Geosci. Model Dev. Discuss.,
doi:10.5194/gmd-2016-315-RC2, 2017

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "The operational eEMEP model for volcanic SO_2 and ash forecasting" *by* Birthe Marie Steensen et al.

Anonymous Referee #2

Received and published: 27 March 2017

General comments

This manuscript describes the eEMEP model, a version of the EMEP MSC-W CTP, dedicated to emergencies. eEMEP aims at providing rapidly the evolution of a volcanic plume, which can be gaseous (SO2) or particulate (ashes). After a presentation of the operational configuration, The work is divided in two parts. The first one focuses on finding 1) the better way to use ensembles of weather forecasts and 2) a compromise between numerical efficiency and information added by a higher resolution, through the simulation of SO2. The second part focuses on the representation of volcanic ash and in particular on the evaluation of the importance of gravitational sedimentation, and concludes that the sedimentation is finally not so important. In general, this manuscript is very interesting, clear and informative. To me, it can be published as long as the authors address the following questions/remarks.

Printer-friendly version

Discussion paper

Specific comments

Section 2.2

(eEMEP is run with 40 or 42 levels. Please precise the corresponding top altitude (even if it is specified in section 4).

Section 3.1

- Is the eruption column between 1500m and 3000m uniform or is there a specific shape ? Does it correspond to what would be done in real time (during an emergency) or is it meant to be as near to the reality as possible ?

- Please define the SO2 'free state' used as initial.

- The sentence about the simple reduction of the meteorological input data is not clear for me. How is the 'representative point (every fourth one) chosen ?

Section 3.2

- Figure 3 is interesting, but it would be very helpfull for the reader to have another one showing the different trajectories according to the different members of the ensembles.

- The authors mention that they believe that a part of the observed SO2 plume is not seen by the model because the emission is older than the beginnning of the run. Maybe. But it would be very easy to prove it by a run beginning 24 hours earlier.

- I fully agree with the conclusions on the compromise to find, to launch ensembles only when the weather is unstable etc. But I think this conclusion is too general. All this work (which is huge!) considers only one meterological situation, one eruption. Maybe the 20x20km is the optimal choice here, but one can not be sure that it will be true under other conditions.

Section 4.1

- please precise how the ash is distributed over the nine bins, to help the reader under-

Printer-friendly version

Discussion paper

standing how the sedimentation will impact fields.

Section 4.3

- In this section, I feel that the authors are more confident in their model than in the observations ! (p 12 line 13 and line 26). I understand they can have some doubts, but I think they should 1) reformulate and 2) ask the people in charge of the observations their expert opinion on the eventual uncertainty of these observations. - It would help to have a (global) idea of the computed gravitational velocity according to the bins. Moreover, the whole study is focused on the position of the ash layer. But does sedimentation impact on the quantity of ash ?

Typo p5, line 23 : Apart form → Apart from

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-315, 2017.

Printer-friendly version

Discussion paper