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Toward an Aerosol Retrieval based on Synergistic Measurements from the EPS-SG platform

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Multi-sensor Aerosol Product (MAP) will be the follow-on product of PMAp, which provides satellite-derived measurements of aerosol optical depth (AOD) and further aerosol related parameters (e.g. aerosol type) over continents and ocean on a daily basis [3]. PMAp is developed at EUMETSAT and it is based on the synergistic use of three instruments onboard Metop series of satellites from the EUMETSAT Polar System (EPS): GOME-2, AVHRR and IASI. The near real time (NRT) production of PMAp (< 3h after the sensing time) is a distinctive feature and PMAp is the first synergistic aerosol product, which is operational since 2014.
To develop MAP, the synergistic approach of PMAp will be extended to the remarkable capabilities of the new sensors onboard EPS-SG platform [4]: METimage, IASI-NG, UVNS and the polarimeter 3MI. The new enhanced approach will exploit the rich spectral content, from UV to TIR, high spatial resolution and sub-pixel information, multi-viewing, multi-spectral and multi-polarisation measurements of the new sensors. This unique combination besides using Generalized Retrieval of Atmosphere and Surface Properties (GRASP) [1] as the scientific core of the retrieval algorithm allows the development of an operational aerosol product with highly added-value compared to PMAp. The aerosol characterization in PMAp - limited to AOD and aerosol type - will be extended to many aerosol parameters in MAP, thanks to the 3MI instrument with the unique design for this purpose [2]. For instance, aerosol model, single scattering albedo, layer height, fine mode fraction, refractive index etc. will be retrieved by MAP as demonstrated for a similar instrument [1].
The current extensive validation analysis of PMAp against AERONET measurements over a long-term period, comparison to satellite AOD products such as MODIS/Terra and VIIRS, and the feedback from users (CAMS) indicate an overall good performance of PMAp. The successful outcome of PMAp in fulfilling the technical and scientific requirements of operational users proves that the concept behind PMAp can be used as a baseline for the development of MAP - a new generation of synergy NRT AOD product - for which we expect an improved performance compared to PMAp.

Keywords: retrieval algorithm, aerosol, synergy

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