Geophysical Research Abstracts
Vol. 15, EGU2013-8642, 2013
EGU General Assembly 2013

salinity Budget analysis of of Western Pacific Warm Pool

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Western pacific warm pool plays an important role in governing global climate variability. In particular, the unique salinity structures of warm pool, barrier layer and salinity front, have significant impacts on the heat content accumulation and zonal migration of warm pool surface water, which further modulate the formation and development of tropical climate phenomenon, such as El Niño, MJO and EAM.

In order to have better understanding of how warm pool salinity contributes to climate change the salinity budget of warm pool are investigated using results from a model of the Consortium for Estimating the Circulation and Climate of the Ocean (ECCO). The results show that the salinity budget of warm pool and its components have significant seasonal and annual variability. The surface freshwater flux is the dominant element of salinity budget, which is well balanced by the other ocean dynamic terms. However among all the terms of ocean dynamics, mixing is most significant, whereas advection and entrainment are not dominant, unlike most other region.
The further analysis of lagged correlation coefficient between the salinity budget, salinity budget components and NIÑO 3.4 reveals that the salinity budget is highly related to El Niño and Southern Oscillation (ENSO). The results indicate that the annual variability of warm pool salinity budget has a notable correlation coefficient with NIÑO 3.4 (0.7); Mealwhile,variabilities of each components of Ocean dynamics,including diffusion, advection and mixing are found to be highly correlated to ENSO.The local barrier layer is believed to be a major reason.