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Investigation Into Antarctic Slope Front Regimes Using an Idealised Isopycnal Model

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The Antarctic Slope Current is a current that flows westward around Antarctica and lies close to the coast on the continental shelf. The slope current region features steeply sloping isopycnals at the continental shelf, characterising the Antarctic Slope Front (ASF). The ASF serves as a barrier between warm Circumpolar Deep Water and the continental shelf. Depending on the local structure of the ASF, Circumpolar Deep Water can flood on to the continental shelf and induce basal melt, with implications for sea level rise globally. Observations in these regions of the ocean are scarce, or even non-existent, and eddy-resolving modelling studies of the ASF are also limited. We have developed a set of idealised configurations with an isopycnal model that can emulate the conditions in different ASF regimes. We investigate how the different ASF regimes are affected by variations in wind forcing, topography and stratification. This aims to identify the different dynamics and the sensitivity of forcings and boundary conditions that allow warm water to reach the shelf in different ASF regimes.