Abstract Submitted
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LES of mixing in coastal areas VINCENZO ARMENIO, FEDERICO ROMAN, DICA, University of Trieste — Large eddy simulations of near shore mixing are carried out using a new large-scale model, LES-COAST. The model integrates the Boussinesq form of the NS equations using a curvilinear formulation of the fractional step method. Complex geometry is reproduced with a combination of curvilinear mesh and immersed boundaries. Anisotropy of the problem ($\Delta x_{vert}/\Delta x_{hor} \sim 10^{-2}$) has required a two eddy-viscosities model. Specifically we use a mixed model, composed of an anisotropic scale-similar part and an eddy viscosity, Smagorinsky part. Two eddy-viscosities are used, $\nu_{T,v/h} = (C_{v/h}\Delta_{v/h})^2|\overline{S}_{v/h}|$ respectively in the two directions. The quantities $\Delta_{v/h}$ are chosen proportional to the local grid spacings in the two directions. Density stratification is also considered using a very simple SGS model, based on the assumption that $Pr_T = Sc_T = 1$. The algorithm is being used for real applications. The following studies will be discussed: the intrusion of fresh water of the Tevere river in the Tirreno sea; mixing in the Muggia Bay (Region of Trieste) under the action of the breeze forcing. Results have clearly shown the reliability of new- generation LES large-scale models for applications in problems with horizontal and vertical scales respectively of the order of $10km$ and $50m$.

Vincenzo Armenio
DICA, University of Trieste

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