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Validation of the dust cycle within the global model in the framwork of GEMS

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Mineral (or 'soil') dust aerosols are one of the largest contributors to aerosol radiative forcing and loading. Current global models reproduce in a coherent manner the dust emissions, its transport and deposition. However, none of the models can simulate correctly all of these components at the same time and in different source regions. Uncertainties arise, among others, from uncertainties in the emissions, physical and optical properties of dust particles and deposition. Within the framework of the GEMS project (Global Earth-system Monitoring using Space and in-situ data), the European Centre for Medium range Weather Forecast (ECMWF) has designed an operational system to deliver air-chemistry forecasts. The validation of the GEMS's global dust cycle will be presented. Results show that the model reproduces the annual cycle of total optical depth retrieved from AERONET in different stations around the globe. However, in station dominated by dust the model overestimates the angström exponent when comparing it with AERONET data. To further evaluate the model's performance to simulate the cycle we are currently evaluating the model's deposition fluxes with respect to measurements. In order to analyse the global cycle in a coherent manner we are starting comparisons with satellite data such as MODIS aerosol optical depth. We concentrate our evaluations in regions over Africa and Asia where most of the dust is emitted.