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# First results from coupled atmosphere-ocean large-eddy simulations

I. Esau (1), M. Letzel (2), S. Raasch (2)

(1) Nansen Environmental and Remote Sensing Center / Bjerknes Centre for Climate Research, Thormohlensgt. 47, 5006, Bergen, Norway (igore@nersc.no, / Fax +47 55205801), (2) Institute of Meteorology and Climatology, University of Hannover, Herrenhäuser Str. 2, 30419 Hannover, Germany

We present the first and largely preliminary results from a coupled atmosphere-ocean large-eddy simulations with PALM code. The coupling approach is to run the same code simultaneously in ocean and atmosphere modes passing through fluxes in the atmosphere to ocean coupler and surface meteorological fields in the ocean to atmosphere coupler with prescribed coupling intervals. To test the approach, a free convection marine boundary layer and ocean mixed layer conditions were chosen. The case is similar to the observed case of December Greenland Sea convection under anticyclone weather that has been utilized to initialize the run. The run and its analysis are computationally expensive as rather high horizontal resolution (15 m) is required to resolve the ocean turbulence. The results obtained so far indicate the need for frequent model coupling of every 300 s or less. It seems that spatial structures in humidity/salinity fluxes correlate stronger than structures in heat fluxes suggesting an important role of the latent heat flux in forcing of the ocean mixing in high latitudes, the mechanism found to be dominant in tropics. It was also found that coupling of turbulent layers acts destructively on the coherent structures in both layers as the scale misfit constantly creates a nudging force adjusting the atmospheric and oceanic structures to each other.