

AEROCLO-sA F20 Lidar LNG aerosols

General information

Dataset name: AEROCLO-sA F20 Lidar LNG aerosols
Dataset DOI: 10.6096/AEROCLO.1774
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Contact(s)

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Period

Date begin (yyyy-mm-jj): 2017-09-05
Date end (yyyy-mm-jj): 2017-09-12

Project(s)

AEROCLO

Data description

Abstract

The airborne high spectral resolution (HSR) lidar LNG operated from the SAFIRE Falcon 20 during the AEROCLO-sA campaign. The aircraft was based in Walvis Bay, Namibia, and performed 10 flights for ~30 flight hours, from 5 to 12 September 2017.

Observing strategy

LNG made observations of atmospheric reflectivity at 3 wavelengths: 355, 532 and 1064 nm. In addition, LNG measures polarized signal at 355 nm.

LNG operated mostly in nadir pointing mode while the aircraft was flying around 8 to 10 km amsl. LNG also made zenith pointing measurements when the Falcon was performing downward spirals (sometimes down to the surface) for the sake of in situ sampling and measurements by the airborne sunphotometer PLASMA located on top of the aircraft.

References

The LNG system is described in Bruneau et al. (2015):

Didier Bruneau, Jacques Pelon, Frédéric Blouzon, Joseph Spatazza, Pascal Genau, et al.. 355-nm high spectral resolution airborne lidar LNG: system description and first results. Applied optics, Optical Society of America, 2015, 54 (29), pp.8776-8785.

Instrument information

Sensor

Instrument type: Lidar/Laser Sounders

Sensor resolution

Observation frequency: 5 s

Horizontal coverage: On the order of 1000 km (depends on the aircraft flight duration)

Vertical coverage: 0-12 km

Geographic information

Aircraft operations from Walvis Bay, Namibia

Location name: Aircraft operations from Walvis Bay, Namibia

Platform type: F-FALCON 20

West bounding coordinate (°): 8

East bounding coordinate (°): 20

North bounding coordinate (°): -16

South bounding coordinate (°): -24

Altitude max: 10000

Measured parameter

Atmospheric reflectivity

Parameter name: Atmospheric reflectivity

Parameter keyword: Atmosphere > Aerosols

Unit: arbitrary

Acquisition methodology and quality: The signal backscattered to the LNG system telescope at the 3 wavelength is range-square-corrected to produce atmospheric reflectivity. This variable is provided in the LNG2* files with a vertical resolution of 6 m and a horizontal resolution of ~1 km (profiles are averaged over 5s, with an aircraft flying at 200 m/s).

The LNG atmospheric reflectivity data are provided as ascii files, containing a header in which a number of information regarding the aircraft position and attitude is provided. Below the header, the data is dispatched in 5 columns. The first column is altitude over a vertical range of [-2, 12] km. The second column is high spectral resolution reflectivity at 355 nm. The third column is depolarization at 355 nm. The fourth column is reflectivity at 532 nm and the fifth column is reflectivity at 1064 nm. Reflectivity at 355 nm was only available during the first for flights on 5 and 6 September. Data in the

2nd column is null in case the high spectral resolution injection did not work.

Note: the data acquired in zenith pointing mode is to be used with caution.

Date begin (yyyy-mm-jj): 2017-09-05
Date end (yyyy-mm-jj): 2017-09-12

Derived parameters

Aerosol Backscatter

Parameter keyword: Atmosphere > Aerosols > Aerosol Backscatter
Unit: 1/km/sr - 1/km/sr
Acquisition methodology and quality: Attenuated backscatter coefficient profiles are derived from atmospheric reflectivity profiles by normalizing the atmospheric reflectivity above the aerosol layers to the molecular backscatter coefficient profiles, at all 3 wavelengths. This is possible since the LNG was well aligned. Hence the slope of the lidar reflectivity above 6 km amsl matched that of the molecular backscatter derived from dropsonde measurements of pressure and temperature.
This variable is provided in the ABC2* files.
Date begin (yyyy-mm-jj): 2017-09-05
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Aerosol Extinction

Parameter keyword: Atmosphere > Aerosols > Aerosol Extinction
Unit: 1/km - 1/km
Acquisition methodology and quality: The extinction coefficient profiles are obtained from the attenuated backscatter coefficient profiles using an Klett inversion procedure, and accounting for multiple scattering in the massive biomass burning aerosol plumes observed over Namibia during the AEROCLO-sA campaign. More details on the inversion procedure are available from the PI.
This variable is provided in the EXT2* files.
Sensor precision: 30%
Date begin (yyyy-mm-jj): 2017-09-05
Date end (yyyy-mm-jj): 2017-09-12

Data use information

Use constraints: The Principal Investigator(s) of the LNG data for the AEROCLO-sA campaign is Cyrille Flamant. If you intend to use the following data please consult with him via e-mail: cyrille.flamant@latmos.ipsl.fr. Please consider authorship for the PI whenever using the LNG data.

The LNG data was acquired with the support of Frédéric Blouzon and Abdel Abchiche (DT-INSU), Mathilde van Haecke (LATMOS) and with the help of the Falcon 20 operator (SAFIRE, www.safire.fr, a joint entity between CNRS, Météo-France and CNES).

Data policy:	AEROCLO data policy
Database:	AEROCLO-sA on BAOBAB
Original data format(s):	ascii text