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# Circulation in the Bransfield Strait (Antarctica): comparison between the dynamics observed and gravity currents simulated in a rotating tank

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The Bransfield Strait is a semi enclosed Antarctic sea located between the South Shetlands Archipelago and the Antarctic Peninsula coast. The basic circulation pattern consists of an inflow of relatively warm and fresh water from the Bellingshausen Sea, referred to as Transitional Zonal Water with Bellingshausen influence (TBW), and inflow of relatively cold and salty water from the Weddell Sea, referred as Transitional Zonal Water with Weddell Sea influence (TWW). Two interdisciplinary mesoscale surveys, CIEMAR (December, 1999) and BREDDIES (January, 2003), were carried out in the Bransfield Strait. In these surveys, we observed two different patterns in the Strait. In the half northwest of the Bransfield Strait, the first 300 meters of the water column are occupied by well stratified TBW, whereas the TWW occupies almost the entire volume of the basin. TBW, less dense that TWW, flows northeast along the northern half of the Strait while TWW circulates southwest along the southern half of the Strait, both water masses being separated by a shallow hydrographic front. Theoretically, this system of water masses can be considered as a gravity current. Without the rotation, the least dense water (TBW) must flow superficially towards the North-East, occupying the whole Bransfield Strait, and the densest water (TWW) must flow below TBW towards the Southwest. In this work we simulate a gravity current in a rotating tank, scaling the experiment to the Bransfield Strait conditions. We compare our results with the dynamical description of the Bransfield Strait obtained from the hydrographical data. Our aim is to analyze if the characteristics of the hydrographic front could be explained only by the influence of rotation on the gravity current or if it is necessary to consider other effects.