

RESEARCH HIGHLIGHTS

ROLE OF LAND-SURFACE VEGETATION IN THE MARCH OF INDIAN MONSOON ONSET ISOCHRONES IN A COUPLED MODEL

During boreal summer, the dominant direction of moisture transport over the South Asian region is eastward because winds blow from the west during the monsoon. The total column precipitable water vapor is higher over the Bay of Bengal than in the Arabian Sea because the former is warmer than the latter. This creates an east-to-west gradient in moisture that is against the direction of the mean low-level winds. In this paper, authors have shown that in observations, the intraseasonal component of the winds drives moisture westward from the Bay of Bengal to northwest India. In particular, the high frequency intraseasonal oscillation with a period less than 20 days is instrumental in such westward moisture transport. The Climate Forecast System version 2 (CFSv2) model was unable to adequately represent this westward

moisture transport at the intraseasonal timescale. When the authors replaced the existing vegetation cover in the model with that derived from recent satellite observations, this westward moisture transport increased, especially during the onset and withdrawal phases of the monsoon. As a result, the orientation of onset isochrones and seasonal mean monsoon rainfall simulation over northwest India improved in the CFSv2 model, which otherwise suffers a severe dry bias.

Reference:

Arindam Chakraborty, Jerry B. Samuel, Anagha Paleri, Role of land-surface vegetation in the march of Indian monsoon onset isochrones in a coupled model, Quarterly Journal of Royal Meteorological Society, 149, 115-132, 2023

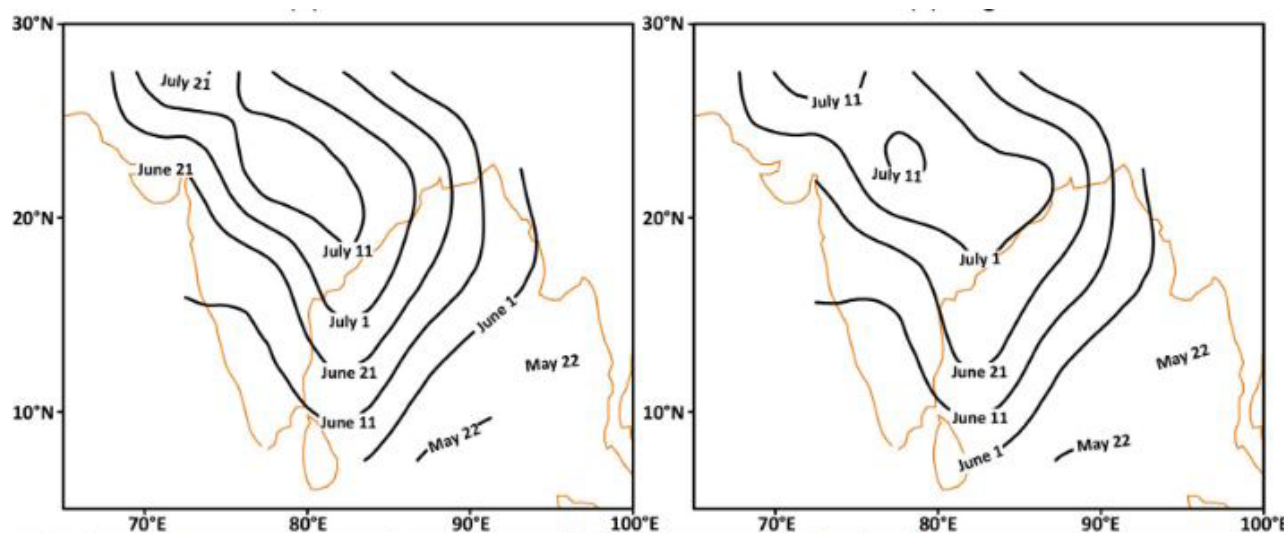


Figure: Onset dates of the monsoon in India in the CFSv2 climate model with the old (left) and new vegetation model (right)