



A 20-year long volume transport time series of the Antarctic Circumpolar Current obtained from in situ and satellite observations. Part II : Analysis of the variations

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A 20 year long transport time series of the Antarctic Circumpolar Current (ACC) has been produced from in situ and altimetric satellite observations across the Drake Passage (see Part I : mean 140 Sv, std 10 Sv). Variations of the total, baroclinic and barotropic volume transports are analysed and their relation to the atmospheric forcing discussed. Sea level anomalies are used to understand the spatial patterns associated with transport variations.

The spectral content of the volume transport time series present different significant periods: a five year trend, annual and semi annual periods that disappears between 2000-2002 and high frequencies.

Variations in the volume transports are principally caused by variations in the Yaghan Basin, and more precisely by variations in the Subantarctic Front (SAF) and the Polar Front (PF).

The total transport ranges between 100 Sv and 180 Sv, with several extreme cases (larger than 165 Sv and smaller than 110 Sv). The altimetric maps and velocity profiles corresponding to these extreme transport values are analysed to examine the typical patterns associated with these situations.

Eastward rossby wave propagation is identified and associated with the semi annual period. The 5 year trend is caused by an indirect response of the baroclinic component of the transport to atmospheric variations via the Southern Annular Mode (SAM), with a lag of around 1,5 years. This 5-year trend disappears soon after 2000. The barotropic transport does not show this-5 year trend.