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Resilience scales of a dammed tropical river

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Artificial river impoundments disrupt the seasonality and dynamics of thermal, chemical, morphological and ecological regimes in river systems. These alterations affect the aquatic ecosystems in space and time and specifically modify the seasonality and the longitudinal gradients of important biogeochemical processes. Resilience of river systems to anthropogenic stressors enables their recovery along the flow path; however little is known about the longitudinal distance that rivers need to partially restore their physical, chemical and biological integrity. In this study, the concept of a "resilience scale" will be explored for different water quality parameters downstream of Kariba dam, the largest artificial lake in the Zambezi basin (South-East Africa). The goal of this project is to develop a modelling framework to investigate and quantify the impact of large dams on downstream water quality in tropical context. In particular, we aim to assess the degree of reversibility of the main downstream alterations (temperature, oxygen, nutrients) and consequently the quantification of their longitudinal extent. Coupling in-situ measurements with hydraulic and hydrological parameters such as travel times, will allow us to define a physically-based parametrization of the different resilience scales for tropical rivers. The results will be used for improving future dam management at the local scale and assessing the ecological impact of planned dams at the catchment scale.