



AERUS-GEO: a MSG/SEVIRI satellite-based aerosol product allowing to capture dust events for the last 10 years over Europe and Africa

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The aerosol signal derived from visible and near-infrared remote sensing observations can now be isolated thanks to a method allowing a proper separation of the atmosphere and surface components. This product is called AERUS-Geo (Aerosol and surface albedo Retrieval Using a directional Splitting method - application to Geo data) and covers Europe, Africa, and the Eastern part of South America. It fully exploits the directional and temporal dimensions of the MSG/SEVIRI satellite signal through the use of a semi-empirical kernel-driven BRDF (Bidirectional Reflectance Distribution Function) model mimicking the radiative anisotropy for the surface/atmosphere coupled system.

The AOD values estimated at $0.63 \mu\text{m}$ and $1.64 \mu\text{m}$ serve to calculate an Ångström coefficient that is further used to classify the aerosol layer into a continental, maritime, or a desert type. The AERUS-GEO product compares favourably with measurements of several AERONET stations, MODIS-derived (Moderate Resolution Imaging Spectro-radiometer), and MISR-derived (Multi-angle Imaging Spectro-Radiometer) products within a 20% of accuracy. The method proves to be competitive, not only in tracking anthropogenic aerosol emissions in the troposphere but also in estimating dust events. In addition, the higher frequency of AOD products with AERUS-GEO provides the means to quantify the aerosol radiative forcing in a more accurate manner than using low-orbit satellite data.

The AERUS-GEO algorithm was implemented by the ICARE Data Center (<http://www.icare.univ-lille1.fr>), which operationally disseminates in near real time (NRT) a daily AOD product at $0.63 \mu\text{m}$ over the MSG (Meteosat Second Generation) disk since 2014. In addition to an NRT AOD product, also a long term reprocessing of satellite derived AOD still based on MSG/SEVIRI observations has been implemented. This allows to perform a thorough monitoring of the dust events over Europe and Africa for the last 10 years (2005 to 2015) for the benefit of a large scientific community.