



Future Changes in the Seasonal Mean Summer Monsoon over Indian Subcontinent and Adjoining Seas Projected by RegCM4.3

Sushil K. Dash (1), Saroj K. Mishra (1), Kanhu C. Pattnayak (1), Ashu Mamgain (1), Laura Mariotti (2), Erika Coppola (2), Filippo Giorgi (2), and Graziano Giuliani (2)

(1) Centre for Atmospheric Sciences, Indian Institute of Technology Delhi, New Delhi-110016, India, (2) Abdus Salam ICTP, Strada Costiera, 11, I-34151 Trieste, Italy

This study is based on the RegCM4.3 simulated climate projections for the South Asia CORDEX domain. The lateral boundary forcing of GFDL-ESM2M is used in the control run and the emission scenario RCP8.5 obtained from the CMIP5 archive. In all the experiments, Emanuel convective parameterization scheme has been used over the land and Grell convection scheme over the ocean. The model has been integrated at 50km resolution starting from the initial condition of 1st January 1970 upto 1st January 2100.

The model simulated surface air temperature and rainfall are validated for the current climate over the reference period 1975-2004. The future simulations are divided into four 30-years time slices of 2010-2039, 2040-2069 and 2070-2099 referred to as the near-future, mid-future and far-future periods respectively. Comparison of JJAS mean model projected rainfall for the different periods in the future interestingly reveals systematic changes over most of the Indian regions. The farther we go into the future the larger is the change from the reference period. Seasonal mean rainfall weakens over the central India, northern Indian Ocean and equatorial Indian Ocean. On the other hand, it strengthens more and more over the Arabian Sea and northern Bay of Bengal. A major fraction of the changes happen to come from the convective component of the rainfall, which is attributed to the fact that Asian Summer Monsoon is largely driven by the atmospheric convection. Nevertheless, non-convective precipitation component partly contributes to the enhancement of rainfall in the Arabian Sea and northern Bay of Bengal and to its weakening in the north Indian Ocean. Atmospheric circulation, surface evaporation, and large scale moisture convergence over the region are found to change along the same line and explain the changes observed with rainfall.