Model Evaluation on Precipitation over NE and a Comparative Assessment between Varsha, MM5 and WRF

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The paper presents a comparative assessment on the reliability of precipitation-prediction over NE a sub-Himalayan region of India. The models that are utilized for precipitation evaluation are MM5, WRF and Varsha. The analysis covers all seasons with special emphasis to pre and post monsoons. The results indicate a tendency of Varsha to generally overestimate precipitation over NE but the model prediction correctly follows the precipitation pattern observed by TRMM. Further, Varsha could well predict the wind and precipitation features during severe storm development processes; this is presented through model output for a few strong cyclonic situations (Alia, Bijii, Phyan, Nargis, Rasmi) formed over Bay of Bengal. The storm-eye that moves from Bay of Bengal via Bangladesh has an effect on rain formation at the southern bank of Brahmaputra (with significant component of South -West wind) but has little contribution to the extreme North Easter districts of Assam and state like Arunachal Pradesh where precipitation in general, is associated with North- East wind except during monsoon. This result also corroborates to our observation when we examine association of wind (all components) and sea surface temperature with triggering of precipitation over NE. This exercise is done with precipitation data for the last two years, covering seven states of NE with 21 districts of Assam, 6 districts of Arunachal Pradesh , 2 districts of Meghalaya and 1 district each from Manipur, Mizoram, Nagaland and Tripura.

In general mm5 model seems to have better predictability over NE, in state representations because of grid sizes. However more cases are being analyzed.

The paper also attempts to identify situations leading to drought like situations of 2006 and 2009, by analyzing wind speed, direction and sea surface temperature covering Far -East pacific region to Arabian sea. For this purpose data from TRMM, Modis and IMD are utilized. The difference in sea surface temperature between Esat Pacific and Arabian Sea is found to have a strong role in development or inhibition of monsoon rain where as the pre monsoon rain is less influenced by such changes. Limitations of model prediction to such cases are highlighted.

Keywords: Varsha; MM5; WRF; precipitation- prediction; cyclonic situation