

Mechanisms of the sea surface temperature cooling in the Somalia-Oman upwelling region during the summer monsoon

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Alongshore southwesterly winds in the western Arabian Sea associated with the Indian summer monsoon induce coastal upwelling and cool sea surface temperature (SST) along the coast of Somalia and Oman. Since the upwelling region is a moisture source of the Indian summer monsoon rainfall, understanding of the SST variations in this region is crucial for the prediction of the Indian summer monsoon precipitation. In this study, an on-line mixed layer heat budget analysis is conducted to clarify the mechanisms of the SST cooling using the Regional Ocean Modeling System (ROMS) simulation. It is revealed that causes of the SST cooling in the upwelling region are different between the onset (May) and mature phases (June-July) of the Indian summer monsoon. The horizontal advection, surface heat flux, entrainment and vertical diffusion terms contribute to the cooling in the former phase, while the vertical diffusion term plays a dominant role in the latter phase.