Geophysical Research Abstracts
Vol. 15, EGU2013-12856, 2013
EGU General Assembly 2013

A role of semi-annual and annual oscillations in generating the asymmetry between El Niño and La Niña events during very strong ENSO episodes

Malgorzata Swierczynska (1), Tomasz Niedzielski (1,2), Wieslaw Kosek (2,3)

(1) University of Wroclaw, Institute of Geography and Regional Development, Department of Cartography, Wroclaw, Poland (goswierk@gmail.com, tomasz.niedzielski@uni.wroc.pl), (2) Space Research Centre, Polish Academy of Sciences, Warsaw, Poland, (3) Agriculture University of Krakow, Environmental Engineering and Land Surveying Department, Krakow, Poland

The sea level anomaly (SLA) variations obtained from observations of altimetric satellites show oscillations with different periods ranging from days to years. The residual values are obtained using a deterministic polynomial-harmonic model comprising: a linear trend and oscillations with periods of 365, 180, 120, 90 and 62 days. The residuals are analyzed using the FTBPF (Fourier Transform Band Pass Filter). The results of that study are wide band amplitudes which exist in residuals. However, some of them are more energetic than the other ones. Using this approach we detected major oscillations that drive the asymmetry between El Niño and La Niña during very strong the El Niño/Southern Oscillation (ENSO) episodes, the detection of which was earlier performed using the analysis of spatial patterns of skewness and kurtosis of sea level anomaly time series. We have found that the semi-annual and annual oscillations have the greatest impact on that asymmetry. Indeed, during very strong El Niño episode in 1997/1998, the semi-annual oscillation was responsible for growth of sea level anomalies that occurred in the western equatorial coast of South America. Almost at the same time, the annual oscillation generated a local rise of seal level in the central part of the Pacific Ocean. They complemented each other and gave a complete picture of the spatial pattern of sea level variation during very strong El Niño events. The presented maps include the analyses of the ENSO episodes that occurred between 1993 and 2012. For the purpose of the study outlined above, weekly sea level anomaly maps obtained courtesy of the Archiving, Validation and Interpretation of Satellite Oceanographic data (AVISO) have been adopted.