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Recent progress from "Global Earth-system Monitoring using Satellite and in-situ data" (GEMS) project

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The objective of the 6th Framework European Integrated Project GEMS is to create a real-time operational assimilation and forecast capability for atmospheric composition. GEMS began about two years ago, and this paper will present the recent progress of the project.

The new GEMS system will be used to monitor the composition, dynamics and thermodynamics of the atmosphere and produce medium-range and short-range air-chemistry forecasts. Aerosols, greenhouse gases, and chemical species have been implemented as model and assimilation variables within the global numerical weather analysis and forecasting system (known as the Integrated Forecast System - IFS) of the European Centre for Medium-Range Weather Forecasts (ECMWF). Satellite data are a major source of information, and ground-based observations are used for validation and evaluation, and later for assimilation. The global analysis and forecasts of atmospheric dynamics and composition provides information on long-range transport of air pollutants including source-receptor relationships. An ensemble of regional European air quality models have set up their interfaces to the IFS system, and intensive model inter-comparisons are being performed. Improved ensemble forecasts for European air quality will be delivered from these models.

The main beneficiaries of GEMS will be high-level policy users, operational regional air-quality and environmental forecasters, users of GMES (Global Monitoring of Environment and Security), and the scientific community.