
Mean and variability of the Dynamic Sea Level of the Indian Ocean from CMIP6 models

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Abstract

The Indian Ocean is now increasingly recognized as a key driver in the global climate change scenario and turn out to be a warming hotspot in the recent decade. As a consequence, among other things, the sea level in the Indian Ocean experience a rapid rise; making one-third of the global population living along the perimeter of the basin vulnerable to the future sea level rise. In this study, we analyse 29 AOGCMs from the sixth phase of the Coupled Model Inter-comparison Project (CMIP6) to understand the fidelity of these models in simulating the dynamic sea level (DSL) of the Indian Ocean. All models simulate the spatial pattern of the dynamic sea level over the Indian Ocean realistically. However, certain consistent biases like positive (negative) DSL bias in the western (eastern) Indian Ocean are noticed across all the models, consistent with the observed bias in the respective windstress curl over the basin. Moreover, the magnitude of such biases varies significantly among the models. The DSL variability simulated by these models is not as robust as the mean sea state. Most models represent the variability near the Seychelles-Chagos thermocline ridge region faithfully, but only the high resolution models are able to capture the variability near Agulhas leakage realistically. Further, selected models based on skill score metrics are used to study the projected change and variability under different emission pathways to assess the risk of sea level rise for the subcontinent.

Keywords: Indian ocean, CMIP6, Dynamic sea level

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