

Potential Bio-physical feedback vis-à-vis El Nino with regard to Indian summer monsoon: A GCM perspective

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An assortment of predominant physiographic features: the North-West Desert (NWD) of arid and semiarid nature in northwest India, snow covered Himalayas in the north and evergreen tropical forests of Karnataka and Kerala in south India nestle in Indian monsoon region. In an attempt to understand the potential biophysical feedback of a forest, two seasonal simulations, control and sensitivity, of atmospheric circulations of June, July and August 1987 had been made with LMD Atmospheric General Circulation Model using Matthew's global vegetation climatology. Some potential physical processes typical of Amazonian forest were triggered off on NWD during sensitivity GCM run. The initial and boundary conditions of the atmosphere as on June 1, 1987 12 GMT, prepared from ECMWF and NCEP/NCAR observed analyses were used. For seasonal forcing, mean monthly sea surface temperatures were prescribed. The resultant mean monthly fields of velocity potential and wind vector at 200 mb and 850 mb and precipitation have been analysed for their sensitivity anomalies from control. Consequently, so pronounced an impact of biophysically enriched NWD region is observed that it brings about an almost doubling of precipitation throughout Indian summer monsoon season over NWD region and its vicinity. Besides the emergence of forest as a rain inducing agent, it also shows a case of counteractive behavior of the biophysical feedback mechanism as opposed to that of 1987 El Niño with regard to Indian summer monsoon.

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