Geophysical Research Abstracts
Vol. 19, EGU2017-16991, 2017
EGU General Assembly 2017

Spectral signatures of the tropical Pacific dynamics from model and altimetry

tchilibou michel lionel (1), lionel gourdeau (1), rosemary morrow (1), Bugshin Djath (2), julien jouanno (1), and frederic marin (1)

(1) LEGOS, UMR5566 CNRS-CNES-IRD-Université de Toulouse III, Toulouse, France (michel.tchilibou@legos.obs-mip.fr), (2) HZM, Helmholtz Zentrum München, Germany (natachadjath@gmail.com)

The tropics are distinguishable from mid latitudes by their small Coriolis parameter vanishing at the equator, large Rossby radius, and strong anisotropic circulation. These peculiarities are at the origin of dynamics that strongly respond to the wind forcing through zonally propagating tropical waves, and of a large range of wavenumbers covering meso and submesoscale interactions. The main tropical meso and submesoscales features are associated with Tropical Instability Waves (Marchesiello et al., 2011), but coherent vorticity structures span the tropical band as described by Ubelmann and Fu (2011). This study aims to infer the dynamics of the tropical Pacific through spectral EKE and SSH analyses by looking at their latitudinal dependence. Also, a question of interest is the observability of such dynamics using along track altimetric wavenumber spectra since the tracks are mainly oriented meridionally in the tropics. This study is based on the 1.12° resolution DRAKKAR global model. Frequency-zonal wavenumber EKE spectra, and their corresponding 1D frequency and zonal wavenumber are analyzed in different latitudinal bands in the tropics illustrating the contrast between the dynamics in the equatorial belt and in the off – equatorial belt. Zonal and meridional wavenumber EKE spectra, and 2D (horizontal wavenumber) spectra of zonal and meridional velocities are used to illustrate the degree of anisotropy in the tropics depending on latitude. These EKE spectra and the relationship between EKE and SSH spectra helps us to discuss the validity of QG turbulence theories in the tropics. These model results combined with those from a 1/36° resolution regional model with explicit tides point out the actual limitation of along track altimetric SSH to infer small scale dynamics in the tropics due the high energy level of high frequency ageostrophic motions.