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The joint influence of topography and atmosphere on the meridional transport process in the Southern Ocean and its consequence on the ENSO events

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The investigation of the influence of topography and coastlines on the dynamics of the depth averaged Antarctic Circumpolar Current (ACC), driven by wind and atmospheric pressure was carried out. This is achieved with the help of a global barotropic circulation model, under idealized and real atmospheric conditions. It is shown that the variability of meridional mass fluxes due to the atmospheric conditions over the ACC can induce density anomalies in the Southern Ocean (SO), which can be transferred to low latitudes by the wave mechanism described by Ivchenko et al. (2004) that could have significance with respect to rapid extra-tropical oceanic links. The results of the barotropic modeling demonstrate that changes in wind strength over the ACC, together with the effect of bottom topography and coastlines, induce variations in meridional flows in the SO, and that the meridional flux in the Pacific Ocean is anticorrelated with the strength of the wind over the ACC. The link between the variations of the meridional flux in the Pacific sector and the El Niño Southern Oscillation is shown.