File Revision Date:
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Data Set Description:

PI: Georg H. Hansen
Instrument: ozone lidar
Site(s): ALOMAR, Andoya, Norway
Measurement Quantities: ozone density (temperature, air density, backscatter ratio)

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Reference Articles:

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Instrument Description:

Location:
Andenes, Norway, 69.29°N, 16.01°E, 379 m a.s.l.
in the Arctic Lidar Observatory for Middle Atmosphere Research (ALOMAR),
run by the Andøya Rocket Range (ARR)

Owners of the ozone lidar:

Norwegian Institute for Air Research (NILU):	70%
Andøya Rocket Range (ARR)	30%

Transmitter:

Lambda Physik LPX 150T Excimer laser
308 nm (150 mJ)
200 Hz pulse repetition frequency
about 15% 353 nm emission by stimulated Raman scattering in H2

Receiver:

100 cm diameter Newtonian type telescope, mechanical chopper

elastic backscattering : 308, 353 nm

filter bandwidth: 2 nm (standard darkness system)

18 pm (308 nm)/7 pm (353 nm) in daylight receiver system

Transient recorder based electronic detection system (analog/PC - Licel)

Algorithm Description:

- Based on standard DIAL method as described in e.g., Steinbrecht (1994)
- Rayleigh correction term: calculated with ECMWF data
- Total ozone up to lowest altitude of lidar profile: from closest ozonesonde (usually Sodankylae)
- Aerosol correction (PSCs, thin cirrus clouds): calculating BSR at 353 using reference density profile from ECMWF or close sonde, assuming a color index (minimum characteristic ozone profile distortion) to derive BSR at 308 nm
- Measurements with marginal 353-nm signal (e.g. daylight system, bad technical shape of emitter): calculating 353 backscatter profile from reference profile (ECMWF or sonde) optimally fitted to measured signal, control: has to yield total ozone close to value derived from an independent measurement (Andøya Brewer, TOMS)
- Not included in algorithm comparison (Godin et al.), but tested with data used in the comparison with satisfactory results (publication in prep.)
- regular comparison with close-by ozone-sonde profiles

Expected Precision/Accuracy of Instrument:

Lower limit (between 8 and 15 km) to 30 km altitude:	1 - 5 %
30 to 40 km altitude:	4 - 30 %
Above 40 km altitude:	> 50 %

BUT: also dependent on measurement conditions!

Instrument History:

Put into operation:	December 1994
NDSC qualification:	September 1996
Aerosol correction algorithm:	since 1997
Implementation of new daylight receiver:	summer 1998
Vs. 2 of algorithm:	summer 1999
Telescope rebuild from biaxial to co-axial	summer 2003
Licel transient recorder base detector	March 2008
Fiber above telescope (no secondary mirror)	summer 2009
Matlab based data-analysis	winter 2009/10