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Plenary Speech I

Reversal of multidecadal sea level trends in the Southwest Indian Ocean thermocline ridge

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Abstract

It has been reported that the sea level falls in the tropical Southwest Indian Ocean (SWIO) from the 1960s to the early 2000s. However, a rising trend of 4.05 ± 0.56 cm/decade has occurred during the recent two decades with our analysis showing that manometric sea level contributes 41% to this sea level rise. 30% of this rise is due to steric sea level (SSL) change in the upper 2000 m with SSL rise in the upper 300 m of secondary importance. Conversely, thermal expansion below the thermocline (300–2000 m), likely caused by water mass spread from the Southern Ocean, induces major contribution to SSL changes. Overall, this study highlights the importance of ocean mass and deeper water thermal structure in regulating tropical SWIO sea level rise in a changing climate, as well as the need for observations and direct assessment of the abyssal ocean beneath 2000m.

Keywords
Southwest Indian Ocean, sea level rise, ocean mass change, thermal expansion, heave and spice

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