



Assessment of the local and the Pacific contribution to sub-surface heat content of the south tropical Indian Ocean in GECCO₂ and ORAS4

Jayasankar TPillai (1), Eldho Ti (1,2), Subimal Ghosh (1,2)

(1) IDP in Climate Studies, Indian Institute of Technology Bombay, Indian Institute of Technology Bombay, Mumbai, India,

(2) Department of Civil Engineering, Indian Institute of Technology Bombay, Indian Institute of Technology Bombay, Mumbai, India

The sea surface temperature and the heat content of the Indian Ocean (IO) have a significant impact on the regional and the global climate. The uncertainties in south tropical Indian Ocean sub-surface heat content (STIOSHC) and the Indo-pacific sea level prior to 1980 are attributed to the divergence in equatorial Pacific easterlies between the wind products in their respective studies. Understanding the impacts of such divergence on the model studies is imperative for distinguishing the signatures of natural climate variability and anthropogenic warming. Here, we have investigated the STIOSHC using two ocean reanalysis products (GECCO₂ and ORAS4) that are forced by the two different wind products. The identified drivers of STIOSHC are the regional Walker and Hadley cells along with the Indonesian through flow (ITF). A simple methodology for assessing the individual contributions of these drivers is tested. The Pacific contribution (ITF) to the STIOSHC cooling during 1960-1999 in one product is lesser (<40%), unlike a study with the other wind product. The local and the Pacific contributions are found to be roughly out of phase throughout with a dominant time period of 10 to 13 years. An increase in the variability of the Pacific contribution is observed after 1985.