



## **Representation of South Asian Summer Monsoon in CMIP5 and its diverse responses to the anthropogenic aerosol forcing**

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The representation of South Asian Summer Monsoon in CMIP5 dataset is evaluated over 20 GCMs. These evaluations include surface temperature gradient, precipitation, and large-scale circulation over South Asia. Observations used to compare with model results are global surface temperature dataset (HadCRUT3), precipitation from India Meteorological Department (IMD), Aphroditeprecipitation, ERA-40 re-analysis. The results are diverse. The observed positive precipitation trend during June over central India only appears in half of the models. The South Asian Summer Monsoon is sensitive to changes in physical parametrization. Local aerosol loadings (Sulphate, Black carbon, Organic carbon, Mineral dust, Sea salt) are compared with observations and satellite data (SeaWiFS). Single anthropogenic aerosol forcing runs available from some models are also used to explore the response of South Asian Summer Monsoon to aerosol forcing. Different aspects of response are explored. The response of surface temperature shows a consistent decrease in the second half of 20th century. However, the precipitation does not show such consistent responses. Further evaluations will focus tropospheric temperature gradient and monsoon circulation changes.