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Impact of climate variability on the hydrodynamics and ecology of Lake Tanganyika

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Lake Tanganyika is a large freshwater lake located in the rift valley of East Africa. Its mean width, length and mean depth are about 50 km, 650 km and 570 m, respectively. Thermal stratification in the lake is well marked and varies seasonally above a permanently anoxic hypolimnion, which is a large reservoir of nutrients. The thermal structure and circulation in the lake depend largely upon the dry season (May-August/September) strong southeast winds. The wind stress pushes surface water away from the southern end, thereby inducing upwelling in this region of cold and nutrient rich bottom water, which results in phytoplankton blooms. While the thermocline becomes shallower in the sourthern part of the lake, it deepens at the opposite end. Superimposed on this movement are thermocline oscillations that are present all year round. One fraction of these oscillations is due to the seasonal cycle of the wind stress, while the other is directly forced by intraseasonal variability.

The climate in the Lake Tanganyika region is influenced by tele-connections of El Nino Southern Oscillations (ENSO). Warm ENSO years result in a shallower thermocline closer to the surface. This affects the ecology of Lake Tanganyika by means of reduced upwelling of nutrient rich bottom water. This work presents an effort to understand the impact of climate variability on Lake Tanganyika circulation and ecology using model simulations. The simulations are performed using a two-layer non-linear reduced-gravity model, which is forced by the winds and solar radiation of the NCEP reanalysis data. The simulations will be compared with observations wherever possi-

ble.