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**Large-eddy simulations of stratified turbulence: an anisotropic subgrid-scale closure** SINA KHANI, University of Washington, MICHAEL WAITE, University of Waterloo — The horizontal and vertical grid spacings are generally equal in large-eddy simulations (LES) of stratified turbulence. In simulations of larger-scale motions, however, it is computationally affordable to use different grid spacings in the horizontal and vertical. In this talk, we introduce a new subgrid-scale (SGS) parameterizations based on horizontal filtering of equations of motions in stratified turbulence. The horizontal and vertical SGS dissipations are not disconnected because the vertical derivatives of horizontal SGS fluxes are included in our newly developed closure, unlike the common horizontal SGS closures in atmospheric and oceanic models. Our anisotropic model can successfully reproduce the flow characteristics, moments and parameters, such as time series of kinetic and potential energy, horizontal and vertical wavenumber energy spectra and mixing efficiency, similar to those in direct numerical simulations while the computational cost is considerably reduced in LES. We suggest that our new SGS model can also improve the dissipative performance of the horizontal Smagorinsky closure in current atmospheric and oceanic models without adding any ad hoc energizing terms at smaller scales.

Sina Khani
University of Washington

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