

# ***Interactive comment on “Identifying forecast uncertainties for biogenic gases in the Po valley related to model configuration in EURAD-IM during PEGASOS 2012” by Annika Vogel and Hendrik Elbern***

## **Anonymous Referee #2**

Received and published: 21 December 2020

This paper presents the uncertainties associated with the simulation of some of the biogenic gases depending on the meteorological model settings and land-use datasets. The presented simulation scenarios are focused on the PEGASOS field campaign conducted over the Po valley during summer 2012. Three flight cases are selected for the numerical experiments.

There are large uncertainties in simulating the fluxes of the biogenic volatile organic compounds and their mixing ratios in the air quality models. It's worth studying these uncertainties. However, my primary concern here is that the authors run the WRF

Printer-friendly version

Discussion paper



model with different input data and physics schemes without verifying how suitable are the selected model settings for the given task. Here, the role of the WRF model is to provide the meteorological drivers to the EURAD-IM offline chemistry transport model. The authors don't provide any verification of the model simulations using the surface or aircraft observations. It's likely that some of the presented model scenarios aren't able to accurately simulate the meteorology in the Po valley for the selected days. Also, accurate simulation of the soil moisture in WRF usually requires model spin-up over some time period, so using a "good" land-surface scheme isn't sufficient. Thus, using inaccurate or unverified meteorological simulations to drive the offline EURAD-IM chemistry model doesn't make sense.

One of the selected sensitivity simulations is done using the MODIS versus USGS land-use dataset. It's expected that the differences in the vegetation map for the Po valley will lead to large differences in the fluxes of the biogenic VOCs. However, the MODIS data is more up-to-date than the USGS land-use data. Therefore, it isn't clear what we learn by testing both meteorological and air quality models using the old (probably not accurate) land-use data (USGS) as input.

The analysis of the effects of source regions (section 4.3.2) is interesting, but again without the verification of the wind speed/direction and other meteorological variables, it's impossible to determine which model simulations or scenarios are realistic here.

It's possible that some of the WRF model scenarios are somewhat similar in terms of their forecast skill, but at least basic model verification is required to select such model configurations to conduct reasonable meteorological simulations to be used as input in the chemistry transport model.

The simulation of other terpenes (e.g. alpha-pinene) isn't presented here. Instead, the authors present the simulation of the aldehydes, which are also produced by the gas chemistry in the EURAD-IM model. This aspect requires additional analysis. Again, it's hard to make any conclusions with respect to the accuracy of the gas chemistry simu-

[Printer-friendly version](#)[Discussion paper](#)

lations as none of the simulated chemical species are compared against the aircraft or other measurements. The discussion of the dry deposition is interesting, however, the role of more important processes such as photochemistry is necessary to consider.

Based on the aforementioned shortcomings of the study, I urge the authors to redo the numerical experiments, conduct extensive model verifications, and submit a substantially revised version of the paper in the future.

---

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-608>, 2020.

Printer-friendly version

Discussion paper

