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Geoscientific Model Development Discussions

Interactive comment on "Simulations over South Asia using the Weather Research and Forecasting model with Chemistry (WRF-Chem): set-up and meteorological evaluation" *by* R. Kumar et al.

R. Kumar et al.

manish@aries.res.in

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Reply to Comments of Reviewer #2

We are thankful to the reviewer for his careful and thorough evaluation of the manuscript and the recommendation for publication. Below, we give a detailed response to each of the comments raised by the reviewer. Reviewer's comments are in regular font and replies are in bold font characters.

Comment

1. Most of regional CTM papers have mainly concerned with the validation of the

model by comparing calculated mixing ratios of chemical species (e.g. O3 and its precursors) with observational data, and the validation of meteorological components has not been fully done with much efforts. However, particularly the application of CTM in tropical/sub-tropical regions, meteorological elements (precipitation, water-vapor, convection etc.) would affect mix ratios and deposition fluxes of chemical species more sensitively than in the mid-/high latitude regions yet, this paper is a pioneering one showing meteorological characteristics of WRF and validating it with observation utilizing satellite data in South Asia.

Reply

We thank the reviewer for his/her encouraging words.

Comment

2. Difference of modeled precipitation between this study and Rakesh's, both using WRF, is interesting and worthwhile to discuss more in detail on the causes.

Reply

Most of the results presented in this study are qualitatively similar to those of Rakesh et al. (2009). Both the studies show maximum simulated precipitation along the west coast of India and in the northeast Bay of Bengal, and minimum precipitation over semi-arid regions of northwest India. Both the studies overestimate precipitation over most parts of the model domain. The only difference is that Rakesh et al. (2009) underestimate precipitation over the Indo-Gangetic Plain and Himalayan foothills while this study shows both an over- and under-estimation over these regions. These differences could be due to differences in model resolution, cloud microphysics and/or boundary layer parametrizations employed by two studies. The objective of the present manuscript is focused on comparison with the observations. While it is important to explore differences between model runs, we think that it could be a separate study.

Comment

3. Fig. 12 is not clear in several aspects. Dotted lines representing individual sites may not be necessary since they are not discernible and not discussed in the next. More scale reading between 100 and 1000 hPa are necessary. As for the dots in the figure, “Low Altitude”/”Moderate Altitude” is one category and “Coastal Sites”/”Inland Sites” are another. One site is classified for example, to both “Low Altitude” and “Coastal Sites”? But it does not seem to be the case since for example, in the r2 plot for temperature.

Reply

The individual profiles of statistical parameters were shown to provide the user with an idea of their exact ranges, but following the reviewer’s suggestion and to make the figure easier to understand we removed these lines. We further added more labels between 100 and 1000 hPa. We would like to confirm that none of site has been classified in more than one category.

Interactive comment on Geosci. Model Dev. Discuss., 4, 3067, 2011.