Mapping of East African Wetlands using Multisensor Remote Sensing

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GlobE East African Wetlands - the project

- Wetlands provide invaluable ecosystem services and contribute significantly to food security around the world. To maintain these functions, wetlands need to be protected from rapid transformation and overuse.
- Spatially explicit information is required for sustainable wetland management. Inconsistencies in data for the wetlands in East Africa (Amler et al., 2015) calls for the need to reconcile available data and update it to the currently existing conditions.
- Within the GlobE project, we try to improve the understanding of these habitats from a remote sensing perspective in Kenya, Rwanda, Tanzania and Uganda.
- Satellite images used include SRTM DEM, MODIS NDVI, Sentinel 1, RapidEye images and UAV flight photos.

Regional scale

- Development of an Inventory of East African Wetlands by usage of multi-temporal, multi-sensor satellite data
- Wetlands defined in relation to their uplands and mapped despite their heterogeneous land cover which is similar to the uplands
- Bright pixels from morphometric analysis (SRTM) show possible wetland locations (Figure 2)
- LUCC is an important input to hydrological models within GlobE wetlands

Catchment scale

- The initial stages towards understanding the functioning of the various components within the wetland ecosystem began by carrying out RF classification using a stacked layer of RapidEye images
- LUCC is an important input to hydrological models within GlobE wetlands

Flood Plain scale

- UAV flights were carried out within the flood plain in Ifakara in May and September 2014 and February 2015 (Figure 5)
- The UAV photos aided in analyzing the status of the fields in dry and wet season and were also used in conjunction with the Rapid Eye images for ground truth site selection for classification purposes
- NVDI in May 2014 was high whereas that in September was low. In February 2015 the NDVI increased attributing to the rains experienced in the wet season (March-May) affect extensive areas located near the river i.e. appx 3 km from the river boundary (Figure 6)
- High percentage of crops planted along these region is destroyed due to excess water resulting to little or no harvest

Field scale

- At field scales, high resolution RGB and NIR subsets obtained within three flight campaigns during the wet season (May), dry season (September) and on set of wet season (February). The NDVI changes over time of the UAV subsets is shown in Figure 7.
- RapidEye images also used to compute RE NDVI in selected sample fields (Figure 8)
- NDVI in May 2014 was high whereas that in September was low. In February 2015 the NDVI increased attributed to the rains experienced in December 2014
- In field analysis of vegetation changes over time using high resolution imagery aids in monitoring growth and determining harvest times due to decreased NDVI in senescing crops.