

Home

Online Library ACP

- ▣ Recent Final Revised Papers
- ▣ [Volumes and Issues](#)
- ▣ Special Issues
- ▣ Library Search
- ▣ Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact  
Factor  
4.865

ISI  
indexed



▣ [Volumes and Issues](#) ▣ [Contents of Issue 2](#)

Atmos. Chem. Phys., 8, 141-158, 2008

[www.atmos-chem-phys.net/8/141/2008/](http://www.atmos-chem-phys.net/8/141/2008/)

© Author(s) 2008. This work is licensed under a Creative Commons License.

## Modeling the impact of sub-grid scale emission variability on upper-air concentration

S. Galmarini<sup>1</sup>, J.-F. Vinuesa<sup>1</sup>, and A. Martilli<sup>2</sup>

<sup>1</sup>European Commission – DG Joint Research Centre, Institute for Environment and Sustainability, 21020 Ispra, Italy

<sup>2</sup>CIEMAT, Madrid, Spain

**Abstract.** The long standing issue of sub-grid emission heterogeneity and its influence to upper air concentration is addressed here and a subgrid model proposed. The founding concept of the approach is the assumption that average emission act as source terms of average concentration, emission fluctuations are source for the concentration variance. The model is based on the derivation of the sub-grid contribution of emission and the use of the concentration variance equation to transport it in the atmospheric boundary layer. The model has been implemented in an existing mesoscale model and the results compared with Large-Eddy Simulation data for ad-hoc simulation devised to test specifically the parametrization. The results show an excellent agreement of the models. For the first time a time evolving error bar reproducing the sub-grid scale heterogeneity of the emissions and the way in which it affects the concentration has been shown. The concentration variance is presented as an extra attribute to better define the mean concentrations in a Reynolds-average model. The model has applications from meso to global scale and that go beyond air quality.

▣ [Final Revised Paper](#) (PDF, 875 KB)    [Discussion Paper](#) (ACPD)    ▣ [Corrigendum](#)

Citation: Galmarini, S., Vinuesa, J.-F., and Martilli, A.: Modeling the impact of sub-grid scale emission variability on upper-air concentration, Atmos. Chem. Phys., 8, 141-158, 2008.    ▣ [Bibtex](#)    ▣ [EndNote](#)    [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- ▣ [Sister Journals AMT & GMD](#)
- ▣ [Financial Support for Authors](#)
- ▣ [Journal Impact Factor](#)
- ▣ [Public Relations & Background Information](#)

Recent Papers

01 | ACPD, 03 Nov 2008:  
Evidence of mineral dust altering cloud microphysics and precipitation

02 | ACPD, 03 Nov 2008:  
Technical Note: A new method for the Lagrangian tracking of pollution plumes from source to receptor using gridded model output

03 | ACPD, 03 Nov 2008:  
Characterisation of episodic aerosol types over the Australian continent

04 | ACPD, 03 Nov 2008: