

Interactive comment on “Air quality in the Kathmandu Valley: WRF and WRF-Chem simulations of meteorology and black carbon concentrations” by Andrea Mues et al.

Anonymous Referee #1

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Mues et al. present evaluation of meteorological variables, and black carbon (BC) simulated by WRF-Chem model in the Kathmandu. Since the region is experiencing strong anthropogenic emissions, and that the surrounding topography is also highly complex, evaluation of model performance is valuable.

The paper is recommended for publication in GMD, however several comments and suggestions as listed below should be considered during the revision.

Title: Air quality is used in more general context, and it is expected to have study of more pollutants, while here focus is only BC. Possibly it would be better to revise the paper title as e.g. WRF-Chem simulations of meteorology and black carbon concen-

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trations in Kathmandu valley

Page 3, l.29: what is the motivation behind preventing sea salt emissions from the small inland lakes? What is the effect on results presented, if this change is not made in the model?

Page 6, l.16 and section 3.1.1: How does model winds compare with the reanalysis near surface (e.g. 800 hPa) as compared to those currently presented (500 hPa)

Page 7, l.24-28: this should be part of data description (2.3.4), and not the evaluation metrics.

section 3.1.2. The text is too general. Please discuss by using average values and standard deviations at few representative pressure levels.

3.1.5. and Fig. 9: if there are sufficient observational data to show the comparison separately for winter (Jan-Feb) and pre-monsoon (March-June), that would be more informative. Singh et al. (Atmos. Chem. Phys., 2016) using this model found overestimation of boundary layer especially towards the pre-monsoon in northern India/Himalayas. It should be mentioned if it is similar / or different at Kathmandu.

3.2.2 It would be possibly useful to discuss the uncertainties among different available emission inventories of BC in this region, and that whether the modified emission flux (based on observations) is within these uncertainties or not. Sharma et al. (Atmos. Chem. Phys. Discuss., 2017, in this special issue) showed large differences among different recent inventories of pollutants over South Asian regions.

Are there BC observations at other stations too in Kathmandu to evaluate further the simulation using observation-based emission flux?

Page 17, l.35, page 18: 1-2: Could authors show a comparison of model and observational BC concentrations separately for day and night, to indicate which sources could particularly be underestimated.

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