File Revision Date:
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Data Set Description:
PI: Mike Newchurch
Instrument: Rocket-city Ozone Quality Evaluation in the Troposphere (RO3QET) Lidar
Site(s): University of Alabama Huntsville
Measurement Quantities: Ozone number density

Contact Information:

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Reference Articles:

Kuang, S., J. F. Burris, M. J. Newchurch, S. Johnson, and S. Long (2011), Differential Absorption Lidar to measure subhourly variation of tropospheric ozone profiles, IEEE Trans. Geosci. Remote Sens., 49, 557-571.

Kuang, S., M. J. Newchurch, J. Burris, and X. Liu (2013), Ground-based lidar for atmospheric boundary layer ozone measurements, Appl. Opt., 52, 3557-3566.

Instrument Description:
The RO3QET lidar is a differential absorption lidar located on the UAH campus at 34.725N and 86.645W at ~206m asl. This lidar measures ozone profiles between 0.1 and ~10 km agl during both daytime and nighttime using two lasers at 289 and 299 nm. The receiving system consists of three receivers with diameter of 2.5 cm, 10 cm and 40 cm, and four photomultipliers. Lidar signal counting was accomplished with both analog and photoncounting modes with a sampling rate of 40 MHz corresponded to a 3.75-m fundamental resolution.

Algorithm Description:
Lidar retrieval of ozone number density is described by Kuang et al. (2013). After various signal corrections, ozone number density is computed from the derivative of the logarithm of the online to offilne signal ratios. If ozone mixing ratio is needed, the atmospheric profile is provided by nearby radiosonde measurement.

Expected Precision/Accuracy of Instrument:
The lidar measurement accuracy and precision are generally better than 10% in the troposphere. For details, please refer to the references.

Instrument History:

Before 5/14/2013:	the lidar measures ozone with wavelengths of 285 and 291 nm and wide-band solar filters.
5/14/2013:	the lidar measures ozone with wavelengths of 289 and 299 nm and 300nm edge filters.
8/26/2014:	the EMI PMTs for the 16-inch telescope are replaced by HAMAMATSU PMTs.
10/22/2014:	the receiving system of the 16-inch telescope is modified so that separate optical channels and narrow-band filters are used for both 289 and 299 nm channels.