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Simulation of the mineral dust emission over Northern Africa and Middle East using an aerodynamic roughness length map derived from the ASCAT/PARASOL

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Aeolian aerodynamic roughness length in arid regions is a key parameter to predict the vulnerability of the surface to wind erosion, and, as a consequence, the related production of mineral aerosol (e.g. Laurent et al., 2008). Recently, satellite-derived roughness length at the global scale have emerged and provide the opportunity to use them in advanced emission schemes in global and regional models (i.e. Menut et al., 2013). A global map of the aeolian aerodynamic roughness length at high resolution (6 km) is derived, for arid and semi-arid regions merging PARASOL and ASCAT data to estimate aeolian roughness length. It shows very good consistency with the existing information on the properties of these surfaces. The dataset is available to the community, for use in atmospheric dust transport models.

The present contribution analyses the behaviour of the NMMB/BSC-Dust model (Pérez et al., 2011) when the ASCAT/PARASOL satellite-derived global roughness length (Prigent et al, 2012) and the State Soil Geographic database Food and Agriculture Organization of the United Nations (STATSGO-FAO) soil texture data set (based on wet techniques) is used. We explore the sensitivity of the drag partition scheme (a critical component of the dust emission scheme) and the dust vertical fluxes (intensity and spatial patterns) to the roughness length. An annual evaluation of NMMB/BSC-Dust (for the year 2011) over Northern Africa and the Middle East using observed aerosol optical depths (AODs) from Aerosol Robotic Network sites and aerosol satellite products (MODIS and MISR) will be discussed.

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