(11-220412-C) **Linking *In Situ* and Lidar Aerosol Measurements for Air Quality Nowcasting**

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Assessing and forecasting how atmospheric aerosols impact the environment is an ongoing challenge due to the diverse sources of primary and secondary particles and the complex pathways by which these particles are transformed and transported. As chemical transport models become more sophisticated, higher resolution and more accurate measurements of aerosol properties are needed for model validation, parameterizations of aerosol properties, and better model initializations and data assimilations.

Droplet Measurement Technologies (Droplet) has developed a suite of *in situ* sensors for measuring the microphysical, optical and chemical properties of aerosol and cloud properties. Droplet is also a commercial provider of the Micro Pulse Lidar (MPL) and the Mini Micro Pulse Lidar (MiniMPL). In collaboration with scientists from the University of Manchester Droplet is developing a measurement system that couples surface measurements of aerosol particles, refractory black carbon (rBC), equivalent black carbon (eBC), fluorescing aerosol particles (FAP) and cloud condensation nuclei (CCN), with vertical profiles of polarized backscattered light as input to a chemical transport model that will incorporate these data, along with other meteorological parameters, to do near realtime forecasting of concentrations of black carbon, hygroscopic and bioaerosol-like particles for the local area and regions immediately downwind from the sensors.

In this presentation we will provide a brief overview of the measurement systems and their capabilities, describe how the *in situ* and lidar measurements will be coupled, and discuss the conceptual idea for developing the nowcasting system for operational implementation

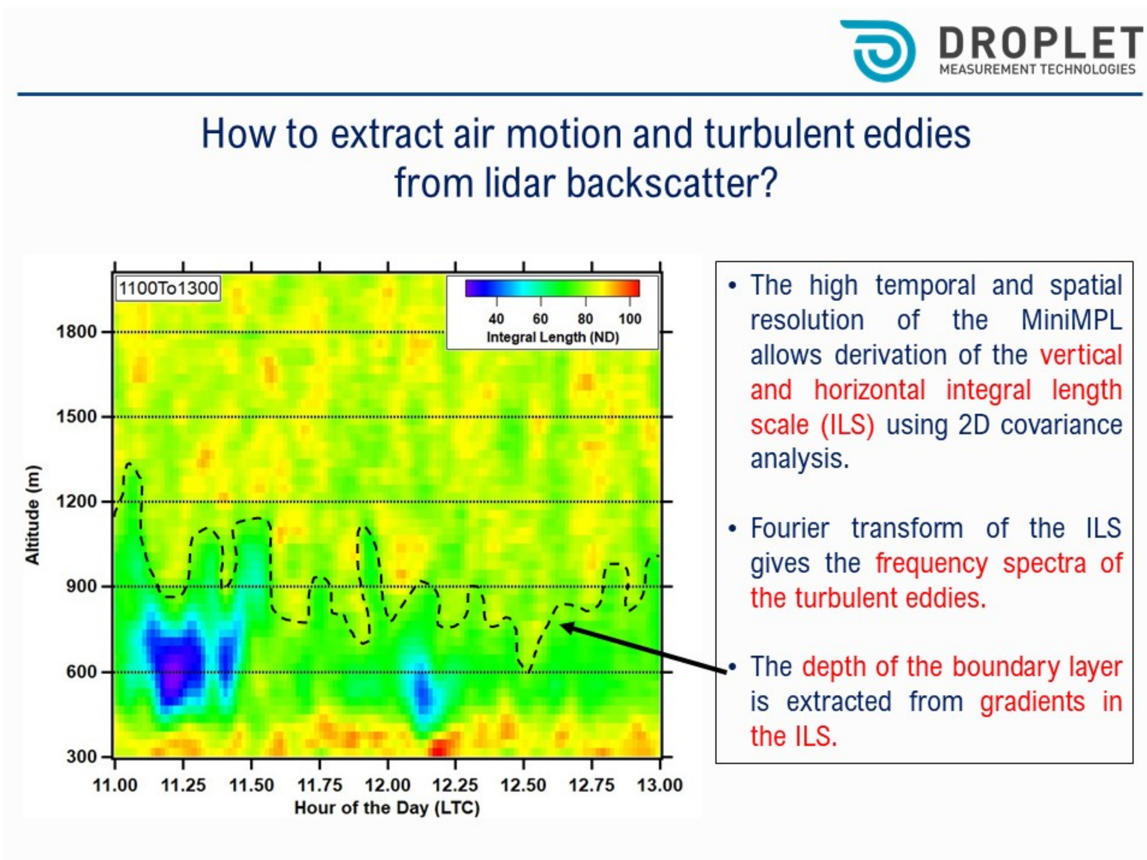

Figure 1. The high temporal and spatial resolution of the MiniMPL allows derivation of the vertical and horizontal integral length scale (ILS) using 2D covariance analysis. Fourier transform of the ILS gives the frequency spectra of the turbulent eddies.The depth of the boundary layer is extracted from gradients in the ILS.