

Aerosol Typing in the Eastern Mediterranean during Pre-TECT Campaign over Finokalia, Crete

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Motivation: Lidar measurements provide vertical profiling of various particle properties with high temporal and spatial resolution, useful for aerosol characterization, originating from different sources. In this work, we are using the lidar measurements collected during the Pre-TECT experiment (<http://pre-TECT.space.noa.gr/>) organized in April 2017 by NOA, and we investigate the performance of two aerosol characterization algorithms, the AUTH aerosol typing algorithm (based on the Mahalanobis classification) and the NATALI algorithm.

Conclusions: In most of the cases analyzed, both algorithms classified correctly the dusty layers as dust and polluted dust. NATALI classified correctly several marine layers. Both algorithms fail to correctly classify aerosol layers with high water vapor concentrations.

(a) NOAA/IAASARS 3 days Backwards FLEXPART-WRF calculation for particles observed at 2700m above Finokalia

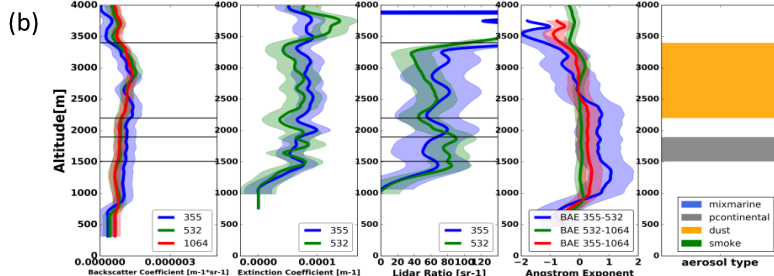
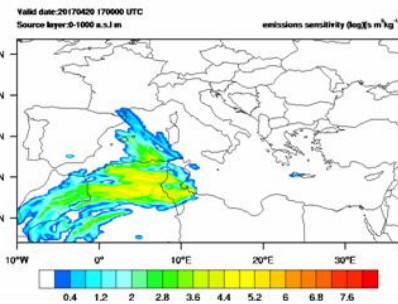


Figure 1: A case study of transported dust. (a) FLEXPART source support for the air masses arriving at Finokalia at 2.7 km on 20 April 2017 at 17:00 UTC and (b) Optical products and aerosol typing from the AUTH classification algorithm on 20 April 2017 at 17:00 – 18:00 UTC.

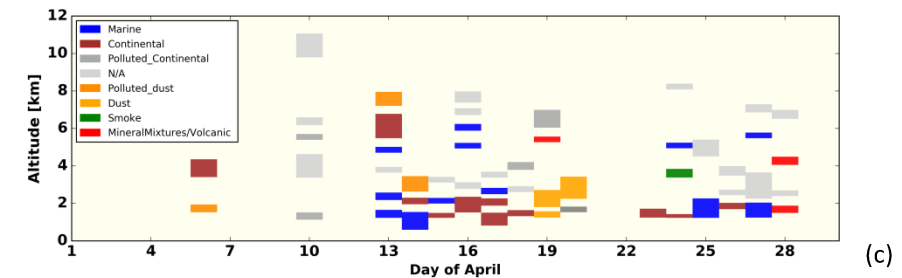
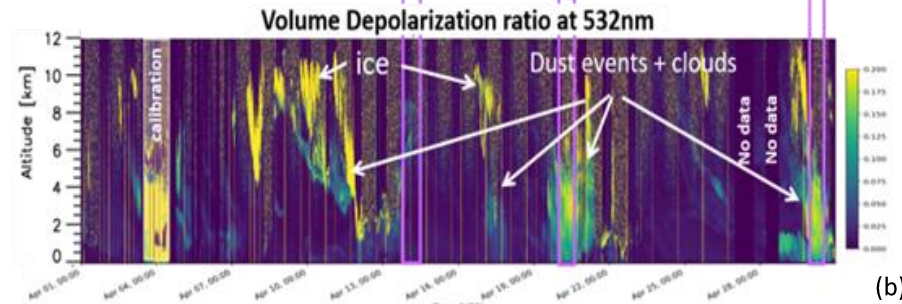
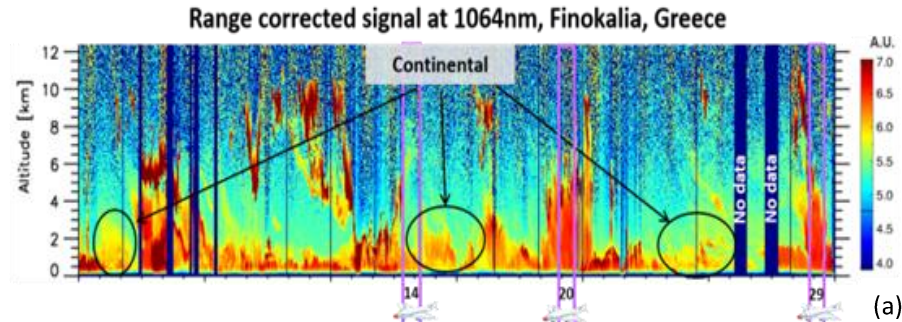


Figure 2: The Pre-TECT lidar observations of (a) the range corrected signal at 1064nm, (b) the volume depolarization ratio at 532nm and (c) the NATALI-based aerosol typing from the nighttime measurement. Highlighted are the time periods of the Falcon flights above the station.



Ongoing Work

EARLINET advanced aerosol typing schemes are applied to reveal the presence of desert dust and marine particles in polarization lidar measurements as well as the mixing conditions with other aerosol types

Questionable typed layers are going to be further investigated using in situ measurements for Falcon collocated flights (A-LIFE, DoGMA and CIIMA EUFAR experiments) and auxiliary observations

The applicability of the typing algorithms in different water vapor mixing ratio and the relative humidity conditions within the aerosol layers are going to be investigated

Combination with other measurements from synergistic instruments (eg. cloud radar, pyranometers) will pave the way for better aerosol-radiation-cloud interaction studies.

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