



## **Multi model ensemble forecasting for emergency support: latest progress in the ENSEMBLE experience**

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The treatment of several predictions resulting from different models (multi-model ensemble) has proved to be a very effective way to overcome the present deficiencies of atmospheric dispersion models. Several are the examples that show how statistically treated model results produced by a large number of models tend to outperform the individual “deterministic” results and in some case also the best results of the group. Since the year 2000 the ENSEMBLE activity has been active in transforming this concepts into an operational practice and in studying the best way to combine the predictions toward a more confident (less uncertain) and robust results to be used for decision support. The concept of *median model* was introduced and proven to be extremely effective in capturing the best performance of the individual ensemble components. The ENSEMBLE activities orbit around the ENSEMBLE system for the real-time web based exchange of model predictions among a number of European and non-European countries. The system, the first of this kind in the field, allows a community of approximately 30 modeling groups to exchange prediction in real time that are produced with a common format and according to the same release specifications and that can therefore be compared in real time and treated in the ensemble sense. The system can be used for any kind of emergency that features releases to the atmosphere and transport to the medium to long range. In the recent years important developments have been introduced as far as coupling the ENSEMBLE with existing system are concerned. Among these EURDEP and ECURIE. The first is the European platform for the real-time exchange of monitoring data; the second the European nuclear emergency notification system. At present both systems can be consulted through EN-

SEMBLE and the information therein is readily made available to the modeling community. Lately, interesting advancements have been made in the field of the statistical treatment of the model output in the ensemble sense. Bayesian model averaging has been recognized as a suitable framework for the explanation of the past results and the extension of the latter. The paper will introduce the ENSEMBLE activity and will present the latest technological developments in the fields of real-time model prediction data exchange and treatment and latest developments in the field of multi-model results treatment and indicator development.