

Interactive comment on “Atmospheric black carbon and warming effects influenced by the source and absorption enhancement in Central Europe” by S. Nordmann et al.

Anonymous Referee #2

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General Comments

I have read the manuscript titled “Atmospheric black carbon and warming effects influenced by the source and absorption enhancement in Central Europe”. This work evaluated BC source and light absorption by using the regional model WRF-Chem and field measurements over Central Europe. It finds that the simulated PM10 mass concentration, aerosol number concentration and optical depth have a good agreement with the observations, while the simulated BC mass concentration are lower than observations. In general, this manuscript is well written and the underlying work will be a useful contribution to the literature.

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Specific Comments

1. I think it is better to use EC, BC and soot carbon consistently
2. Model runs R1, R3 and R4 come all of a sudden on page 14647. It is better to first introduce Table 2 and provide some descriptions of these model runs.
3. Lines 9-12, page 14649, suggest the authors explain why PM10 is overestimated in the western part and underestimated in the eastern part, and why this is especially true for the continental time period.
4. Section 3.1.3, I feel some information is missing in the discussion. It is interesting to find negative bias in this work but positive bias in other studies (Schaap et al., 2008; Remer et al., 2005) over most regions in central Germany. It will be great if the authors can provide more details about this difference. Besides, authors are better to explain the causes for high overestimates of AOD in the south-western and north-eastern parts (right panel in Fig. 6).
5. Section 3.1.5, three additional model runs were performed with different emission magnitudes to verify the assumption of underestimated emissions. The emissions in these model runs are adjusted by scaling, which may miss important information in emission estimates. I am wondering whether it is possible for the authors to run the simulations with emissions widely used by global models, such as Lamarque et al. (2010). This issue is also raised by the other reviewer.

Editorial Comments

1. Ageing vs. aging, be consistent
2. Line 16, page 14639, missing references in “(?)”
3. Figure1, it seems that there should be some texts in the rectangle next to each dot.
4. Table 3 and 4, exchange the order since table 4 was discussed first

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