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Slope currents variability over a continental slope forced by mesoscale turbulence

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Flow close to continental slope are driven by large β topographic effect. This effect dramatically decreases coherent structure size because of the decrease of Rhines scale. It implies that eddies are destabilized on the slope. Evolution of different terms of Potential Vorticity(PV) conservation equation gives information about this process. In deep ocean, flow is driven by PV advection which allows long lived eddies. But close to continental slope, β topographic term becomes important. It is responsible of slope currents variability and allows Coastal Trapped Waves (CTW) generation and propagation.

Here, mesoscale turbulence interacts with an idealized continental slope in a primitive equation model. Experiments are performed to study the influence of slope and stratification on CTW propagation. Those parameters strongly control CTW behaviour along continental slope. In the one hand, strong stratification and steep slope enhance insulating nature of continental slope. On the other hand, we observe that wave breaking occurs easily for weak slope or weak stratification enhancing mixing over the slope.