

## **Detection, attribution and future projections of the South Asian regional monsoon climate**

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Observed climate records and datasets during the last 50 years indicate an overall weakening of the large-scale boreal summer monsoon circulation and a significant decrease in moderate and low monsoon rainfall events over India during recent decades. Global climate model simulations have major uncertainties in estimating the observed monsoon precipitation changes over South Asia. This is partly due to the inability of the coarse resolution global models to resolve the fine scale structure and variability of the regional monsoon precipitation distribution. The present study describes recent initiatives at CCCR to address some of the scientific issues on the detection, attribution and future projections of climate change over the South Asian monsoon region using the LMDZ global model with high-resolution zooming capability over South and West Asia. We have initiated 3 sets of climate simulations (a) Historical run (b) Historical Natural run (c) RCP 4.5 scenario using the LMDZ model. The Historical run includes both natural and anthropogenic (eg., GHG, aerosols, etc) climate forcing during the historical period (1890 - 2005). The Historical Natural experiment includes only natural climate forcing during the historical period (1890 - 2005). The third experiment Representative Concentration Pathway 4.5 (RCP 4.5) is a future projection run that includes both natural and anthropogenic forcing based on the IPCC AR5 RCP 4.5 scenario (2006 - 2100) . The evolution of GHG and anthropogenic aerosols in RCP 4.5 scenario produces a global radiative forcing of + 4.5 W m<sup>-2</sup> at the end of 2100. The present version of the LMDZ atmospheric model uses a spatially varying grid with a maximum resolution of ~35 km over South Asia and the runs have been initiated at CCCR / IITM, India, in collaboration with LMD, Paris. The zoom domain covers the region (45E-120E; 15S-45N). The SST and Sea-Ice for the runs are prescribed from the CMIP5 coupled model outputs for the corresponding experiments. Preliminary simulations from the LMDZ model indicate that the summer monsoon rainfall along the narrow Western Ghat Mountains and the orographic slopes near Burma and northern Bay are well captured in the present-day climate simulations. Results from the aforementioned high resolution model simulations of the South Asian monsoon and its response to global climate change will be presented during the conference.