RTMOD: a web based system for long-range atmospheric dispersion model inter-comparison and Nuclear Emergency Preparedness

S. Galmarini[1], R. Bianconi[2], G. Graziani[1] and W. Klug[3]

[1]Environment Institute, Joint Research Center Ispra, Italy; e-mail: stefano.galmarini@jrc.it
[2]Enviroware s.r.l., Agrate Brianza, Italy
[3]Mittermayerweg 2, Darmstadt, Germany

RTMOD is www-based system sponsored by the European Commission aimed at performing regular tests for the evaluation and improvement of long range transport and dispersion models operational in Emergency response agencies in the European Union and worldwide. Several (22) institutes around the world, officially in-charge of performing atmospheric dispersion forecast in case of accidental releases of harmful materials, are requested to perform regular real-time simulations of fictitious releases and to submit the results for evaluation to JRC-Ispra. The web-based character of the RTMOD system allows the real-time collection of the model results and the real-time inter-comparisons. In the first year of the RTMOD activity several 'dry-runs' have been performed on different atmospheric conditions. The fully automated and general character of the system has no limitations on the frequency of the dry-runs to be performed as well on the region of applicability.

Other than being an optimal system for model evaluation, RTMOD can also be seen as an extremely useful tool in case of an emergency. Under this condition in fact, most of the support to decision makers relies on the results of one or few models. As shown in the recent past, long range transport models can not be considered to be totally reliable due to the different approaches adopted in atmospheric dispersion modeling, the lack of knowledge on how to model some fundamental atmospheric processes and the intrinsic uncertainty present in meteorological input data. Relying on a single or few model results can easily lead the decision-maker to the wrong conclusions. Given the fact that no better tools than atmospheric models is presently available in the management of a nuclear emergency, a key point is therefore how to minimize of the risk of taking the wrong decision. The simultaneous analysis of a number of model results can be of help in this respect. Using RTMOD in case of an emergency a decision maker can analyze the results of an ensemble of models, thus judging the degree of agreement or disagreement of the models, estimate the reliability of the results a thus take a more appropriate and supported counter-action. This is particularly the case if appropriate statistical parameters are used to present the result to the decision maker that summarize the results of the ensemble of models into few quantitative indicators. In this respect a new project is now taking place in which such parameters will be devised for the purpose of harmonizing and reconciling diverse forecast originating from different models.

The paper will present the RTMOD system, its applications as model evaluation tools and the way in which it can be used as support to decision making and the possibility to couple it with the exiting systems for the exchange of information relating to real time radioactivity measurements.