

Intercomparison of CMIP5 Ocean Model Performance for SST Variations over EEIO and its Relation to Thermocline

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The motivation of this study is to evaluate SST variations of Coupled Model Intercomparison Project (CMIP5) dataset in Eastern Equatorial Indian Ocean (EEIO) by considering the influence of subsurface ocean structure. Variations of SST are studied by applying Power spectral density (PSD) analysis on SST of CMIP5 dataset and observation of SODA dataset. Some models show stronger/weaker SST variations than observation on specific time scale. Based on the strength of SST variations relative to observation, models are divided into three groups: strong model, moderate model and normal model. Normal models have SST variations close to observation, while strong and moderate models show stronger SST variations (relative to observation) on 1-2 years, 2-3 years and 3-7 years time scale.

The cause of strong SST variations on 3-7 years time scale is related to shallow thermocline of models. Strong linearity in SST-thermocline relation may indicate more dominant influence of subsurface to SST variations on this time scale. In warming climate, relationship between thermocline and SST is still maintained; models with shallow thermocline shows stronger SST variations than models with deeper thermocline. Many models show unchanged thermocline depth, which may become the cause of a little change in SST variations on 3-7 years time scale.

Keywords: CMIP5, Eastern Equatorial Indian Ocean, Thermocline, SST variations