Large Eddy Simulation of the response of a stratified reservoir with inclined walls to an oscillating surface shear stress SARA MARKOVIC, VINCENZO ARMENIO, Dipartimento di Ingegneria e Architettura, Università di Trieste, 34127 Trieste, Italy — We present results of numerical simulations of the response of a reservoir with two-layer stratification to an oscillating surface shear stress. The simulations are carried out at a laboratory scale, using Large Eddy Simulation. We solve the three dimensional Navier-Stokes equations under the Boussinesq approximation for the density field using a model based on `buoyantBoussinesqPimpleFoam` implemented in the OpenFOAM library. The model was validated by reproducing experimental results for reservoir response to surface shear stress and resonant frequencies of the internal waves. The response of different domain geometries was investigated, obtained varying the inclination angle of the side walls, from zero (vertical walls) to 30°. When the frequency of the forcing is close to the first mode, resonant internal seiche occurs, in other cases forcing conditions are non-resonant. The results of simulations show that the slope of the side walls dramatically affects the surface mixed layer. Mixing is enhanced and penetrates deeper in the vertical as slope inclination grows. Under resonant forcing, interfacial waves are much more energetic and there is less change in the density profile compared to non-resonant conditions.

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