The Use of UAS for Assessing Agricultural Systems in AN Wetland in Tanzania in the Dry- and Wet-Season for Sustainable Agriculture and Providing Ground Truth for Terra-SAR X Data

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Abstract

The paper describes the assessment of the vegetation and the land use systems of the Malinda Wetland in the Usambara Mountains in Tanzania with the parachute UAS (unmanned aerial system) SUSI 62. The area of investigation was around 8 km2. In two campaigns, one in the wet season and one in the dry season, approximately 2600 aerial photos of the wetland were taken using the parachute UAS SUSI 62; of these images, ortho-photos with a spatial resolution of 20 cm × 20 cm, were computed with an advanced block bundle approach. The block bundles were geo-referenced using control points taken with differential GPS. As well a digital surface model (DSM) of the wetland was created out of the UAS photos. Using the ortho-photos it is possible to assess the different land use systems; the differences in the phenology of the vegetation between wet and dry season can be investigated. In addition, the regionalisation of bio mass samples on smaller test plots was possible. The ortho-photos and the DSM derived from the UAS proved to be a valuable ground truth for the interpretation of Terra-SAR X images. The campaigns demonstrated that SUSI 62 was a suitable, robust tool to obtain the valuable information under harsh conditions.