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Vulnerability of Swiss lakes to climate change along an altitudinal gradient

Love Råman Vinnå^{1,2}, Iselin Medhaug³, Martin Schmid², and Damien Bouffard²

¹CHYN, University of Neuchatel, Neuchatel, Switzerland

²Surf, Eawag, Kastanienbaum, Switzerland

³Institute for Atmospheric and Climate Science, ETH Zürich, Zürich, Switzerland.

Studies investigating the influence of 21st century climate warming on lakes along altitudinal gradients has been obscured by complex local atmospheric phenomena, insufficiently resolved by regional climate model grids in mountain regions. Here we used locally downscaled climate models to force the physical lake model Simstrat under three future climate scenarios to investigate the impact on 29 Swiss lakes, varying in size and located along an altitudinal gradient. Results predict significant changes linked to altitude in duration of ice-cover, and stratification. Lower and especially mid altitude lakes risk changes in mixing regimes. A large fraction of previously dimictic lakes shift to a monomictic regime under RCP8.5. Analysis further indicates that for many lakes climate related change can be limited by adhering to RCP2.6.