

Interactive comment on “Speciation of anthropogenic emissions of non-methane volatile organic compounds: a global gridded data set for 1970–2012” by Ganlin Huang et al.

Ganlin Huang et al.

xgh@ier.uni-stuttgart.de

Received and published: 21 April 2017

Comments from W. Wei (Referee) : It is a nice effort to improve the global NMVOC emission database in time, in sector, and in speciation resolution. The data extended by the authors will greatly help the application of VOC emission inventory in the chemical transport simulation of various air quality models. However, the method of the revision of EDGAR NMVOC emission is obscure. The emission factors from EMEP/EEA guidebook were mainly from European references, but their application in developing countries has certain uncertainty. It needs to be further analyzed and evaluated. Moreover, the average abatement efficiencies of the abatement measures for various sectors in various countries should be more introduced in the manuscript. These issues

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had better be properly handled by the authors before publication of this paper.

Response: The authors are grateful to the Referee Wei for the comments received. We tried to improve the paper as requested with more information on the EDGAR methodology in Section S4 of the supplementary material, as reported below:

Total NMVOC emissions from a given sector i in a country C accumulated during a year t are estimated with the following formula (Fig. 1) in the EDGAR database:

EDGAR emission estimates are based on country-specific activity data (AD) for each anthropogenic emission sector i , on which a mix of j technologies (TECH) and a mix of k end-of-pipe measures (EOP) are installed; uncontrolled emission factors (EF) for each sector i and technology j with relative reduction (RED) by abatement measure k are also used in the calculation. The technology mix, (uncontrolled) emission factors and end-of-pipe measures are defined at country-specific, regional, country group (e.g. Annex I/ Non-Annex I), or global level. In particular, NMVOC emission factors are consistent with the EMEP/EEA 2013 Guidebook (EEA, 2013) for Europe and scientific literature has been taken into account to introduce country- and region- specific information, while abatement measures are implemented mainly for the road transport sector (consistent with the Euro standards), for the production of chemicals (CH₂ formaldehyde (methanal), total polyethylene, CH₂ propylene glycol, total polystyrene), for power generation (auto produced electricity and public electricity production from natural gas) and for landfills. Further details on the EDGAR methodology can be found in Section S4 of the Supplementary material of Crippa et al. (2016).

References

Crippa, M., Janssens-Maenhout, G., Dentener, F., Guizzardi, D., Sindelarova, K., Muntean, M., Van Dingenen, R. and Granier, C.: Forty years of improvements in European air quality: regional policy-industry interactions with global impacts, *Atmos. Chem. Phys.*, 16(6), 3825–3841, doi:10.5194/acp-16-3825-2016, 2016.

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$$EM_i(C,t) = \sum_{j,k} \left[AD_i(C,t) * TECH_{i,j}(C,t) * EOP_{i,j,k}(C,t) * EF_{i,j}(C,t) * (1 - RED_{i,j,k}(C,t)) \right]$$

Fig. 1. Equation for NMVOC emissions accounting

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