ESA MesosphEO

NLC occurrence and particle size distribution retrieved from SCIAMACHY limb-scatter observations

MesosphEO Data File Description

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1. General information

The numeric results are stored in NetCDF file format. This format contains descriptive information about the data it stores, the units used and provides further information. The data files were created using the IDL software suite. A separate data file is provided for each year/time interval and for each property measured: NLC occurrence (SH and NH) and particle size. The files are named in a self descriptive way. The NLC data sets were retrieved from SCIAMACHY limb-scatter observations. NLC occurrence is retrieved from observations in both hemisphere, but NLC particle size is only available for the northern hemisphere.

2. Stored Data

Level 2 data provides NLC occurrence data and particle size information with geolocation, orbit number and further information. In the case of NLC occurrence data up to over 400 measurements per day are possible, therefore the information for latitude and longitude is given in separate variables.

Level 3 data provides information about NLC occurrence, averaged for 5° width latitude bands between 40°, 45°, 50°, 55°, 60°, 65°, 70°, 75°, 80°, 85° (9 values). Within the file the centre positions of the bands are given, e.g. 42.5° for the first band. The latitude bands are the same for the northern and southern hemisphere. The time period covered reaches from 2002 to 2012. Missing occurrence measurements are marked with an -1.

Particle size information is given for three assumed distributions: monodisperse, gauss and lognormal with a distribution width of σ =1.52. Caution should be given to the variable named "mean radius value". It does not mean a mean radius of a distribution, but a mean value of all calculated radii, which number is also given in the variable "measured radii". Correspondingly the standard deviation refers to the mean radius determination.

3. Data structure

To store data into the NetCDF format, first the indexing Values (dimensions) are to be defined. On those values the variables do depend on. Additional information in clear text is provided within the data file.

Level 3 NH and SH occurrence data:

What	Name	Short Name	Units	Comment
Dimension	Time	Time	[Nr]	
Dimension	Latitude Bin	LatBin	[Degree]	Centre position of a latitude band
Variable	Date	daydate	[YYYYMMDD]	
Variable	NLC occurrence frequency	nlcof	[Nr]	
Variable	Number of measurements	nmeas	[Nr]	Limb measurements pro latitude bin

Level 2 NH and SH occurrence data:

What	Name	Short Name	Units	Comment
Dimension	Time	Time	[Nr]	Day index
Dimension	Measurement	Measurement	[Nr]	Measurement index
Variable	Date	date	[YYYYMMDD]	
Variable	Orbit number	orbit	[Nr]	
Variable	Latitude	lat	[Degree]	
Variable	Longitude	lon	[Degree]	
Variable	NLC detection	nlc	[Flag]	1 if NLC's detected, 0 else
Variable	Solar azimuth angle	ssa	[Degree]	
Variable	Solar zenith angle	sza	[Degree]	
Variable	SCIAMACHY State	state	[Nr]	

Level 3 Particle Size Data:

What	Name	Short Name	Units	Comment
Dimension	Time	Time	[YYYYMMDD]	
Variable	Day relative to Solstice	drs	[Day]	
Variable	Mean particle radius	mrad	[µm]	Mean of all considered radii on a given day
Variable	Standard deviation	mstd	[µm]	
Variable	Measured radii	mnum	[Nr]	Number of radius values
Variable	Mean particle radius	gausr	[µm]	
Variable	Standard deviation	gauss	[µm]	
Variable	Measured radii	gausn	[Nr]	
Variable	Mean particle radius	lognr	[µm]	
Variable	Standard deviation	logns	[µm]	
Variable	Measured radii	lognn	[Nr]	

Level 2 Particle Size Data:

What	Name	Short Name	Units	Comment
Dimension	Time	Time	[Nr]	Day index
Variable	Date	date	[YYYYMMDD]	
Variable	Orbit	orbit	[Nr]	
Variable	NLC detection flag	nlc	[0/1]	NLC detected =1, else 0
Variable	Latitude	lat	[degree]	
Variable	Longitude	lon	[degree]	
Variable	Solar zenith angle	sza	[degree]	
Variable	Scattering angle	sca	[degree]	
Variable	Altitude	alt	[km]	
Variable	Mean particle radius	mrad	[um]	Monodisperse distribution
Variable	Standard error	merr	[um]	Monodisperse distribution
Variable	Mean particle radius	gausr	[um]	Gauss distribution
Variable	Standard error	gauserr	[um]	Gauss distribution
Variable	Mean particle radius	lognr	[um]	Lognormal dist. (· =1.52)
Variable	Standard error	lognerr	[um]	Lognormal dist. (· =1.52)