Decadal Sea level Variability in the subtropical South Pacific

Frauke Albrecht[1], Oscar Pizarro[1,2], and **Eduardo Zorita**[3]

[1]Millennium Institute of Oceanography, Chile (frauke.albrecht@imo-chile.cl)
[2]Department of Geophysics, University of Concepción, Chile
[3]Helmholtz Zentrum Geesthacht, Geesthacht, Germany

Observational altimetry data and data of 18 phase 5 of the Coupled Model Intercomparison Project (CMIP5) are investigated to analyze decadal sea level variability for the subtropical South Pacific. The altimetry data covers the period 1993 to 2017. In order to analyze decadal variability yearly means of detrended data are considered. An Empirical Orthogonal Function (EOF) analysis of the Region 20°S to 60°S is performed in to analyze sea level variablility in the subtropics. The tropical region has been omitted in order to avoid the strong El Niño Southern Oscillation (ENSO) signal masking other subtropical variability in the analysis. The first EOF of the altimetry data shows a clear pattern with a North-South dipole explaining 30% of the variance and the corresponding time series shows a decadal periodicity. The decadal variability of this pattern is reproduced by the CMIP5 models. Analyzing model ocean circulation data show consistent decadal variability in the North-South velocity. As a possible forcing zonal (westerly) surface winds are analyzed. Their pattern confirm Ekman transport to the North (South) in the lower (higher) latitudes, leading to a convergence zone and therefore explaining the sea level rise as seen in the EOF pattern, consistently with the Ekman transport a deep compensatory poleward flow is observed.