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Baroclinic mixed layer instability in the presence of convection JOERN CALLIES, RAFFAELE FERRARI, Massachusetts Institute of Technology — It has recently been discovered that geostrophic turbulence in the upper ocean undergoes a seasonal cycle at submesoscales, the scales smaller than the most energetic mesoscale eddies. Observations and theory suggest that baroclinic mixed layer instabilities release potential energy stored in deep mixed layers, energizing the submesoscales in winter. In shallow summer mixed layers, there is no such energization. The oceanic mixed layer, besides being prone to baroclinic instabilities, is subject to atmospheric forcing, which drives convective overturns. We here study how this forced convection interacts with baroclinic instabilities in a set of idealized numerical simulations resolving both processes. A major question is whether baroclinic instabilities can be damped out by convection. Implications for the seasonal cycle in submesoscale turbulence will be discussed.

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