EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00111, 2007
7th EMS Annual Meeting / 8th ECAM

On the use of long-term simulations with mesoscale meteorological model for environmental impact assessment studies

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Numerical simulation with atmospheric dispersion models is an approved and commonly used procedure when trying to assess the impact on air quality of an activity involving the emission of air pollutants.

The rise in the sophistication of the models and the physical phenomena they describe has resulted in an increase of the demands on the input data requirements for their execution. This kind of information is not always regularly gathered by the standard meteorological stations historically installed, a fact which sometimes can jeopardize the correct use of the model, since the user often has to make coarse estimations of certain parameters to be able to enter all the data the model needs to run.

Today's increase in computer's capabilities and speed makes possible the use of output from long term simulations with three-dimensional mesoscale models as input for atmospheric dispersion models to be used in environmental impact studies. By doing so, difficulties to gather surface and upper-air meteorological information to run the model are overcome. In addition, the use of mesoscale meteorological data often includes a more accurate characterization of the atmospheric regional circulatory patterns in the study area, specially in regions of complex terrain. In these cases, representativeness of surface stations is spatially reduced, since meteorology can change significantly in locations separated by little distance, making risky the extrapolation of data from the nearest meteorological station to the study region.

This contribution proposes a new methodology to be used when doing environmental

impact studies of air pollution emissions, and shows some examples of cases where it has been successful applied. Special attention will be put in showing the ability of the system to study and reproduce episodes taking place under situations where mesoscale forcing dominates dispersion.