



A 3-D evaluation of the MACC reanalysis dust product over the greater European region using CALIOP/CALIPSO satellite observations

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Significant amounts of dust are being transferred on an annual basis over the Mediterranean Basin and continental Europe from Northern Africa (Sahara Desert) and Middle East (Arabian Peninsula) as well as from other local sources. Dust affects a number of processes in the atmosphere modulating weather and climate also having an impact on human health and the economy. Therefore, the ability of simulating adequately the amount and optical properties of dust is essential. This work focuses on the evaluation of the MACC reanalysis dust product over the regions mentioned above. The evaluation procedure is based on pure dust satellite retrievals from CALIOP/CALIPSO that cover the period 2007-2012. The CALIOP/CALIPSO data utilized here come from an optimized retrieval scheme that was originally developed within the framework of the LIVAS (Lidar Climatology of Vertical Aerosol Structure for Space-Based LIDAR Simulation Studies) project. CALIOP/CALIPSO dust extinction coefficients and dust optical depth patterns at 532 nm are used for the validation of MACC natural aerosol extinction coefficients and dust optical depth patterns at 550 nm. Overall, it is shown in this work that space-based lidars may play a major role in the improvement of the MACC aerosol product.

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