

EGU21-4880

<https://doi.org/10.5194/egusphere-egu21-4880>

EGU General Assembly 2021

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Global Teleconnections to the Indian Summer Monsoon in CFSv2 model: Tropics vs. Midlatitude

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Traditionally, monsoon teleconnections are measured in terms of the strength of a simultaneous linear relationship. Such associative metrics do not quantify precipitation variations through physical parameters directly related to the moisture budget of the atmosphere. In this study, for the first time, we develop a linear model for the Indian summer monsoon rainfall (ISMR) based on surface pressure over regions surrounding it and sea surface temperature (SST) forcing from tropics and midlatitude. This surface pressure acts as a dynamical link between SST forcing and convective processes over the Indian region, which was missing in previous studies. We also use this novel approach to understand the ISMR prediction skill in the National Centers for Environmental Prediction (NCEP) Climate Forecast System version 2 (CFSv2). We find that the interannual variability of ISMR does not rely solely on tropical processes, but the midlatitude phenomenon also plays a crucial role in modulating it. The model, however, derived most of its variability from the ENSO mode. The understated midlatitude forcing in the model can be attributed to its low prediction skill.