



## **Ground-based lidar remote sensing for aerosol detection in Iceland**

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Scanning Doppler Light Detection and Ranging (lidar) systems have been used widely to measure wind profiles and atmospheric aerosols, combined with other measurement techniques. The lidar system in use at the Icelandic Meteorological Office (IMO) can provide continuous measurements of the wind velocity and direction based on the Doppler effect from the emitted signals, as well as the backscatter coefficient and depolarization ratio for retrieving aerosols properties. In this study, we combine observations retrieved from a mobile lidar, ceilometer, and sun-photometer and discuss their application to retrieving ash aerosol properties. For this purpose, in September 2018 an aerosol characterization campaign started at IMO, comprising measurements from a Leosphere scanning lidar with depolarization functionality, a Vaisala CL-31 ceilometer, which provides backscatter coefficient, and a Cimel CE-318 sun-photometer, which provides atmospheric optical properties. In spring 2019, the equipment will be moved to a location in South Iceland (Gunnarsholt), near Hekla volcano. A 2-step approach is applied to identify different aerosols in the atmosphere and potentially estimate the ash concentration using a combination of lidar, ceilometer, and sun-photometer observations. Preliminary results indicate that the combination of data obtained from these three instruments provides advancement towards estimating aerosol concentrations. Based on these results, we conclude that the application of our approach may significantly reduce the challenges associated with localized ash detection during the next ash-rich eruption in Iceland.