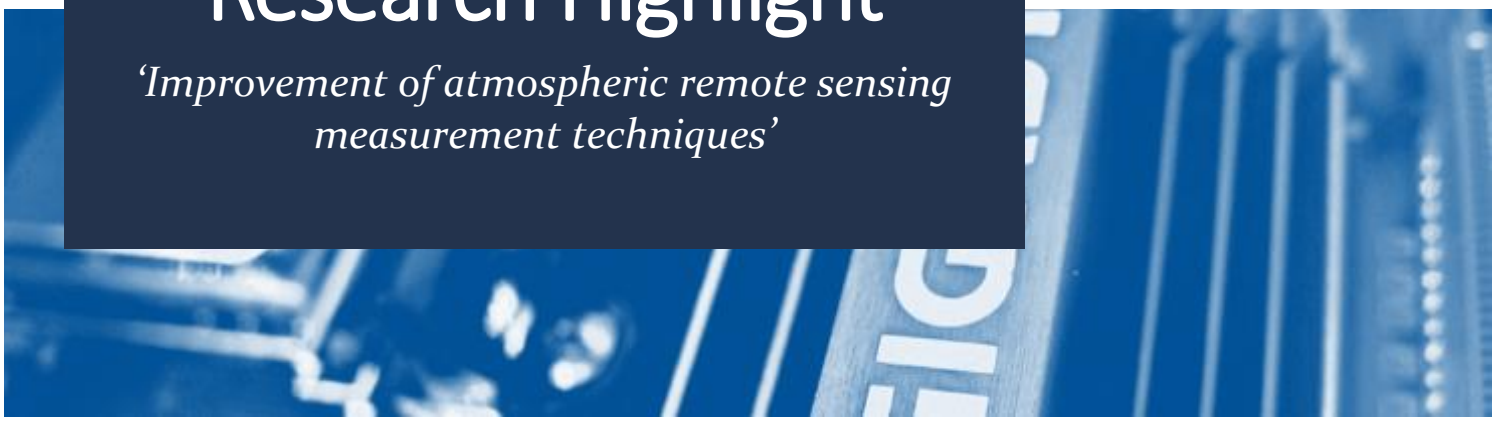
CARE-C
CLIMATE AND ATMOSPHERE RESEARCH CENTER

THE CYPRUS INSTITUTE
RESEARCH·TECHNOLOGY·INNOVATION

Research Highlight

'Improvement of atmospheric remote sensing measurement techniques'



Summary

We introduce a new method for improving aerosol typing by lidar, through characterizing depolarization measurements using a reference system. Focusing on the Nicosia CIMEL CE376 lidar system and utilizing as reference the Polly XT in Limassol, our study retrospectively applies the approach to measurements obtained during the 2021 Cyprus Fall campaign. We focus here on how aerosol particles in the atmosphere affect the polarization of light, which allows to identify desert dust and other aerosols. We emphasize the significance of precise lidar measurements in advancing our comprehension of atmospheric aerosols and their implications for climate and human health.

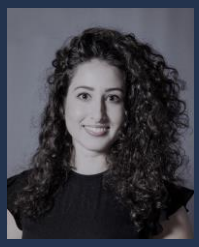
Impact

By using the new method, we retrospectively improved previous data, acquired in 2021 during a multi-instrumented campaign, which included UAVs and remote sensing, and which would otherwise have been less accurate.

Moreover, we presented an approach that can be exploited to transfer the polarization parameters from one system to another (e.g. in the case of a travelling standard) and we believe that this type of application will become more and more useful as the density of instrument networks increases.

Lidar is a widely used tool allowing to retrieve highly resolved information on the spatial and temporal distribution of aerosols, which are one of the atmospheric constituents affecting radiative forcing, and one of the major uncertainties on our understanding of climate change.

Authors' bios



Alkistis Papetta is a PhD candidate at the Climate and Atmosphere Research Center (CARE-C), with a background in Physics and Wind Energy, and has experience with lidar technology for atmospheric measurements. Her research interests lie in the development of innovative techniques for remote sensing applications, particularly in conjunction with UAV technology, to investigate the distribution and properties of free tropospheric aerosols and their impact on climate.

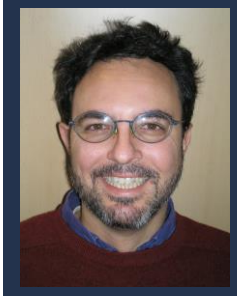
Reference

Papetta, A., Marenco, F., Kezoudi, M., Mamouri, R.-E., Nisantzi, A., Baars, H., Popovici, I. E., Goloub, P., Victori, S., and Sciare, J.: Lidar depolarization characterization using a reference system, Atmos. Meas. Tech., 17, 1721–1738, https://doi.org/10.5194/amt-17-1721-2024, 2024.

Contact details

Alkistis Papetta – a.papetta@cyi.ac.cy

Franco Marenco – f.marenco@cyi.ac.cy



Prof. Franco Marenco is an associate professor at the Climate and Atmosphere Research Center (CARE-C), where he leads the Remote Sensing group.