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Evaluation of the GEMS aerosol model with aerosol data retrieved from SEVIRI onboard MSG-1 and Brewer spectrophotometers

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In the framework of the EU FP6 project GEMS (Global and regional Earth-System Monitoring using Satellite and in-situ data), real-time operational assimilation and forecasts of aerosols, greenhouse gases and reactive gases are being developed. The aerosol forecast model includes currently a 3-bin representation for both sea salt and desert dust aerosols, and organic and black carbon aerosols represented by the hydrophilic and hydrophobic components. Within the forecast model, these prognostic aerosols undergo the dynamic processes of advection, vertical diffusion, and convection, and also the usual aerosol physical processes (source, sedimentation, dry and wet deposition, plus hygroscopy for organic and black carbon aerosols). Emission data comprises anthropogenic emission inventories of aerosol and its precursors, assimilation of information on wild fires, wind-blown dust emission from desert areas, and wind-blown sea salt emissions. Comparisons of aerosol optical depth (AOD) data of the GEMS aerosol module with AOD data retrieved from both the SEVIRI instrument on MSG-1 satellite and from ground-based Brewer spectrophotometers will be presented. The SEVIRI aerosol product includes AOD at 0.63, 0.83, and 1.61 μm and is for the time being routinely only available over ocean. AOD over desert is currently developed. The spatial resolution is 9x9 km. A special cloud screening was applied which took into account information from SEVIRI on MSG-1. An algorithm to derive

AOD at 0.32 μm from direct sun observations with Brewer spectrophotometers has been developed at the RMIB and applied to raw (radiation) Brewer data from 16 stations including stations with maritime, dust, urban and background aerosol regimes. Brewer AOD data has been compared to AOD data from co-located sunphotometers of the Aeronet network to assure comparability in case the GEMS aerosol model has no AOD output in the UV-B. We will present comparisons between modelled and measured AOD for different time and spatial scales and for some desert dust case studies. We will also show first results and comparisons with SEVIRI AOD over desert. The comparisons are complemented with ground-based measurements from Aeronet stations.