



## **Effect of riverine freshwater discharge in salinity simulations over the northern Indian Ocean**

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Sea surface salinity (SSS) in the north Indian Ocean (NIO) exhibits contrasting spatial distribution, particularly in the two semi-enclosed basins namely the Arabian sea (AS) and Bay of Bengal (BoB). BoB experiences excess amount of freshwater inflow from rivers as well as from the surplus of precipitation over evaporation (E-P) and thus maintains a fresher surface water throughout the year as compared to AS. Major rivers such as Ganges, Brahmaputra, Mahanadi, Godavari, Krishna, and Irrawaddy discharge large amount of freshwater volume to the BoB. The input of relatively less saline waters by the Indonesian Throughflow (ITF) makes the eastern equatorial IO fresher. Substantial change in salinity and temperature due to river runoff results in a change in ambient sea-water density near river mouths in coastal regions. In the present study, we simulate the circulation features of the NIO using a free-surface primitive equation ocean general circulation model 'Regional Ocean Modeling System' (ROMS). The model domain extends from 30°S-30°N, 30°E-120°E with 1/4 x 1/4 degree resolution in the horizontal and 40 vertical terrain following sigma levels. The model is initialized with annual mean climatology of temperature and salinity from World Ocean Atlas 2009 (WOA09) and forced with daily climatological winds from Quikscat and ASCAT and other atmospheric forcing fields from TropFlux. Different numerical experiments were carried out to understand the impact of freshwater forcing on the sea surface salinity (SSS) simulations. Model simulations and available in-situ and satellite observations utilized to understand processes, particularly the contribution of freshwater forcing, controlling the SSS spatial and seasonal variations in various sectors of the Indian Ocean.