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Methane extraction from Lake Kivu: a case study for model-based policy

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Abstract: Lake Kivu in East Africa contains enormous amounts of dissolved carbon dioxide and methane. The dissolved methane is increasingly used as a resource to produce electricity, with two power plants currently in operation and several additional facilities in planning. The design of such gas extraction facilities needs to take into account possible negative impacts: if badly designed, the extraction could disturb the lake's permanent density stratification and thus risk to create a catastrophic gas eruption; and it could increase nutrient fluxes from the deep water to the surface layers, leading to eutrophication and related negative consequences for the ecosystem, fisheries and tourism. To avoid this, strict regulations concerning the design of gas extraction facilities were developed and enforced. These regulations were partially based on the results of a numerical model used to predict the long-term effects of different gas extraction scenarios on lake stratification and nutrient fluxes. In this presentation, the modelling approach, its influence on policy, and the related successes and difficulties will be discussed.

Keywords: lake management, methane, electricity production, gas extraction