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Joint retrieval of aerosol load and surface reflectance using MSG/SEVIRI observations: towards the generation of demonstration datasets.

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The new Land Daily Aerosol Algorithm has been recently developed at EUMETSAT to derive the mean daily tropospheric aerosol load and surface reflectance from observations acquired by the SEVIRI radiometer on-board the Meteosat Second Generation satellites. Potential applications can be among others data assimilation in air quality forecasting models, climatological studies, or meteorology. Based on the Optimal Estimation method, this algorithm infers the aerosol optical depth from a forward radiative transfer model against daily accumulated observations in the 0.6, 0.8 and 1.6 SEVIRI bands. These daily time series provide the angular sampling used to discriminate the radiative effects that result from the surface anisotropy, from those caused by the aerosol scattering. The inverted forward model explicitly accounts for the surface anisotropy and the multiple scattering for the coupled surface-atmosphere system. The aerosol classes used for the inference are defined by their single scattering albedo and their phase function. These classes are the result of an original analysis of ground-based observations provided by AERONET, accounting for the sphericity and the non-sphericity of the aerosol particles. In this context, the Optimal Estimation method provides a rigorous mathematical framework to combine satellite data, prior information on the observed system, and the modelling representation of that system. The retrieval error resulting from the measurement and forward model uncertainties can be explicitly calculated.
After an extensive and detailed evaluation of the LDA aerosol and derived surface albedo products against AERONET and MODIS data, demonstration datasets have been generated for limited areas and are presented here to potential users.