Investigating morphological responses to sediment flux alterations and land use changes in the Mara Wetland, Tanzania

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B43I-2963: Investigating morphological responses to sediment flux alterations and land use changes in the Mara Wetland, Tanzania

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13:40 - 18:00
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The Mara River is the only perennial river of a vast semi-arid area, including the Mara – Serengeti ecoregion in Kenya and Tanzania. The river sustains more than one million inhabitants and millions of wild animals. In its lower reaches, the Mara River forms a wide wetland before flowing into Lake Victoria. The wetland represents a rich ecosystem providing essential services, but it is being threaten by increasing human activities. Farming, grazing, fishing and deforestation to produce charcoal and open new crops have deeply modified the riparian vegetation spatial distribution and the habitat morphology. Additionally, the construction of a new dam is planned immediately upstream of the wetland for irrigation purposes and hydropower.

This work is undertaken to set up a hydro-morphodynamic model to predict the short- and long-term effects of human activities on the Mara Wetland habitat. The model will be a tool to evaluate strategies to mitigate the negative effects of the activities.

The Lower Mara River is poorly gauged and only a few scattered data and observations are available. Therefore, in October - November 2017 (dry period) and May 2018 (wet period) multidisciplinary field work was conducted along a 130 km stretch of the river. An unmanned aerial vehicle (UAV) was used to produce high resolution orthophoto mosaics and digital elevation models of selected areas. The UAV gave topography and ground observations on vegetation type, size and distribution, and other features of unattainable areas. A sonar was used to map the bathymetry of some stretches of river and wetland. River discharge was measured on 4 locations. Bed sediments and water samples were collected from 8 spots to analyse sediment granulometry and suspended sediment concentration. Results suggest that, at wetland inlet, the river is particularly rich in suspended sediment, with measured averaged concentrations of the order of 500 mg L^{-1} and peaks of 2700 mg L^{-1}. The wetland, thanks to its extent and dense vegetation cover, traps the 90% of the suspended sediments and releases clear waters to the Lake Victoria. The future placement of the dam may have a strong influence: without an adequate management, the dam solid and liquid discharge regulation may further trigger morphological changes and jeopardize the wetland ecosystem.

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