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Turbulence-resolving simulations of circulations near ice edge

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Nonlinear interactions between ice breeze and convective turbulence at the ice edge destabilize the flow both in the atmosphere and the ocean. The destabilization result in significant modification of the atmosphere-ocean turbulent exchange. A large amplification of vertical turbulent fluxes related to the ice edge instabilities has been found in turbulence-resolving large-eddy simulations. A number of direct and indirect evidences supporting this non-monotonic, with respect to the surface-atmosphere temperature difference, behavior of the fluxes have been found in literature. The excessive heat and momentum fluxes are related to the significant structural modification in the self-organized patterns of convection as it is clearly revealed in special and temporal analysis of the simulations.