Geophysical Research Abstracts
Vol. 15, EGU2013-2672, 2013
EGU General Assembly 2013

Influences of the Intraseasonal Variability on ENSO and Long Equatorial Waves

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The influences of the intraseasonal variability on the El Nino-Southern Oscillation (ENSO) and associated oceanic Kelvin and Rossby waves are investigated using an oceanic general circulation model forced by the wind stress (surface wind) of the National Centers for Environment Prediction (NCEP). The simulation has well reproduced the sea level anomalies (SLA) of the AVISO altimeter observations and sea surface temperature anomalies (SSTA) of the Hadley Centre. The results show that the effects of the atmospheric intraseasonal forcing on SSTA and SLA in the equatorial Pacific are small both on the interannual and interdecadal timescales. Because of the nonlinear relationship between wind stress and surface wind, numerical simulation forced by the surface wind has some differences with that forced by the wind stress, especially in the western equatorial Pacific.
The equatorial Kelvin and Rossby waves decomposed from the model simulation show that the propagation and reflection of the equatorial Kelvin and Rossby waves play an important role in the evolution of El Nino and La Nina events. Moreover, the atmospheric intraseasonal forcing is found to play a minor role in the dynamics of the equatorial Kelvin and Rossby waves.