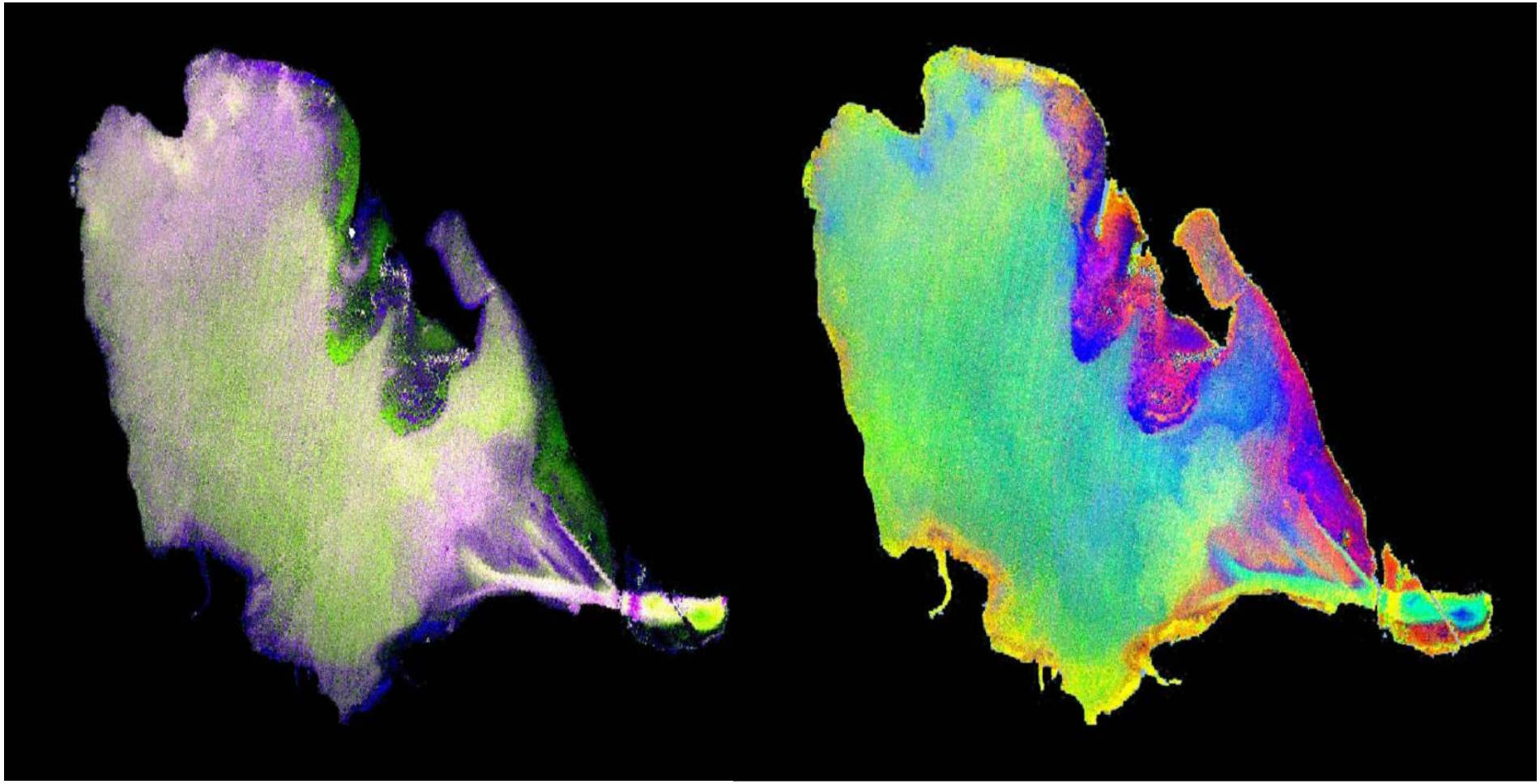
- The theory of DII to emphasize of bottom types



Example of efficiency of DII

DII image

DII image after PCA

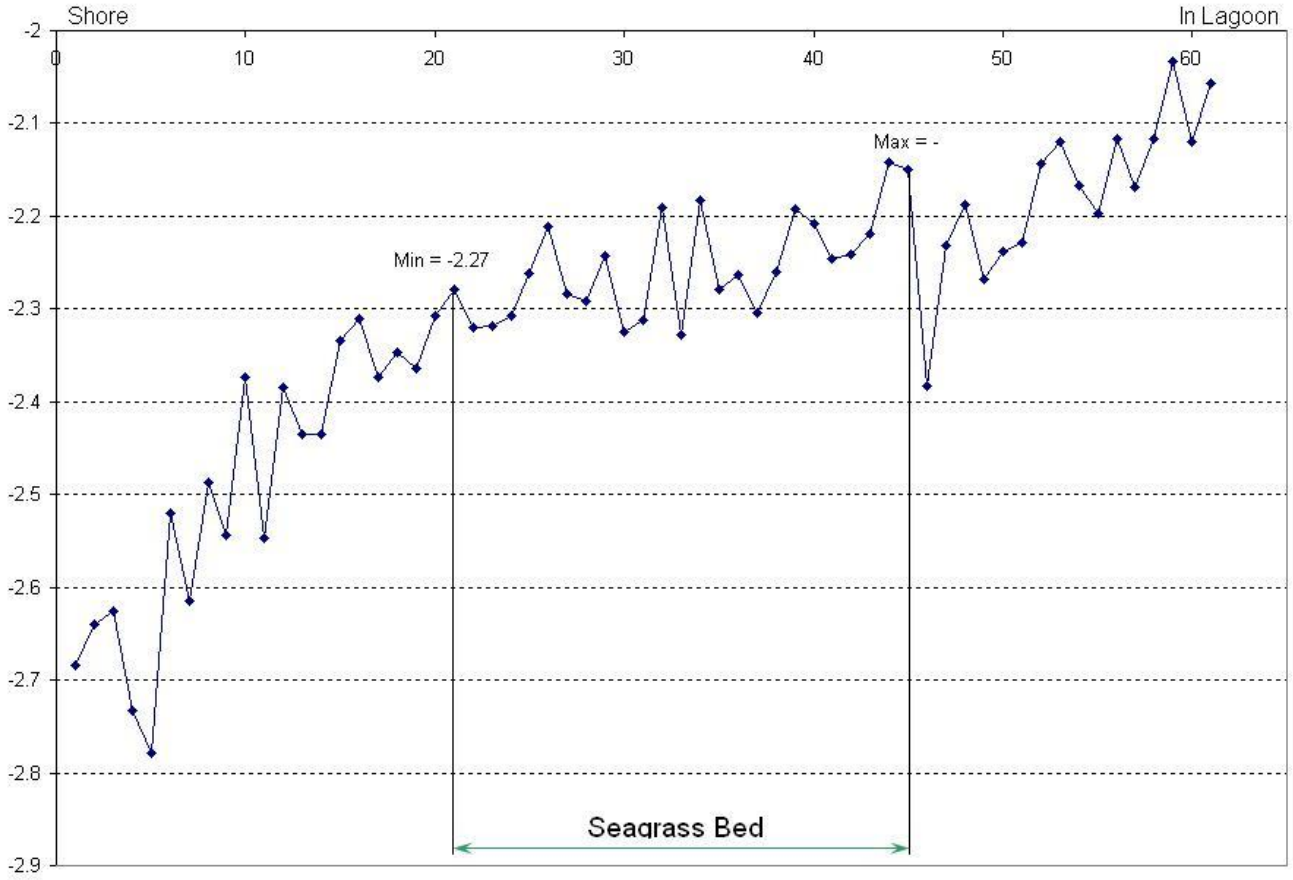


3. Methodology

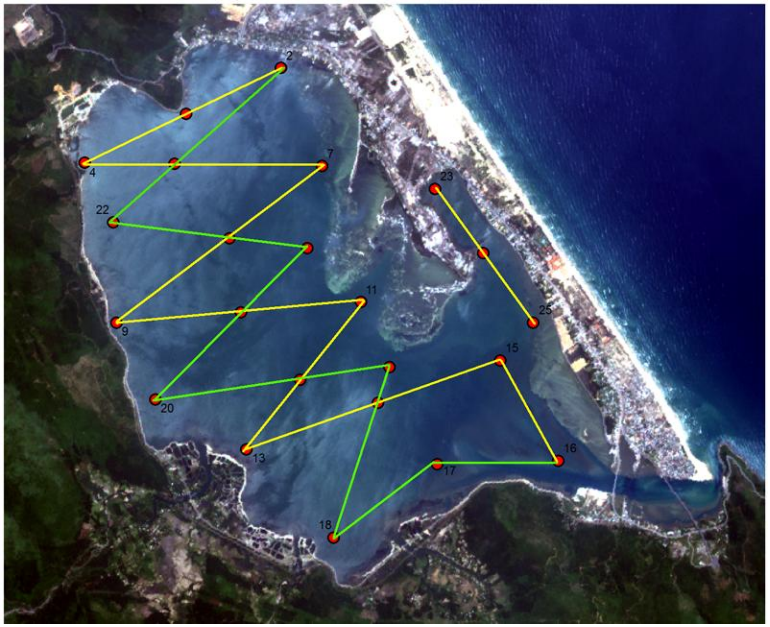
Apply the simple algorithm:

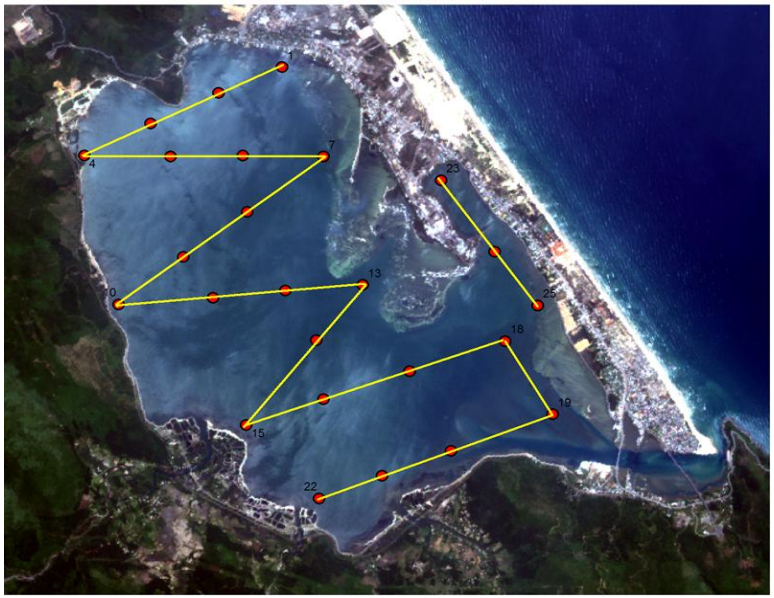
$PCA1_{max} > b1 > PCA1_{min}$

Where: b1 is chosen from PCA1 band.



4. Field trip contents





4. Schedule of Research

Time	Contents
August – September 2012	- Filed trip in Viet Nam. - Data processing (seagrass classification, spectra measurement and analysis…)
Mid-September 2012	- Interim presentation
October - November 2012	- Create maps of soil type, depth, DII, PCA analysis - Threshold values detection
December 2012 – January 2013	- Create map of seagrass distribution in Lap An lagoon - Accuracy assessment of the maps - Writing the thesis
February – March 2013	- Propose the seagrass sanctuary in Lap An lagoon - Writing the thesis
April 2013	- Submit the first draft

THANK YOU
FOR YOUR ATTENTION !