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Building an integrated forecasting system for global reactive gases in the troposphere and stratosphere - The GEMS GRG project

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The Integrated project GlobalĚ (GEMS) consists of four topical sub projects dealing with global simulations of greenhouse gases, reactive gases and aerosols, respectively, and with regional air quality. Within the sub project on global reactive gases (GRG) we developed an ensemble strategy to couple three state-of-the-art chemistry transport models (CTMs) to the integrated forecasting system at the ECMWF. Satellite observations of chemical constituents (mostly column integrals) are assimilated and advected in the IFS and these fields are passed to the CTMs, which in turn provide the IFS with forecasts of the chemical formation and loss rates of several key species. At this stage the system has been technically developed and is now tested for selected episodes in the year 2003. These episodes are also being analyzed in parallel studies with uncoupled CTM simulations making use of a wide variety of in-situ observations of the atmospheric chemical composition. These studies serve as preparation for the development of an operational validation procedure which will be implemented towards the end of the project. In the near future we will begin to produce the first reanalysis data sets with the coupled model system and we will have to evaluate the coupling strategy and the use of the assimilated observations afterwards. This presentation will provide an overview about the sub project status, summarize recent results from various activities within GEMS GRG, and provide an outlook onto the implementation of an operational service after 2008.