The water exchange between the Indian and South Atlantic Ocean is an important component of the thermohaline circulation. The warmer and saltier waters from the Indian Ocean enter the South Atlantic at the retroreflection of the Agulhas Current. Recent studies show that this process, known as the “Agulhas Leakage”, has been increasing, as a consequence of a poleward shift of the winds in the southern hemisphere. In this work, the NCEP Reanalysis wind-products were used to force an OGCM, to investigate the effects of changes in the wind on the South Atlantic circulation. The model, the Hybrid Coordinate Ocean Model (HYCOM), was implemented to a domain delimited by 98W-114E, 65S-60N, and forced with monthly means of NCEP/Reanalysis starting in 1948. The ongoing analysis of the results shows that several features associated with the South Atlantic circulation is undergoing multiple time-scale variability. The preliminary analyses show that the inter-basin water exchange, the “Agulhas Leakage”, might be increasing since the 1960s or undergoing variability in multi-decadal scale. As a result, there is an intensification of the subtropical gyre, with increase in sea surface temperature and salinity. The mean heat transport across 35°S computed with the model results has a zonal averaged value of about .6 petawatts, agreeing reasonably well with observations. However, the time series of the model heat transport in presents a small negative trend in the last four decades. In general, the results show a positive trend for both Sea Surface Temperature and salinity in the Subtropical South Atlantic.