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High-resolution Air Quality Modelling for the Netherlands

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A high-resolution, numerical air pollution modelling system is presented along with a range of applications satisfying various user needs. The chemistry-transport model used for this purpose is the Chimère model. The meteorological forcing is supplied by the WRF (Weather Research and Forecasting) numerical weather prediction model. In order to enhance the model performance, a new emission database is being created for an area covering The Netherlands and surroundings. This database will replace the currently available coarse (50 km resolution) EMEP (Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe) database. The new database will include detailed road, industrial, and household emissions. Details of the database are presented, along with model validation methods and results.

The high-resolution modelling system combined with the detailed emission database and satellite data enables the development of a wide range of applications. Air quality forecasts are produced twice per day on regional and local scales with resolutions from 16 km down to 1 km. In the framework of the ESA PROMOTE (Protocol Monitoring for the GMES Service Element) project, the high-resoltuion forecasts are delivered daily to the province of Zeeland in the Netherlands. The model system can be used to aid decision makers with legislation processes and the evaluation of emission control scenarios. Monitoring activities are also performed, including monitoring aerosol emissions related to the shipping industry. Another category of applications combines the advantages of the high resolution ($<$1 km) and timely availability of forecasts with a GIS-based user interface to aid rescue teams with hazard mitigation.