
Morpho-sedimentary and ecological implications of human-triggered river avulsion in a highly degraded fluvial system: Case study from Lake Rweru, Rwanda.

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Résumé

Inland water ecosystems represent about 8-9% of the continental surfaces and are strongly threatened by both global change and local anthropic pressure. A major factor in the degradation of wetlands biodiversity is changes in land-use, including both the modification of the catchment surface properties (deforestation, agriculture practices, urban development) and the modification of the wetlands themselves (agriculture development, draining, construction of dams for hydropower or water storage). The impacts depend on the type of environment: while human activity has obvious impacts on the ecosystems, they may be mitigated by the local environment, and especially the morphology of the catchment area. For example, the occurrence of vegetated floodplains or river-connected lakes may buffer the sediment transport and pollution transfers inside the system. Changes – either natural or anthropic – in this morphology will have local consequences but may also affect the whole system. Hosting 42 million people with an average density of 250 ha/km², the Lake Victoria basin in Eastern tropical Africa is a key example of the urgent necessity to conduct regional studies of the source-to-sink sediment and pollution transfers in rapidly degrading regions. Lake Victoria is the second world largest freshwater body and its catchment is shared between Burundi, Kenya, Rwanda, Tanzania and Uganda. The poorly mechanized agriculture in some of the sharing countries makes for extensive conversion of land, deforestation and soil degradation. This study addresses the interactions between lakes, rivers and the connected floodplains in the Nyabarongo – Kagera river system, in the southwestern part of Lake Victoria basin. Using remote sensing images, climate and water discharge data, this work discusses how a sudden modification in the local drainage, probably linked to human activity and the rapid conversion of the Nyabarongo River floodplain to agriculture modified the environment of Lake Rweru (creating a new delta and affecting the water quality), disconnected the Nyabarongo River from the Kagera River and modified the water discharge and sediment load of the latest. The results advocate for an increased research effort to better support initiatives to preserve these valuable wetland ecosystems.

Mots-Clés: Floodplains, Soil degradation, Source, to, sink, River avulsion, Eastern Africa

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