



A microphysical aerosol module in the ECMWF Integrated Forecasting System

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The Monitoring Atmospheric Composition and Climate II (MACC-II) project will provide a system for monitoring and predicting the characteristics of atmospheric constituents. Our contribution to this work is the incorporation and evaluation of the GLOMAP-mode microphysical aerosol scheme (Mann et al., 2010, GMD) within the ECMWF Integrated Forecasting System (IFS). The two-moment modal GLOMAP-mode scheme includes new particle formation, condensation, coagulation, cloud-processing, and wet and dry deposition. GLOMAP-mode is already incorporated as a module within the TOMCAT chemistry transport model and within the UK Met Office HadGEM3 general circulation model (where it is known as UKCA-mode).

The use of a microphysical, process-based model allows a more realistic representation of the properties of the multi-component aerosol and will enable aerosol-cloud interactions to be robustly simulated within the IFS system. Presented here is an evaluation of the performance of the IFS-GLOMAP system in comparison to mass, number and aerosol optical depth measurements, using different chemical drivers to the aerosol scheme. Ongoing work explores the complexity needed to describe the aerosol size distribution such that the important characteristics of the aerosol are represented. A key driver of this latter work is the need to reduce the number of tracers and hence compute time required so that the aerosol scheme can be run in an operational environment, without greatly affecting model skill.