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Coupling ECMWFs Integrated Forecast System to Chemical Transport Models by means of OASIS4

J. Flemming (1), C. Larsson (1), P. Moinat (2), A. Segers (3), O. Stein (4), A. Dethof (1) and M. Schultz (5)

(1) ECMWF Reading, (2) Météo-France Toulouse, (3) KNMI De Bilt, (4) Max Planck Institute for Meteorology, Hamburg, (5) FZ Juelich

We present software aspects of a coupled modelling system combining ECMWFs integrated forecast system IFS with the Chemical Transport Models (CTMs) MOZART, TM5 and MOCAGE by means of the OASIS4 software. The coupled system has been developed in the framework of the GEMS subproject on Global Reactive Gases.

The purpose of the coupled system is (i) to provide meteorological data at high temporal resolution to CTM simulations and (ii) to enable the IFS 4DVAR data assimilation scheme to assimilate CO, NOX, O3, SO2 and CH2O satellite observations without the need to integrate the complex atmospheric chemistry and emission schemes in IFS.

The presentation will cover the following topics:

* Motivation to build a coupled system rather than to integrate atmospheric chemistry schemes in IFS

* Implementation of the coupled system in ECMWF forecast and data assimilation suites

* Efforts to optimise the performance by better load balancing and synchronisation of the exchange.

* Run time performance and memory consumption of the coupled system in comparison to stand alone model runs.

* Incorporation of the OASIS4 control structures in the ECMWF configuration software prepIFS.

A presentation of first scientific results of the coupled system has been submitted to session AS 3.10 Modelling, Data-Assimilation and Source-Sink Inversion for Operational Atmospheric Composition.