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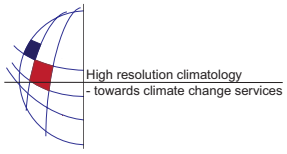

Impact of assimilation of meso-scale tower data on simulations of weather over the Himalayan region.

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Abstract: A continuing difficulty in improving numerical forecast at smaller spatial scales relates to the fact that input observational information is limited and inaccurate, especially in data sparse areas like oceans, deserts and regions of complex topography. The accuracy of analysis from numerical models over mountainous region is further degraded by relatively more error over high altitude in case of satellite observations. Use of surface observations, preferably from a meso-scale network is expected significantly improve simulations over region of complex topography. The Council of Scientific and Industrial Research (CSIR) has established a series of meteorological towers over the mountainous terrain over the Himalayan region which provides meteorological observations at 3 levels every half hour on a regular basis. In this study we have made use of these observations for studying the impact of assimilation of local data on short-range forecasts. We have used the Advanced Weather Research and Forecasting (WRF) model with the three dimensional variational (3D-Var) assimilation scheme. The National Center for Environmental Prediction (NCEP) analysis is used for providing model initial and boundary condition. Assimilation experiments were conducted for selected rainy and non-rainy events for different months. A comparative analysis of control simulations (no assimilation) and assimilation experiments (with assimilation of tower observation) shows significant improvement in model predicted fields especially in wind speed and rainfall.