Geophysical Research Abstracts
Vol. 19, EGU2017-484, 2017
EGU General Assembly 2017

Role of the Interannual equatorial Kelvin wave propagations in the equatorial Atlantic on the Angola Benguela current system.

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The link between equatorial Atlantic Ocean variability and the coastal region of Angola and Namibia is investigated at interannual time scales from 1998 to 2012. An index of the equatorial Kelvin wave activity is defined based on equatorial PIRATA in situ data. Results show a significant correlation between monthly dynamic height anomalies derived from the Prediction and Research Moored Array in the Tropical Atlantic (PIRATA), monthly Sea Surface Height anomalies (SSHA) derived from altimetry and SSHA calculated with an Ocean Linear Model. This allows interpreting PIRATA record into equatorial Kelvin wave signal. Estimated phase speed of eastward propagations from PIRATA equatorial mooring remains in agreement with the linear theory, emphasizing the dominance of the second baroclinic mode. Systematic analysis of all strong interannual equatorial SSH anomalies shows that they precede by one month extreme interannual SST anomalies along the African coast, suggesting that major warm and cold events in the Angola-Benguela current system are remotely forced by ocean atmosphere interactions in the equatorial Atlantic. Wave dynamics along the equatorial wave guide, as inferred from the Ocean Linear Model, is at the origin of their developments. Wind anomalies in the Western Equatorial Atlantic force equatorial downwelling and upwelling Kelvin waves that propagate eastward along the equator and then polewards along the African coast triggering extreme warm and cold events respectively. A proxy index based on linear ocean dynamics appears to be significantly more skilful in forecasting coastal variability than an index based on wind variability.