



C-IFS: Inline chemistry in ECMWF's integrated forecast system

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Chemical transport model and meteorological model have been combined in recent years to better simulate the many interactions between atmospheric composition and weather. We present a first version of ECMWF's integrated forecast system (IFS) where modules for chemistry, photolysis, deposition and emission of reactive gases are implemented, the C-IFS system. This new system aims to provide global forecasts of chemical composition of the atmosphere, making use of the IFS data assimilation system. The current version of C-IFS is based on modules from the chemistry transport model TM5 and includes simple parameterisations for dry deposition and other physical processes. The inline chemistry implementation implies that all meteorological data is directly available for the chemical module, on the IFS spatial and temporal resolution. Vice versa fields of reactive trace gases are directly available for other parameterizations in IFS, such as radiation. Also, the chemistry module benefits from the efficient computational environment in IFS. Experiments with the Rn222 tracer show that the non-conserving properties of the IFS transport scheme do not restrict the implementation of reactive tracers, as the errors are sufficiently small. We analyze also mass conservation for stratospheric ozone and other relevant tracers. We present a first evaluation of the C-IFS system as compared to the off-line TM5 version.