



Regional climate projections of trends and variability in the Indian summer monsoon

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The Indian summer monsoon (ISM) influences daily lives and economies in many countries in the South Asian region, and a wide range of indices have been defined to measure and predict the strength of the ISM. The most obvious impact is on rainfall in the monsoon season (June to September), which accounts for about 75% of the annual precipitation in India. Thus, the all-India monsoon rainfall (AIMR) index has been defined as the total rainfall amount from June to September averaged over whole India. Although the observed interannual standard deviation in the AIMR is only about 10% of the long-term mean, the extremes lead to floods and droughts. Other indices for the ISM are based on the vertical shear over certain pressure levels of zonal or meridional winds or on the use of outgoing longwave radiation as a measure of convection. Also, there is a well documented relationship between the nino3.4 index and the ISM. However, which index best estimates the ISM strength remains controversial.

This study gives an overview on projections of different ISM indices by the regional climate model COSMO-CLM for the time period 1960-2100. To generate a small ensemble of possible future developments, the scenarios A1B, B1, A2, and the commitment scenario have been used. Trends and temporal variabilities of the indices are investigated as well as the pairwise correlations between the indices over different time spans. Changes in the temporal distribution of precipitation are revealed by different indices like rain-day frequency, intensity, the maximum 5-day precipitation amount or the number of consecutive dry days.