

# Assessing Aeolus Aerosol Observational Capabilities for data assimilation in Air Quality and NWP Models

E. Proestakis<sup>(1)</sup>, A. Benedetti<sup>(2)</sup>, A. Dabas<sup>(3)</sup>, V. Amiridis<sup>(1)</sup>, E. Marinou<sup>(1)</sup>, P. Paschou<sup>(1),(4)</sup>, A. Georgiou<sup>(1),(5)</sup>, A. Gkikas<sup>(1)</sup>, A. Kampouri<sup>(1),(6)</sup>, A. Gialitaki<sup>(1),(4)</sup>, A. Tsekeri<sup>(1)</sup>, W. McLean<sup>(2)</sup>, L. Steele<sup>(2)</sup>

**Presenting author:** E. Proestakis or A. Dabas or A. Benedetti

<sup>(1)</sup> *IAASARS, National Observatory of Athens (NOA), Athens, Greece.*

<sup>(2)</sup> *European Centre for Medium-Range Weather Forecasts, Reading, RG2 9AX, UK.*

<sup>(3)</sup> *Météo-France, CNRS, Toulouse, France.*

<sup>(4)</sup> *Laboratory of Atmospheric Physics, Physics Department, Aristotle University of Thessaloniki, Thessaloniki, Greece.*

<sup>(5)</sup> *Department of Informatics, Athens University of Economics and Business (AUEB), Athens, Greece.*

<sup>(6)</sup> *Department of Meteorology and Climatology, Aristotle University of Thessaloniki, Greece.*

The EUMETSAT ADD-CROSS (Upgrading Aeolus Aerosol Observational Capabilities Towards Improving Air Quality and NWP Models) project aims to demonstrate the benefits of assimilating Aeolus Level 2A (L2A) aerosol/cloud optical products for Numerical Weather Prediction (NWP), either by expanding the current instrument capabilities or by proposing a new structural design of ALADIN. These options refer to the design of the transceiver that enables the detection only of the returned co-polar component of the transmitted light, and in addition, to different possible setup configurations (co- and cross- polar) of ALADIN. The same series of analysis will be performed assuming a hypothetical linear configuration of ALADIN instead of the circular one, since the impact of the missing cross-channel is larger when the emitted light is circularly polarized. The different experimental datasets (355nm - w/wo cross-channel / linear and circular) to be used in the ECWWF's 4D-Var, will be provided as a reconstruction of Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO) profiles of particulate depolarization ratio and backscatter coefficient in the mid-visible (532 nm).

The specific objectives of ADD-CROSS are to:

1. Quantify the impact of the cross-channel on data assimilation in air quality and NWP models.
2. Quantify the impact of linear vs circular configuration in the absence of the cross-polar channel.

The ADD-CROSS assimilation experiments will include the Western Sahara and the Tropical Atlantic Ocean, while due to the extensive wealth of available observational data collected in the framework of the European Space Agency (ESA) ASKOS Tropical Campaign in Cape Verde, which are needed for a complete and descriptive assessment analysis of the assimilation outputs, the experiments will be performed for September 2021.

Preliminary results from the project will be presented.