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Temperature Steps in Lake Kivu: A Bottom Heated Saline Lake

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ABSTRACT

Vertical profiles of temperature microstructure in Lake Kivu were obtained with “mini-microstructure recorders” developed by C.S. Cox and William Johnson at Scripps Institution of Oceanography. The profiles reveal three depth intervals containing many isothermal layers typically 0.25–2 m thick and of increasing temperature increments 0.01–0.03°C from layer to layer. Approximately 150 such layers appear in a single profile.

We assume double-diffusive convection and apply the results of Huppert and of Turner to calculate an upward heat flux of 0.71 to 1.6 W m⁻² and a corresponding upward salt flux equal to one-fifth of the average salt output of the lake's only outflow. The chief source of heat and salt is probably geothermal springs in the lake bottom.

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