Validation of ATLID Level 2A Products Using Potenza Ground-Based Measurements (EVID05)

Christina-Anna Papanikolaou[1], Nikolaos Papagiannopoulos[1], Michail Mytilinaios[1], Pilar Guma' Claramunt[1], Benedetto De Rosa[1], Aldo Amodeo[1], Lucia Mona[1]

(1) *Consiglio Nazionale Delle Ricerche, Istituto di Metodologie per l'Analisi Ambientale (CNR-IMAA), 85100 Potenza, Italy*

christinaannapapanikolaou@cnr.it

CIAO observatory: Potenza ACTRIS/EARLINET site

Figure by Laurita, T., et al.: CIAO observatory main upgrade: building up an ACTRIS compliant aerosol in-situ laboratory, Atmos. Meas. Tech. Discuss. [preprint], https://doi.org/10.5194/amt-2024-57, in review, 2024.

Located in Potenza, on a mountainous site in the central Mediterranean region of southern Italy, CIAO (CNR IMAA Atmospheric Observatory; (Laurita et al., 2024) offers ideal conditions for studying aerosols from different sources under varying weather patterns. Over the years, CIAO has been actively involved in the validation of satellite missions. POLPO (POtenza Lidar for Particle Observations), one of the observatory's lidar systems, is a fixed multi-wavelength Raman lidar that operates at three wavelengths (355, 532, and 1064 nm), while it measures particle depolarization across all of them. Designed for continuous observations, POLPO surpasses the measurement standards set by ACTRIS (Aerosol Clouds and Trace Gases Research Infrastructure) and EARLINET (European Aerosol Research Lidar Network). Additionally, it has been actively employed for measurements during scheduled EarthCARE satellite overpasses, contributing to the mission's validation processes. This study focuses on comparing the aerosol optical properties retrieved from ATLID Level 2A products with the ones measured at Potenza station, as well as the aerosol classification, using the HETEAC-Flex approach for aerosol typing at the ground-based site, as described by Floutsi et al., 2024.

ATLID L2A Products:
A-EBD and A-TC
(high resolution)

→

Screening:
Quality Status and Extended Quality Status

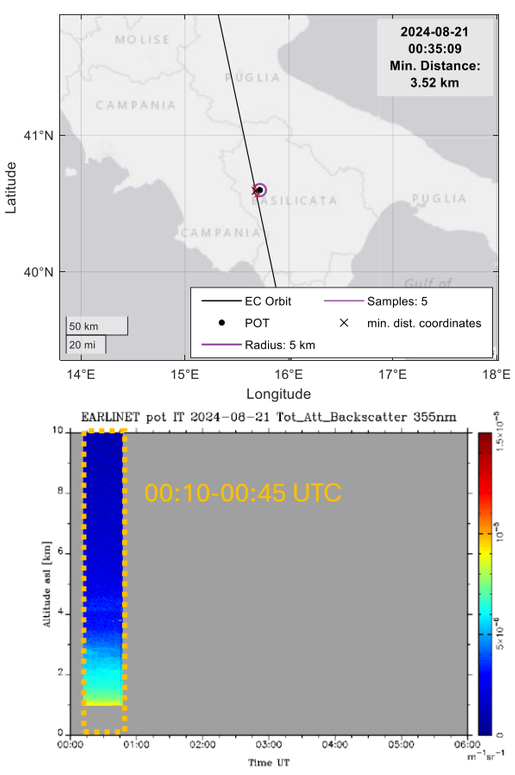
→

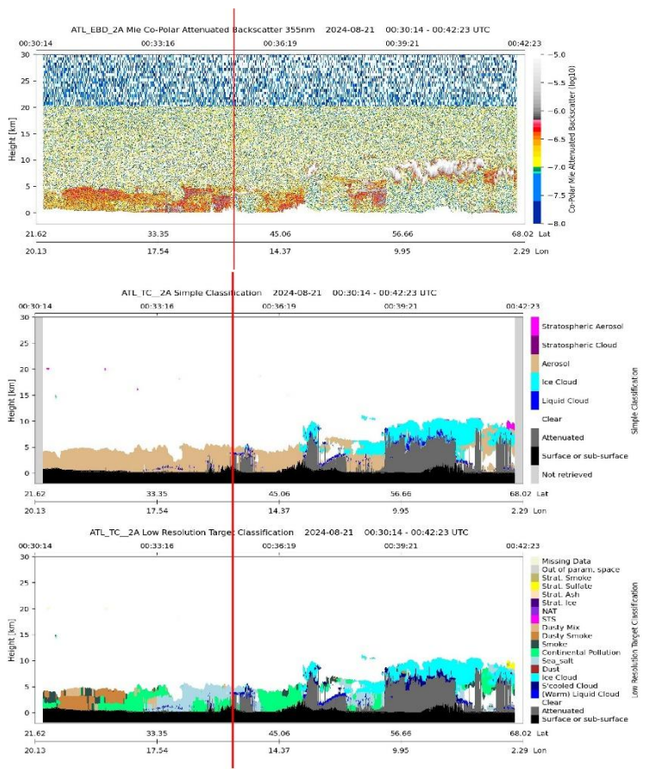
Comparison with **ACTRIS/EARLINET** Potenza site lidar data at 355 nm and **HETEAC-flex**

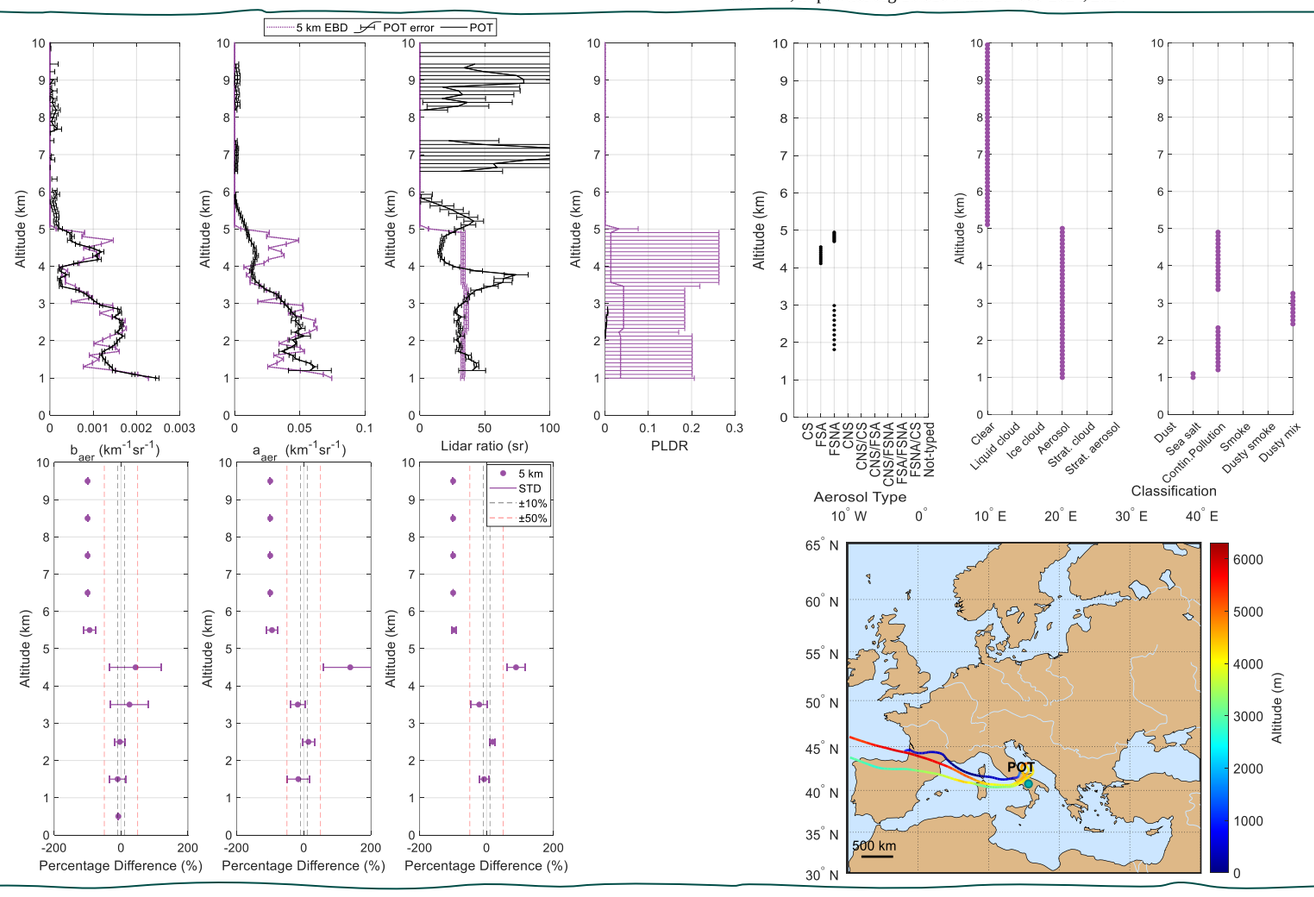
HETEAC-Flex*	
Abbreviation	Definition
CS	Coarse-mode, spherical
FSA	Fine-mode, spherical, (strongly) absorbing
FSNA	Fine-mode, spherical, non-(weakly) absorbing
CNS	Coarse-mode, non- spherical
CNS/CS, CNS/FSA, CNS/FSNA, FSA/FSNA, FSNA/CS	Mixtures of the main aerosol types listed above

*Floutsi, A. A., et al.: HETEAC-Flex: an optimal estimation method for aerosol typing based on lidar-derived intensive optical properties, Atmos. Meas. Tech., 17, 693–714, https://doi.org/10.5194/amt-17-693-2024, 2024

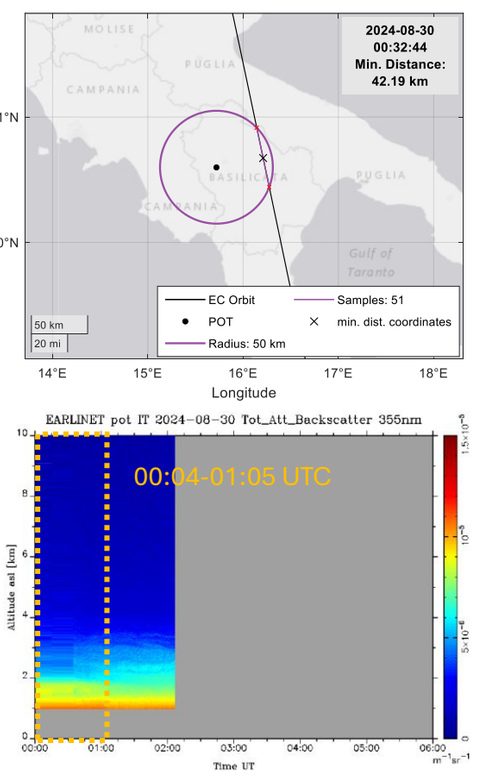
Case I: 2024-08-21

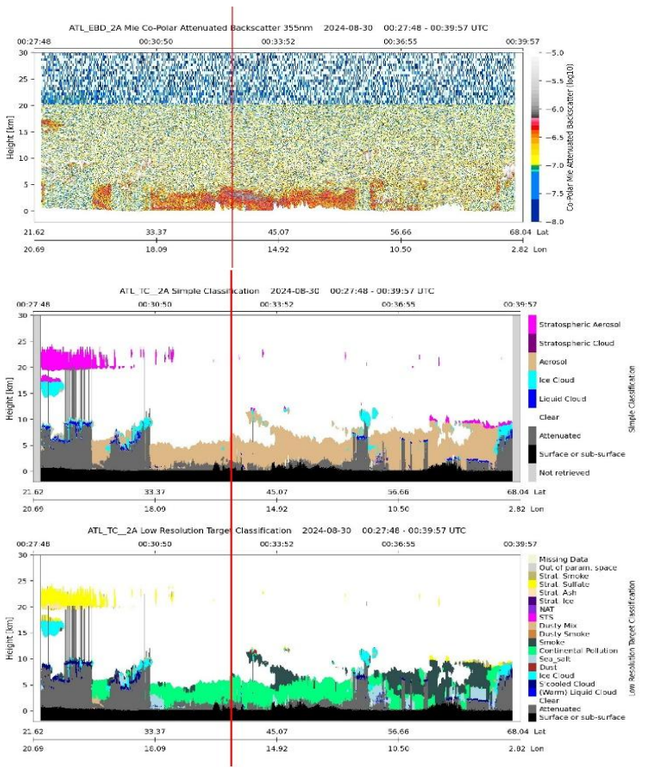


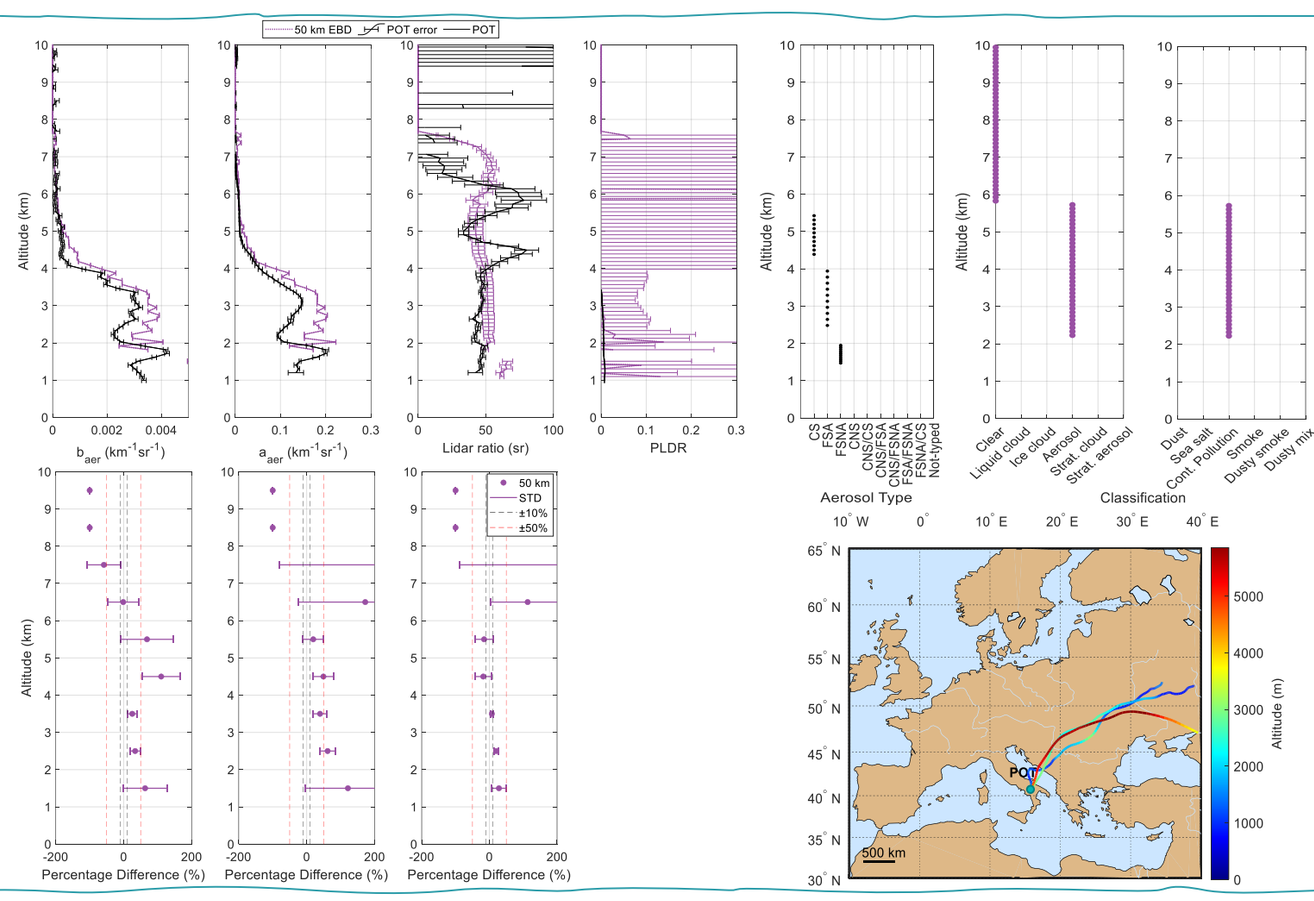




Case II: 2024-08-30







Acknowledgments

This study is supported by the project on Strengthening human capital of ACTRIS Italy Research infrastructure-PER-ACTRIS-IT (project code no. CIR01_00015, no. 2595—CUP: B58I20000220001). We also acknowledge the IR0000032—ITINERIS, Italian Integrated Environmental Research Infrastructures System (D.D. no. 130/2022—CUP B53C22002150006) funded by the EU—Next Generation EU PNRR-Mission 4 "Education and Research"—Component 2: "From research to business"—Investment 3.1: "Fund for the realization of an integrated system of research and innovation infrastructures" and the European Commission under the Horizon 2020 – Research and Innovation Framework Programme, through the ATMO-ACCESS Integrating Activity under grant agreement No 101008004.