



The scientific and computational challenges of the global elements of the GEMS project

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The EU-funded GEMS project (GEMS: Global Earth-system Monitoring using Satellite and in-situ data) was initiated in the first half of 2005 with the aim of implementing by mid-2009 a new European operational system for real-time operational monitoring and forecasting of atmospheric composition, dynamics and thermodynamics on global and regional scales; the new system will be designed to make extensive use of both satellite and in-situ data. The GEMS consortium comprises about fourteen leading research labs with capabilities & models on all aspects of atmospheric chemistry, nine regional centres with operational responsibilities for regional air-quality forecasting, three national environment agencies and ECMWF, the latter with global assimilation and modelling capabilities. The GEMS integrated global forecast / assimilation capability is being built in a modular fashion with distinct modelling and assimilation elements for greenhouse gases, reactive gases and aerosols. Each of these modules poses a specific set of scientific and computational challenges in modelling and assimilation. The presentation will outline the challenges, and describe the approaches being used to address them.