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Origins of low-frequency variations in the Malvinas Current volume transport since 1992.

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The Malvinas Current (MC) is a 2000 km long northward loop of the northern branch of the Antarctic Circumpolar Current (ACC) in the Argentine Basin. A 15-year-long time series of MC volume transport was computed using satellite altimetry and statistical information derived from two currentmeter data sets obtained 8 years apart at the same location at 41S near its merger with the Brazil Current. Athough no general trend was noticed, interannual variations were important. A spectacular shift in the spectral composition of the MC transport variations was observed: from 1992 until the end of 1997 transport variations occurred at rather short periods (50-90 days and to some degree around 180 days) whereas after year 2000 longer periods including a seasonal cycle dominated. Regression and coherence analyses between the MC transport and the wind field over the southern ocean suggested that the MC transport variations at periods larger than 120 days followed the wind stress curl (WSC) over the South East Pacific (50S-40S) with a short lag. However after 2001, convergence of water to the north of Drake Passage induced by WSC anomalies of opposite sign to the north and south of 50S and /or zonal wind stress anomalies in the South Pacific to the south of 60S appeared to be a major cause of MC transport variations around the annual period. That convergence forcing at the annual period peaked in 2004 and reduced after 2006 as did the annual component in the MC volume transport. Local dynamics in the Southwest Atlantic played some role in the MC transport variations at 41S even at the interannual time scale. After 2001, the Brazil-Malvinas front location was on averaged shifted to the south by more than a degree in latitude and the amplitude of its variations was reduced. The minimum annual mean MC transport value in 2005 coincided with a southernmost location of the Confluence in summer 2005 and pinching of the MC by a Brazil Current ring during spring.