

Aerosol Characterisation based on EPS-SG/3MI polarimetric observations

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The EPS-SG Multi-View, Multi-Channel, Multi-Polarisation Imaging mission (3MI) is a push-broom radiometer dedicated to aerosol characterisation for air quality, numerical weather prediction, atmospheric composition, and climate monitoring. 3MI will provide multi-spectral (from 410 to 2130 nm), multi-polarisation (three polarisation acquisitions at +60°, 0°, and -60°), and multi-angular (14 views) images of the top of atmosphere outgoing radiance in order to both accurately measure the aerosol load, by resolving the directional anisotropy, and to characterise the microphysical properties of the atmosphere. It supersedes previous similar missions such as POLDER in terms of spatial resolution, spectral and angular information,

The high information content consequence of the multi-spectral, multi-polarisation and multi-angular characteristics of 3MI in combination with the GRASP (Generalized Retrieval of Aerosol and Surface Properties) algorithm will allow the retrieval of aerosol properties with very high accuracy. For 3MI the priority is the retrieval of the aerosol optical depth and aerosol type. In the case of sufficient information content availability, further parameters such as Aerosol layer height, Angstrom exponent and size distribution could be derived.

GRASP is a state-of-the-art algorithm based on a spatial and temporal multi-pixel retrieval concept. However, this configuration may not be fully compatible with the needs for near real time processing required at EUMETSAT for product dissemination to operational users. Therefore, GRASP is being modified and optimised to establish a configuration that satisfies the NRT requirements while preserving the accuracy in the retrieval of selected aerosol parameters.

Keywords: 3MI, polarisation, retrieval algorithm, aerosol properties