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Learning from the past to shape the future: Environmental change, health and ecosystem services of Lake Malawi

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Freshwaters and their biodiversity are in a state of crises across the world. Yet, these ecosystems are of global significance and provide resources on which, unlike in Europe, the livelihoods of millions of people depend in sub-Saharan Africa. Academics and African universities, however, lack experts for meeting multifold challenges of saving hotspots of aquatic biodiversity. Two consecutive three-week field schools, funded by Volkswagen Foundation, have been conducted in Malawi between 2022 and 2023 and were based on a sustainable network of African and German partnerships initiated during previous field schools. For the first time, the field schools were initiated and conceptualized by former African participants, who now have been acting as field school lecturers. These field schools aimed at training M.Sc. and Ph.D. students from DR Congo, Zambia, Sierra Leone, Malawi, Tanzania, Uganda and Germany in paleo-limnology, aquatic ecosystem science, human health, sustainable resource use and conservation. All participating countries have important freshwater ecosystems often shared with neighboring countries experiencing strong and multifold anthropogenic pressure. The magnitude of these impacts can only be understood by a combination of paleo-limnological methods with actualistic ecological water analyses. The field schools have covered major aspects ranging from a) reconstructing past conditions, b) assessing the present state to c) planning the future. A One Health framework has been adopted, making use of a citizen science approach to translate our field work findings into public outreach projects. The ultimate goals of the field schools were: a) Establishment of permanent network of interdisciplinary collaboration in paleo-environmental and aquatic sciences between African and German universities, b) Establishment of a sustainable teaching and research program in paleo-environmental and aquatic sciences applicable at African universities such as in Malawi, and c) Initiation of a long-term collaboration and of joint research and teaching projects between African scientific partners in the participating countries. This collaborative approach opens new perspectives on further research for the sake of better management of African inland waters in general. Most importantly, this cooperation exposed and equipped young researcher with skills for further research work in their own countries.