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Trends and variability in the sea surface height, sea surface temperature and wind stress curl in the South Atlantic ocean

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Altimetry sea level anomalies (SLA), sea surface temperatures anomalies (SSTA) and wind stress curl (WSC) were analyzed and had their trends calculated and their variability studied for the South Atlantic ocean using the last 19 years of SALTO/DUACS altimeter data, ERSST data and ERA-INTERIM data. All data had their temporal resolution adjusted to the one of altimeter data. The trends were calculated between January, 1st 1993 and December, 31th 2011. The stronger and positive SLA trends occurred in the region of the Zapiola Ridge (14 mm/year) and in some places in the Drake Passage (10 mm/year). Negative trends were observed in the Southern part of Argentinian basin (-4 mm/year), next to the Confluence Brazil Malvinas (-8 mm/year) and to the southwest of the African coast (-6 mm/year). The SST trends were positive North of 40°S, and negative south of 60°S. They were also negative along the Argentinean continental slope along the path of the Malvinas Current. The WSC trend was also negative along the Argentine continental slope. In the Southeast Atlantic, the WSC trend had a zonal distribution with alternate signs.

To understand the processes responsible for the trend patterns in the South Atlantic ocean, the high and the low frequencies were obtained applying successively a 25 week band pass filter followed by a 37 week band pass filter. The percentage of explained variance by the high frequency, low frequency and seasonal signals (hf/lf/ss) were compared for SLA, SSTA and WSC. The variance of SLA in the Southwestern Atlantic was explained by the proportion of (80%, 15%,5%), except along the Argentinean continental slope (15%, 50%, 35%), the inner part of the ZR (10%,65%,25%). The central part of the South Atlantic showed dominant low frequency variance (proportions of 15%, 80% and 5% (hf/lf/ss), respectively). The SSTA variance was dominated by the high frequency in the Uruguayan coast, around ZR, in the Drake Passage and in the Agulhas Leakage (60-80%), low frequency variability responds to 55-75% of the total variability away from the continental borders. The seasonal frequency is important in the CBM region and in the inner of ZR (25%, 40%, 35%). The WSC variance was mostly explained by high frequencies (70%), low frequencies explained between 10% and 15%, at latitudes lower than 20°S, in the Argentinean continental slope and in the Agulhas Leakage. The EOF analysis were performed on the high and low frequencies components of each variable. The results will be presented in the poster.