



## ***Interactive comment on “Towards an online-coupled chemistry-climate model: evaluation of COSMO-ART” by C. Knote et al.***

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This is a follow-up on our responses to reviewer #1, where we left open an answer to “R1.14) Page 1823, section 3.2.1: Are there any black carbon measurements that can be used to evaluate the model? For direct radiative forcing relevant for climate applications, this is a critical component. Even a small amount can have a profound effect on the relative contribution of scattering and absorption in the atmosphere.”

I have reviewed possible sources of information about black carbon measurements in Europe during our simulation periods and tried to devise a reasonable method to create a homogenized dataset which could be used in a comparison. Three sources were considered: data measured during the AMS campaigns, data from the EMEP

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network and data from the EBAS website (<http://ebas.nilu.org>). There is some data from the measurement campaigns and also from EMEP/EBAS giving black carbon or elemental carbon measurements. It was found however to become a major undertaking to compare these measurements to our modelled “soot” concentrations, and even the possibility to compare different stations seems very limited: different optical (multi-angle absorption photometer MAAP, particulate soot absorption photometer PSAP) and thermo-optical systems (EC/OC monitor) are used, with different measurement protocols, which all introduces a considerable source of error (Andreae and Gelencsér, 2006). Accounting for all these effects would be a major undertaking which would be out of scope for our publication. We do agree however with the reviewer that this has to be considered once such a dataset is available. Hence we have added two sentences to the text. One in the description of the measurement data (page 1818, line 21):

“[...] EMEP intensive campaign in June 2006. No evaluation of elemental carbon has been made, as the different measurement techniques used make even inter-station comparison difficult (Andreae and Gelencsér, 2006), and devising a homogenized dataset was out of scope for this work. Homogenized [...]”

And one in the conclusions, the sentence at page 1843 line 22-23 has been extended and now reads

“The lack of a coordinated, european-wide measurement network for NH<sub>3</sub> and NMVOC impairs our ability to wholly evaluate gas-phase chemistry, and a missing homogenized elemental carbon dataset hinders evaluation of this aerosol component.”

### References

Andreae, M. O. and Gelencsér, A.: Black carbon or brown carbon? The nature of light-absorbing carbonaceous aerosols, *Atmos. Chem. Phys.*, 6, 3131-3148, doi:10.5194/acp-6-3131-2006, 2006.