CLASSIFYING AND MAPPING NIGER DELTA MANGROVES USING SENTINEL IMAGERY

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Introduction

- Mangrove importance and vulnerability
  - Fisheries, timber, coastal protection, tourism and carbon.
  - Sea level rise, exploitation, drainage

- Mangrove research
  - Carbon
  - Large scale studies

- Remote sensing options
  - Difficulty in navigation, large scale studies

Remote sensing options

- Optical- (LandSat, Sentinel, MODIS)
  - Canopy cover vs vegetation type

- Radar (ALOS PALSAR, Sentinel 1)
  - Forest structure vs vegetation type

- Elevation (SRTM, ASTER, ALOS DEM)
  - Coastal vegetation
My research

• Niger delta

• One of the largest delta in Africa, largest petroleum producer in Africa

Regional situation

• Pollution, urbanisation, exploitation

Research problems

• Security, navigation in mud and dense trees

AIM:

to provide new data on productivity patterns of Niger Delta mangrove forests and map mangrove areas using field based measurements, remote sensing and modelling.

MAPPING OF MANGROVE REGIONS IN THE NIGER DELTA AND INVESTIGATING THE IMPACT OF NIPA PALM INVASION ON ITS COVERAGE
Use of Sentinel 2 to classify crop and forest types in central Europe

Immitzer et al., 2016

Characteristics of the Multi Spectral Instrument (MSI) on board Sentinel-2.

Average spectral signatures of the seven crop classes of cropland test.

Average spectral signatures of the seven tree species of the forest site.
Field work

- AGB- diameter at breast height; soil and leaf samples; and canopy cover
- Ground truthing points
  - GPS, vegetation type, height range

- Challenges
  - Navigation
  - Tide
  - Access
Data

- Sentinel 2 2016 product (10m, 20m).
- Advanced Land Observing Satellite Phased Array type L-band Synthetic Aperture Radar (ALOS PALSAR) 2015 products (25m).

Challenges

- Cloud free data
- Overlapping scenes
- Different acquisition dates
Methodology

• Supervised- Maximum Likelihood Classifier

• Not enough Ground Control Points for other means such as
  • Neural Network
  • Support Vector Machine

• Challenges
  • Misclassification
  • Tide
  • Thin Nipa edge
Sentinel 2, ALOS PALSAR, DEM
Overall Accuracy - 99%
Producers and users accuracy for 5 classes above 90%; however:
Nipa - Prods Accuracy - 90%
Users Accuracy - 50%
Next Step

• Improve classification parameters; unsupervised
• More GCPs
  • June – September
• Updated height map
• Include sentinel 1 products
THANK YOU FOR LISTENING