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Altered sediment flux endangering the habitat of the Mara Wetland, Tanzania

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The Mara River is the only perennial source of flowing surface water of a vast area including the Mara – Serengeti region in Kenya and Tanzania. The river support the life of millions of wild animals and a human population of nearly one million. The river is rich in suspended sediment that has been increasing during the last decades by deforestation, change of land uses and mining along the basin. In its lower reach, the Mara River forms a wide wetland before flowing into the Lake Victoria in Tanzania. The wetland represents a rich ecosystem which provides essential services. But this ecosystem is threaten by perceptible increasing human activities along the upstream portion of the basin as well as in the same wetland area. Farming and forest fire to produce charcoal and open new crops are here intense and have deeply modified the riparian vegetation spatial distribution. Additionally, the construction of a new dam is planned immediately upstream of the wetland for irrigation porpoise and hydropower. The dam solid and liquid discharge regulation will further influence the morphological changes already triggered by the land use modifications, with the result of potentially jeopardize the wetland ecosystem.
This work is undertaken to set up a hydro-morphodynamics model in order to predict the short and long term effects that the mentioned drivers are generating on the Mara Wetland habitat. The model will be a tool able to hint strategies to mitigate the negative effects of the human activities.
During October - November 2017 a multidisciplinary field work has been conducted visiting a stretch of 130 km of the Lower Mara River. The field work has been built on two past missions realized in 2016 and 2017 by a team of IHE Delft. An Unmanned Aerial Vehicle (UAV) has been deployed obtaining high resolution ortophoto mosaics and digital elevation models. The ortophoto mosaics have been extremely useful for the observation of vegetation and other features in unattainable areas. The low flow condition permitted the mapping of the floodplains, otherwise inundated in wet season. A sonar has been used to map the bathymetry of some stretches of the wetland. An ADCP and a current meter have been employed to measure the river discharge on 3 locations. Water samples have been gathered from 5 spots to get the total suspended sediment concentration. The water level has been systematically measured in a number of locations with the objective of inferring the water balance of the wetland. The field work and preliminary analyses and results will be here presented. A further mission is planned at the end of the heavier rainy season, in order to gather additional suspended sediment data and water storage at high flow condition.