Monitoring coastal protection structures along the Volta delta shoreline using Unmanned Aerial Vehicle (UAV)

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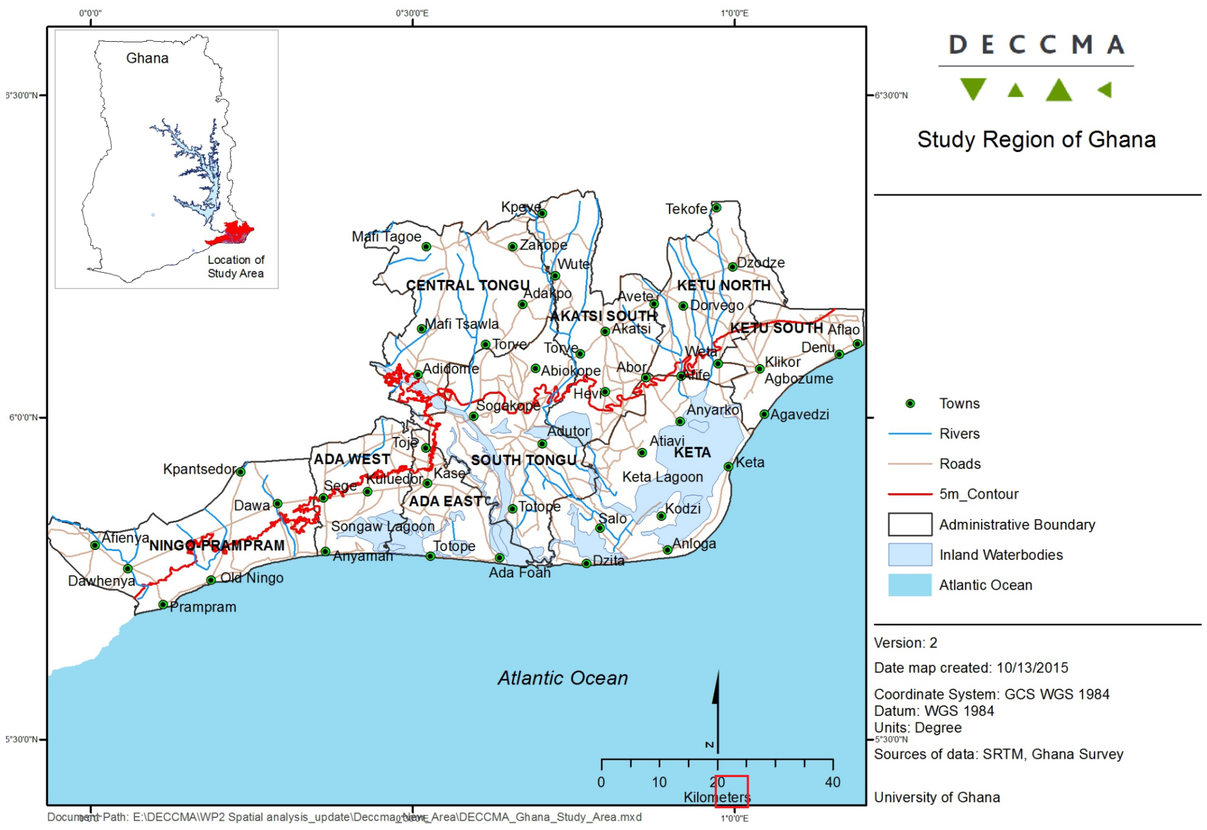
Introduction

- Increased coastal erosion in Keta, within the Volta Delta resulted in the destruction of property and infrastructure and also displaced people (Appeaning Addo, 2015; Boateng, 2012 and Ly, 1980)
- Efforts to manage the impacts of coastal erosion led to the Keta Sea Defence Project (KSDP), which used both hard (groynes and revetment) and soft (nourishment) engineering measures
- Since its completion in 2004, there has not been a sustainable monitoring scheme to monitor the KSDP
- This study is using UAVs for both short and long term monitoring of the Keta sea defence structures

Approach

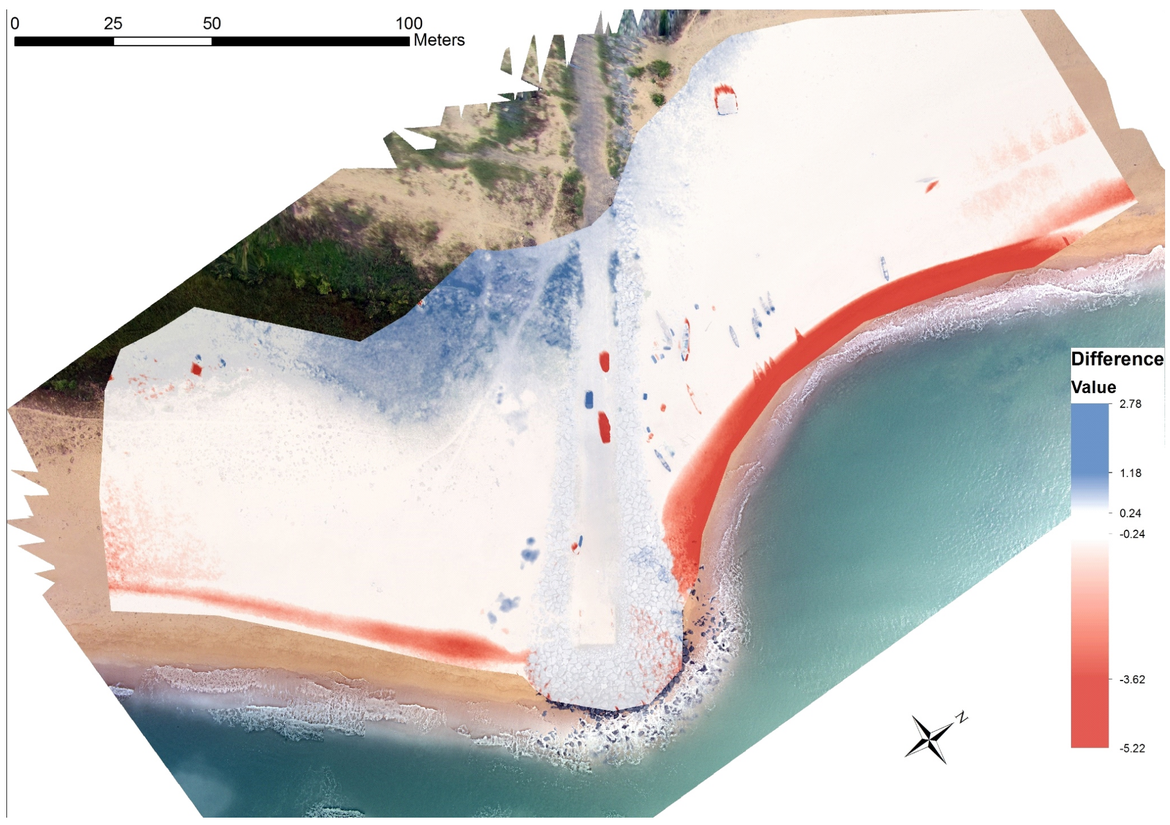
Study Area



Map of the Volta Delta Showing the Study Location

DJI Phantom 3

- Bi-monthly repeated surveys using DJI phantom series of UAV
- Established Ground Control Points using high precision differential GPS system
- Generation of high resolution orthophotos and DEMs
- Detection and analyses of both planemetric and volumetric change



Overlay of generated DEMs showing change

Preliminary Results

May 2015 Survey Groyne 1

July 2015 Survey Groyne 1

Conclusion

- Preliminary results from two months of field surveys (May and July 2015) revealed significant lateral and topographic changes in the beach system.
- Although the observed changes could be cyclical, they have the potential to influence the beach system in the long term
- Continues survey will provide insight into the Volta delta shoreline variability and the influence of the KSDP on the delta environment
- Long term results is relevant for effective management of the delta system

Literature CIted:

✓ Appeaning Addo K. (2015) Assessment of the Volta Delta Shoreline Change. Journal Coastal Zone Management 18: 408 .
✓ Boateng, I. (2012) An assessment of the physical impacts of sea-level rise and coastal adaptation: a case study of the eastern coast of Ghana. Climatic Change, 114(2), 273-293.
✓ Ly, C.K. (1980). The Role of the Akosombo Dam on the Volta River in Causing Coastal Erosion in Central and Eastern Ghana (West Africa). Marine Geology, 37, 323-332.

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DFID Department for International Development
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