**Motivation**

Aerosols, clouds, and their interaction play a key role in the climate of our planet. Space-based remote sensing platforms have vastly contributed to our understanding of earth’s atmosphere by providing data over large temporal and spatial scales but many of the microphysical retrieval algorithms used are based on assumptions that have not yet been well validated. In situ measurements of the unpolarized and polarized angular dependence of scattered light are central to both the validation of remote sensors as well as obtaining accurate radiative forcing estimates. In an effort to advance these in-situ measurements the Laboratory for Aerosols, Clouds and Optics (LACO) has developed a novel instrument concept called the Imaging Nephelometer.

**Polarized Imaging Nephelometer**

The imaging nephelometer is a novel polar nephelometer design that uses a high-powered laser and wide field of view optical detection system (CCD camera). This setup capitalizes on multiple scattering locations to allow for measurements of scattering matrix elements over a very wide angular range with an angular resolution that is limited only by the number of pixels contained on the CCD. A pair of these images from the CCD, corresponding to orthogonal input polarizations, can be combined to obtain and at scattering angles from 3° to 176°.

**PI-Neph Validation**

The PI-Neph validation has been successful and is currently continuing with several different airlines. The instrument is being used to validate the existing airborne PI-Nephelometer data with the goal of improving the precision of the measurements.

**Data Visualization Toolkit**

http://laco03.umbc.edu/pineph/

Password: QWOP89

All PI-Neph scattering data, including data from the most recent SEAC4RS flight, can be publicly available through LACO’s web-based data visualization system. This tool is capable of quickly displaying PI-Neph scattering measurements with the associated aircraft altitude and location as well as temperature, pressure, and relative humidity data for the sampled aerosol.

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**References**