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LES of a stratified reservoir subject to periodic wind stress and rotation SARA MARKOVIĆ, VINCENZO ARMENIO, Department of Engineering and Architecture, University of Trieste, Trieste, Italy — Lakes are often subject to periodic wind forcing in form of the surface shear stress. Energy induced by the wind is transferred to the internal waves and subsequently dissipated. A small portion of the introduced energy is spent on mixing, mainly near the boundaries. We are investigating how rotational effects influence the internal wave field and mixing that are excited by an oscillating surface shear stress. We conduct a series of numerical experiments on a laboratory scale where oscillating surface shear stress is applied to the rectangular basin of the stratified fluid in the rotating frame of reference. We focus on the Burger numbers that are relevant for the medium and smaller lakes. The simulations are carried out using Large Eddy Simulation. Three dimensional Navier-Stokes equations under the Boussinesq approximation for the density field are solved by the code that uses the OpenFOAM library. We focus on the mid-latitudes, where layered stratification in lakes is common during summer. We have found that near-surface mixing and boundary mixing are increased when rotational effects are introduced. Due to feedback that mixing may have on internal wave field, rotational effects can be important also for medium-sized lakes.

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