



## **The boundary currents in the Weddell Sea - the seasonality of an overturning system**

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It is essential to understand what drives the variability of the coastal flow in the Weddell Sea because it both contributes to the export of dense water towards the lower latitudes and controls the inflow of modified deep warm water (MWDW) into the adjacent ice shelf cavities. So far, the boundary current's dynamic have been analysed on isolated selected sites only. This study investigates for the first time the structure and the seasonality of the whole boundary current system using velocity and temperature measured by moored instruments as well as hydrographic observations collected around the Prime Meridian, Kapp Norvegia and the tip of the Antarctic Peninsular between 1989 and 2017. Climatological averages of hydrographic sections estimated via objective mapping at the three study sites confirm that there exists a densification of the water masses between Kapp Norvegia and the tip of the Antarctic Peninsular, which forces the mean baroclinic flow to shift from surface to bottom intensified. The analysis of the current meters reveals a coherent seasonal acceleration of the barotropic flow at all sites while the baroclinic adjustments are significant only upstream of Kapp Norvegia. We compare this results with the variability in sea surface height and the wind stress field and discuss the changes in flow regime between the region upstream of Kapp Norvegia with the region downstream. It is argued that the asymmetry in the wind field as well as the sea ice concentration must be considered to explain the dynamic of the coastal flow.