ROLES OF HIGH-FREQUENCY RAINFALL ON THE INDIAN OCEAN-ATMOSPHERE CLIMATE

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The role of TRMM daily precipitation on the interannual variability of the Indian Ocean climate are examined with data (Reynolds SST, TOPEX sea level, AVHRR SST, QuikSCAT wind stress, TRMM daily and ARKIN monthly precipitation) and a nonlinear reduced-gravity thermodynamic model. Two experiments are performed. In the first experiment (Run ARKIN), the ocean is forced with QuikSCAT daily winds and ARKIN monthly precipitation. In the second experiment (Run TRMM), wind remains unchanged, but rainfall is prescribed to the TRMM daily precipitation calibrated onto ARKIN monthly values. Interestingly, differences of SST between the two experiments are not large where TRMM and ARKIN differ most. Since climatological heat fluxes are used to force the model, changes of temperature are solely due to oceanic processes. The maximum SST difference is as large as 2 degree Celsius in the southwestern tropical Indian Ocean. This location corresponds to the shallowest thermocline in the Indian Ocean on annual average, implying a strong ocean feedback onto the atmosphere. Thus, the impact of high-frequency rainfall on SST is potentially important for the coupled Indian Ocean-Atmosphere processes that are responsible for the climate changes.