

Operational Polarimetry – Where we come from, Where we are, Where we go...

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The era of space polarimeter started more than 30 years ago with the scientific missions POLDER [1]. This very first generation of measurements and geophysical retrievals seeded the physical and scientific basis for the use of polarimetry from space. Since then, a lot of developments, scientific as well as technological, have improved the knowledge, understanding, and performance of both measurements and retrievals [2] [3]. New methodologies and calibration approaches have been developed better characterizing the instrument both on-ground and in-flight, allowing a more precise description of the performance. Today, a new generation of instruments is able to offer more accurate and more extensive measurements [4] [5] [6]. On the side of the Level-2 retrieval, processing capabilities have evolved, allowing new generations of processors able to extract from a large state vector a more comprehensive list of parameters for instance improving characterization of aerosol and clouds [3]. The approach and methodology for the evaluation and validation of the various geophysical parameters have also improved providing a more accurate evaluation of the real performance and potential limitations [3]. The 3MI instrument has been developed relying on this heritage in order to provide long-term and near-real time operational characterization of aerosol through a suite of advanced optical and microphysical parameters [3] [6].

After recalling the beauty of polarization through a couple of selected images, highlighting the asset with polarisation for the observation of aerosols, the 3MI mission will be presented in the context of an operational NRT provision of accurate aerosol characterisation. Results from POLDER-3 and 3MI will support the discussion for both Level-1 and Level-2 aspects.

The expectations for near future are particularly exciting. The NRT availability of performing data, combined with a multi-sensor synergistic approach, are paving the floor for some decades of progress for all types of operational uses, such as air quality assimilation model, numerical weather prediction, advisory and warning systems (ash and dust), climate change, in addition to more scientific applications (e.g. aerosol properties).

References

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