ADM-AEOLUS LEVEL-2B PROCESSOR

INPUT/OUTPUT FORTRAN STRUCTURES DESCRIPTION

Authors

Paul POLI
MÉTÉO-FRANCE

Jos de KLOE
KNMI

David TAN
ECMWF

CHANGE LOG

Version	Date	Comment	Name
0.1	7 Jun 2007	Initial draft version	P. Poli
0.2	29 Nov 2007	Updated version based on branch dat_CY32R3_Nov16. Separated header and BRC-level datastructures	P. Poli
0.3	9 May 2008	Update in line with L2BP version 1.33	P. Poli

1.Introduction

The present document details the input/output datastructure types used by the ADM-Aeolus Level-2B Processor (L2BP). The L2BP package contains code to read L1B measurement data from the ESA native EE format, and to process them into ADM-Aeolus L2B HLOS winds with associated error quantifiers, using auxiliary meteorological data.

By design, L2BP can be used as following:
- as a standalone tool (using EE files in input and output); in that case the user may not need to read the present document,
- as a series of subroutines which may be called from within a data assimilation system or other simulation environment capable of providing meteorological data at the time/location of the ADM-Aeolus measurements; in that case the user needs to fill in the input variables and understand the contents of the output variables, using the descriptions contained in the present document.

The L2BP code is implemented in Fortran and so are the datastructures described in the present document.

The document is organized as follows. Applicable and reference documents are listed in section 2, along with the acronyms used in this document. Section 3 lists the datastructure types used by the L2BP. Section 4 describes these datastructures.

2.Documents

2.1.Applicable documents

Ref	Document title	Document ref	Version	Date
[AD1]	Statement of Work of the Development and Production of L2B/C Aeolus data.	AE-SW-ESA-GS-0117	1B	Sep 2004
[AD2]	Answer to RFQ/3-11094/04/NL/MM.			Jul 2004

2.2.Reference documents

Ref	Document title	Document ref	Version	Date
[RD1]	L1B & E2S Input/Output Data Definitions Interface Control Document	ADM-IC-52-1666	3.5	Feb 2008
[RD2]	ADM-Aeolus Level-2B Processor Input/Output Data Definitions Interface Control Document	AE_IF_ECMWF-L2BP-0001	1.32	Feb 2008
[RD3]	ADM-Aeolus Level-2B Processor: Top-Level Design	AE-SAF-KNMI_L2BP-002	0.8	May 2008
[RD4]	ADM-Aeolus Level-2B Processor for NWP: User's Guide	AE-SAFUM-KNMI_L2BP-004	0.1	Dec 2007

2.3.Acronyms

ADM	Atmospheric Dynamics Mission
AOCS	Attitude and orbit Control System
AMD	Auxiliary Meteorological Data
BRC	Basic Repeat Cycle
DEM	Digital Elevation Map
DSR	Data Set Record
ECMWF	European Center for Medium-Range Weather Forecasts
EE	Earth Explorer
ESA	European Space Agency
FP	Fabry-Perot
HLOS	Horizontal Line of Sight
L1B	Level-1b
L2B	Level-2b
L2BP	Level-2b Processor
NWP	Numerical Weather Prediction
RBC	Rayleigh Brillouin Correction

3. Description of the datastructure types in input/output of the L2BP

The design of the L2BP is described in [RD3], along with its arguments and datastructure types.

The present document describes these types in separate sections numbered 4.x as detailed below.

The following datastructure types are required in input and describe instrument data as well as meteorological data:
- type l1b_brc_datatype (4.1): describes the ADM-Aeolus L1B data for one BRC
- type l1b_hdr_datatype (4.9): describes the ADM-Aeolus L1B data header information
- type amd_brc_datatype (4.8): describes the auxiliary meteorological data for one BRC
- type amd_hdr_datatype (4.7): describes the auxiliary meteorological data header information

The following datastructure types are also required in input and describe ancillary information (their actual data content is supposed to change only a few times during the lifetime of the instrument):
- type auxclim_datatype (4.2): describes the auxiliary climatology data
- type rbc_datatype (4.6): describes the auxiliary Rayleigh-Brillouin correction look-up table data

The following datastructure types describe L2BP user settings:
- type l2bp_settings_type (4.4): describes the settings of the L2BP
- type joborderdata_type (4.5): describes the names of the input and output files

The following datastructure types are returned in output:
- type l2bc_brc_datatype (4.3): describes the ADM-Aeolus L2B data for one BRC
- type l2bc_hdr_datatype (4.10): describes the ADM-Aeolus L2B data header information

Note that the latter L2B structures can also accommodate ADM-Aeolus L2C data elements but *these elements are neither defined nor filled in by the L2BP processor*.

The following datastructure type is required as an intermediate step (this is relevant only if one wishes to separate the L2BP processing steps):
- type workingdatatype (4.11)

The L2BP package provides the routines necessary to load the input structures from EE files to memory, and also to write the output structures from memory to EE files. These routines are introduced in [RD3]. Further guidelines for using the L2BP package are contained in [RD4]. Readers interested in the details of ADM-Aeolus EE files should look in [RD1,RD2].

Note that all the structures described below contain equivalent information in the EE file definitions [RD2]. The variable names may differ slightly because of the 31-character limit imposed by the Fortran language. The Fortran variable names are not case-sensitive (i.e. the variables may be written in upper or lower caps).

4. Description of the Fortran datastructures

4.1. l1b_brc_datatype

Name	Variable type	Description
geoloc_ads	type(l1b_geoloc_ads_type), pointer	STRUCTURE – see Table 1.2
pcd_ads	type(l1b_pcd_ads_type), pointer	STRUCTURE – see Table 1.9
gwd_ads	type(l1b_gwd_ads_type), pointer	STRUCTURE – see Table 1.16
meas_ads	type(l1b_meas_ads_type), pointer	STRUCTURE – see Table 1.19
cal_ads	type(l1b_cal_ads_type), pointer	STRUCTURE – see Table 1.25
us_mds	type(l1b_us_mds_type), pointer	STRUCTURE – see Table 1.43
wv_mds	type(l1b_wv_mds_type), pointer	STRUCTURE – see Table 1.47

Table 1.1: Definition of the structure **l1b_brc_datatype**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
obs_aocs	type(aocs_type)	STRUCTURE – see Table 1.4
meas_aocs	type(aocs_type), dimension(:), pointer	STRUCTURE – see Table 1.4
obs_geoloc	type(obs_geolocation_type)	STRUCTURE – see Table 1.5
meas_geoloc	type(meas_geolocation_type), dimension(:), pointer	STRUCTURE – see Table 1.7

Table 1.2: Definition of the structure **l1b_geoloc_ads_type**

Name	Variable type	Description
daycount	integer*4	since 1-1-2000 0:0 h (may be negative)
seconds	integer*8	elapsed since beginning of the day
microseconds	integer*8	elapsed since start of last second

Table 1.3: Definition of the structure **datetimetype**

Name	Variable type	Description
obs_centroid_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
x_position	real*8	m
y_position	real*8	m
z_position	real*8	m
x_velocity	real*8	m/s
y_velocity	real*8	m/s
z_velocity	real*8	m/s
roll_angle	real*8	deg
pitch_angle	real*8	deg
yaw_angle	real*8	deg

Table 1.4: Definition of the structure **aocs_type**

Name	Variable type	Description
mie_rangebin_geoloc	type(rangebin_obs_geoloc_type), dimension(:),pointer	STRUCTURE – see Table 1.6
rayleigh_rangebin_geoloc	type(rangebin_obs_geoloc_type), dimension(:),pointer	STRUCTURE – see Table 1.6
lat_of_dem_intersection	integer*4	10E-6 deg N
lon_of_dem_intersection	integer*4	10E-6 deg E
alt_of_dem_intersection	real*8	m
line_of_sight_velocity	real*8	m/s
geoid_separation_of_height_bin	real*8	m

Table 1.5: Definition of the structure **obs_geolocation_type**

Name	Variable type	Description
lon_of_height_bin	integer*4	10E-6 deg E
lat_of_height_bin	integer*4	10E-6 deg N
alt_of_height_bin	real*8	m
topoc_azim_of_height_bin	real*8	deg
topoc_elev_of_height_bin	real*8	deg
target_to_sun_visib_flag	integer*2	
satellite_range_of_height_bin	real*8	m

Table 1.6: Definition of the structure **rangebin_obs_geoloc_type**

Name	Variable type	Description
mie_rangebin_geoloc	type(rangebin_meas_geoloc_type), dimension(:),pointer	STRUCTURE – see Table 1.8
rayleigh_rangebin_geoloc	type(rangebin_meas_geoloc_type), dimension(:),pointer	STRUCTURE – see Table 1.8

lat_of_dem_intersection	integer*4	10E-6 deg N
lon_of_dem_intersection	integer*4	10E-6 deg E
alt_of_dem_intersection	real*8	m
aocs_los_velocity	real*8	m/s

Table 1.7: Definition of the structure **meas_geolocation_type**

Name	Variable type	Description
lon_of_height_bin	integer*4	10E-6 deg E
lat_of_height_bin	integer*4	10E-6 deg N
alt_of_height_bin	real*8	m

Table 1.8: Definition of the structure **rangebin_meas_geoloc_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	STRUCTURE – see Table 1.3
nmeas	integer*2	
npulses	integer*2	
observation_pcd	type(observation_pcd_type)	STRUCTURE – see Table 1.10
measurement_pcd	type(measurement_pcd_type), dimension(:), pointer	STRUCTURE – see Table 1.14

Table 1.9: Definition of the structure **l1b_pcd_ads_type**

Name	Variable type	Description
nr_meas_laser_freq_unlocked	integer*4	
nr_ref_laser_freq_unlocked	integer*4	
nr_sat_not_on_target_meas	integer*4	
nr_corrupt_mie_meas	integer*4	
nr_corrupt_rayleigh_meas	integer*4	
nr_corrupt_mie_ref_pulses	integer*4	
nr_corrupt_rayleigh_ref_pulses	integer*4	
avg_laser_freq_offset	real*8	
avg_uv_energy	real*8	
laser_freq_offset_std_dev	real*8	
uv_energy_std_dev	real*8	
nr_invalid_mie_peak	integer*4	
obs_alt_bin_pcd	type(obs_alt_bin_pcd_type), dimension(:), pointer	STRUCTURE – see Table 1.11
nr_mie_invalid_meas	integer*4	
nr_mie_invalid_ref_pulses	integer*4	
nr_rayleigh_invalid_meas	integer*4	
nr_rayleigh_invalid_ref_pulses	integer*4	
mie_mean_emitted_freq	real*8	
mie_emitted_freq_std_dev	real*8	

rayleigh_mean_emitted_freq	real*8	
rayleigh_emitted_freq_std_dev	real*8	
multimode_ratio_quality_flag	logical	

Table 1.10: Definition of the structure **observation_pcd_type**

Name	Variable type	Description
error_quantifier	type(errorquantifiertype)	STRUCTURE – see Table 1.12
mie_wind_velocity_std_dev	real*8	
rayleigh_wind_velocity_std_dev	real*8	
mie_useful_signal_std_dev	real*8	
rayleigh_useful_signal_stdev_a	real*8	
rayleigh_useful_signal_stdev_b	real*8	
mie_core_char	type(mie_core_char_type)	STRUCTURE – see Table 1.13
scattering_ratio	real*8	
mie_snr	real*8	
rayleigh_snr_channel_a	real*8	
rayleigh_snr_channel_b	real*8	

Table 1.11: Definition of the structure **obs_alt_bin_pcd_type**

Name	Variable type	Description
error_quant_mie	real*8	
error_quant_rayleigh	real*8	
error_quant_rayleigh_channel_a	real*8	
error_quant_rayleigh_channel_b	real*8	

Table 1.12: Definition of the structure **errorquantifiertype**

Name	Variable type	Description
peak_position	real*8	
fwhm	real*8	
amplitude	real*8	
offset	real*8	
error_flag	logical	
residual_error	real*8	
num_iterations	integer*2	

Table 1.13: Definition of the structure **mie_core_char_type**

Name	Variable type	Description
num_mie_invalid_ref_pulses	integer*4	
num_rayleigh_invalid_ref_pulses	integer*4	
avg_laser_freq_offset	real*8	

avg_uv_energy	real*8	
laser_freq_offset_std_dev	real*8	
uv_energy_std_dev	real*8	
meas_alt_bin_pcd	type(meas_alt_bin_pcd_type), dimension(:), pointer	STRUCTURE – see Table 1.15
vel_of_att_uncertainty_error	real*8	
mie_mean_emitted_freq	real*8	
mie_emitted_std_dev	real*8	
reference_pulse_fwhm	real*8	
rayleigh_mean_emitted_freq	real*8	
rayleigh_emitted_freq_std_dev	real*8	
uv_energy_quality_flag	logical	

Table 1.14: Definition of the structure **measurement_pcd_type**

Name	Variable type	Description
mie_meas_invalid	logical	
rayleigh_meas_invalid	logical	
invalid_mie_peak	logical	
mie_core_char	type(mie_core_char_type)	STRUCTURE – see Table 1.13
scattering_ratio	real*8	
mie_snr	real*8	
rayleigh_snr_channel_a	real*8	
rayleigh_snr_channel_b	real*8	

Table 1.15: Definition of the structure **meas_alt_bin_pcd_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
mie_ground_corr_velocity	real*8	[m/s]
rayleigh_ground_corr_velocity	real*8	[m/s]
updated_mie_ground_corr_vel	logical	flag
updated_rayleigh_grnd_corr_vel	logical	flag
mie_avg_grnd_wind_bin_alt	real*8	[m]
rayleigh_avg_grnd_wind_bin_alt	real*8	[m]
mie_avg_grnd_wind_bin_thick	real*8	[m]
rayleigh_avg_grnd_wnd_bin_thick	real*8	[m]
validation_criteria	type(validation_criteria_type)	STRUCTURE – see Table 1.17
meas_gwd	type(meas_gwd_type), dimension(:), pointer	STRUCTURE – see Table 1.18
mie_grnd_corr_wght_factor	real*8	[no unit]
rayleigh_grnd_corr_wght_factor	real*8	[no unit]
mie_ch_tot_zero_wind_corr	real*8	[no unit]
rayl_ch_tot_zero_wind_corr	real*8	[no unit]

hbe_mie_grnd_corr_vel	real*8	[m/s]
hbe_rayl_grnd_corr_vel	real*8	[m/s]

Table 1.16: Definition of the structure **l1b_gwd_ads_type**

Name	Variable type	Description
min_n_mie_grnd_echo_meas_bins	integer*2	
min_n_rayl_grnd_echo_meas_bins	integer*2	
nr_of_mie_ground_bins	integer*2	
nr_of_rayleigh_ground_bins	integer*2	

Table 1.17: Definition of the structure **validation_criteria_type**

Name	Variable type	Description
mie_grnd_wind_detected	logical	
mie_grnd_bin_number	integer*2	
mie_grnd_bin_thick_ab_dem	real*8	
rayleigh_grnd_wind_detected	logical	
rayleigh_grnd_bin_number	integer*2	
rayleigh_grnd_bin_thick_ab_dem	real*8	

Table 1.18: Definition of the structure **meas_gwd_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
num_of_reference_pulses	integer*8	Unsigned int4 stored as i8_.
mie_reference_pulses	type(mie_spectrometer_count_type), dimension(:), pointer	STRUCTURE – see Table 1.20
rayleigh_reference_pulses_a	type(rayl_spectrometer_count_type), dimension(:), pointer	STRUCTURE – see Table 1.21
rayleigh_reference_pulses_b	type(rayl_spectrometer_count_type), dimension(:), pointer	STRUCTURE – see Table 1.21
mie_measurement_data	type(mie_measurement_spectrum_type), dimension(:), pointer	STRUCTURE – see Table 1.22
mie_time_delays	type(time_delay_type)	STRUCTURE – see Table 1.23
rayleigh_time_delays	type(time_delay_type)	STRUCTURE – see Table 1.23
validity_indicators	type(validity_indicator_type), dimension(:), pointer	STRUCTURE – see Table 1.24

Table 1.19: Definition of the structure **l1b_meas_ads_type**

Name	Variable type	Description
spectrometer_count	integer*4, dimension(20)	

Table 1.20: Definition of the structure **mie_spectrometer_count_type**

Name	Variable type	Description
spectrometer_count	real*8	

Table 1.21: Definition of the structure **rayl_spectrometer_count_type**

Name	Variable type	Description
mie_spectra_alt_bin	type(mie_spectrometer_count_type), dimension(:), pointer	STRUCTURE – see Table 1.20

Table 1.22: Definition of the structure **mie_measurement_spectrum_type**

Name	Variable type	Description
bin_layer_integration_time	integer*4, dimension(:), pointer	
background_integration_time	integer*4	

Table 1.23: Definition of the structure **time_delay_type**

Name	Variable type	Description
measurement_data_present	logical	
mie_measurement_sp_valid	logical	
rayleigh_measurement_sp_valid	logical	
measurement_laser_freq_locked	logical	
spacecraft_attitude_on_target	logical	

Table 1.24: Definition of the structure **validity_indicator_type**

Name	Variable type	Description
mrc_first_start_of_obs_datetime	type(datetimetype)	STRUCTURE – see Table 1.3
mrc_last_start_of_obs_datetime	type(datetimetype)	STRUCTURE – see Table 1.3
rrc_first_start_of_obs_datetime	type(datetimetype)	STRUCTURE – see Table 1.3
rrc_last_start_of_obs_datetime	type(datetimetype)	STRUCTURE – see Table 1.3
l1b_char_data	type(l1b_char_data_type)	STRUCTURE – see Table 1.26

Table 1.25: Definition of the structure **l1b_cal_ads_type**

Name	Variable type	Description
sat_char_data	type(sat_char_data_type)	STRUCTURE – see Table 1.27
mie_resp_calib_data	type(mie_resp_calib_data_type)	STRUCTURE – see Table 1.30
rayl_resp_calib_data	type(rayl_resp_calib_data_type)	STRUCTURE – see Table 1.38

Table 1.26: Definition of the structure **l1b_char_data_type**

Name	Variable type	Description
laser_wavelength	real*8	
err_quant	type(err_quant_type)	STRUCTURE – see Table 1.28
list_tripod_obscur_corr	type(list_tripod_obscur_corr_type), dimension(1:16)	STRUCTURE – see Table 1.29
nf_order	integer*4	
mie_harmonic_bias_coeff_a	real*8, dimension(1:1024)	
mie_harmonic_bias_coeff_b	real*8, dimension(1:1024)	
rayl_harmonic_bias_coeff_a	real*8, dimension(1:1024)	
rayl_harmonic_bias_coeff_b	real*8, dimension(1:1024)	

Table 1.27: Definition of the structure **sat_char_data_type**

Name	Variable type	Description
mie_err_quant_k1	real*8	
mie_err_quant_k2	real*8	
mie_err_quant_k3	real*8	
rayl_err_quant_ka2	real*8	
rayl_err_quant_ka3	real*8	
rayl_err_quant_kb2	real*8	
rayl_err_quant_kb3	real*8	

Table 1.28: Definition of the structure **err_quant_type**

Name	Variable type	Description
tripod_obscur_corr	real*8	

Table 1.29: Definition of the structure **list_tripod_obscur_corr_type**

Name	Variable type	Description
calib_valid	logical	
list_mie_freq_step_res	type(list_mie_freq_step_res_type), dimension(1:nummrcfreqsteps)	STRUCTURE – see Table 1.31
mie_meas_resp_calib	type(mie_meas_resp_calib_type)	STRUCTURE – see

		Table 1.34
mie_ref_pulse_resp_calib	type(mie_ref_pulse_resp_calib_type)	STRUCTURE – see Table 1.35
meas_calib_valid	type(meas_calib_valid_type)	STRUCTURE – see Table 1.36
ref_pulse_calib_valid	type(ref_pulse_calib_valid_type)	STRUCTURE – see Table 1.37

Table 1.30: Definition of the structure **mie_resp_calib_data_type**

Name	Variable type	Description
mie_freq_step_res	type(mie_freq_step_res_type)	STRUCTURE – see Table 1.32

Table 1.31: Definition of the structure **list_mie_freq_step_res_type**

Name	Variable type	Description
freq_offset	real*8	
freq_valid	logical	
meas_resp_valid	logical	
ref_pulse_resp_valid	logical	
meas_resp	real*8	
meas_err_mie_resp	real*8	
ref_pulse_resp	real*8	
ref_pulse_err_mie_resp	real*8	
freq_step_data_stat	type(freq_step_data_stat_type)	STRUCTURE – see Table 1.33

Table 1.32: Definition of the structure **mie_freq_step_res_type**

Name	Variable type	Description
num_valid_meas	integer*4	
num_meas_usable	integer*4	
num_ref_pulse_usable	integer*4	
num_meas_freq_unlock	integer*4	
num_ref_pulse_freq_unlock	integer*4	
num_sat_not_on_target_meas	integer*4	
num_corrupt_meas	integer*4	
num_corrupt_ref_pulse	integer*4	

Table 1.33: Definition of the structure **freq_step_data_stat_type**

Name	Variable type	Description
meas_mean_sensitivity	real*8	
meas_zero_freq	real*8	
meas_err_mie_resp_stdev	real*8	

Table 1.34: Definition of the structure **mie_meas_resp_calib_type**

Name	Variable type	Description
ref_pulse_mean_sensitivity	real*8	
ref_pulse_zero_freq	real*8	
ref_pulse_err_mie_resp_stdev	real*8	

Table 1.35: Definition of the structure **mie_ref_pulse_resp_calib_type**

Name	Variable type	Description
mean_sensitivity_valid	logical	
error_resp_stdev_valid	logical	
zero_freq_resp_valid	logical	
data_monotonic	logical	

Table 1.36: Definition of the structure **meas_calib_valid_type**

Name	Variable type	Description
mean_sensitivity_valid	logical	
error_resp_stdev_valid	logical	
zero_freq_resp_valid	logical	
data_monotonic	logical	

Table 1.37: Definition of the structure **ref_pulse_calib_valid_type**

Name	Variable type	Description
calib_valid	logical	
list_rayl_freq_step_res	type(list_rayl_freq_step_res_type), dimension(1:nummrcfreqsteps)	STRUCTURE – see Table 1.39
rayl_meas_resp_calib	type(rayl_meas_resp_calib_type)	STRUCTURE – see Table 1.41
rayl_ref_pulse_resp_calib	type(rayl_ref_pulse_resp_calib_type)	STRUCTURE – see Table 1.42
meas_calib_valid	type(meas_calib_valid_type)	STRUCTURE – see Table 1.36
ref_pulse_calib_valid	type(ref_pulse_calib_valid_type)	STRUCTURE – see Table 1.37

Table 1.38: Definition of the structure **rayl_resp_calib_data_type**

Name	Variable type	Description
rayl_freq_step_res	type(rayl_freq_step_res_type)	STRUCTURE – see Table 1.40

Table 1.39: Definition of the structure **list_rayl_freq_step_res_type**

Name	Variable type	Description
freq_offset	real*8	
freq_valid	logical	
meas_resp_valid	logical	
ref_pulse_resp_valid	logical	
meas_resp	real*8	
meas_err_rayl_resp	real*8	
ref_pulse_resp	real*8	
ref_pulse_err_rayl_resp	real*8	
freq_step_data_stat	type(freq_step_data_stat_type)	STRUCTURE – see Table 1.33

Table 1.40: Definition of the structure **rayl_freq_step_res_type**

Name	Variable type	Description
meas_mean_sensitivity	real*8	
meas_zero_freq	real*8	
meas_err_rayl_resp_stdev	real*8	

Table 1.41: Definition of the structure **rayl_meas_resp_calib_type**

Name	Variable type	Description
ref_pulse_mean_sensitivity	real*8	
ref_pulse_zero_freq	real*8	
ref_pulse_err_rayl_resp_stdev	real*8	

Table 1.42: Definition of the structure **rayl_ref_pulse_resp_calib_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
obs_us	type(us_type)	STRUCTURE – see Table 1.44
meas_us	type(us_type), dimension(:), pointer	STRUCTURE – see Table 1.44

Table 1.43: Definition of the structure **l1b_us_mds_type**

Name	Variable type	Description
mie	type(rangebin_us_mie_type), dimension(:), pointer	STRUCTURE – see Table 1.45
rayleigh	type(rangebin_us_rayleigh_type), dimension(:), pointer	STRUCTURE – see Table 1.46

Table 1.44: Definition of the structure **us_type**

Name	Variable type	Description
data_quality_flag	integer*2	8 bits flag
useful_signal	real*8	

Table 1.45: Definition of the structure **rangebin_us_mie_type**

Name	Variable type	Description
data_quality_flag	integer*2	8 bits flag
useful_signal_channel_a	real*8	
useful_signal_channel_b	real*8	

Table 1.46: Definition of the structure **rangebin_us_rayleigh_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
line_of_sight_wind_flag	integer*1	
obs_wind_profile	type(wind_profile_type)	STRUCTURE – see Table 1.48
meas_wind_profile	type(wind_profile_type), dimension(:), pointer	STRUCTURE – see Table 1.48

Table 1.47: Definition of the structure **l1b_wv_mds_type**

Name	Variable type	Description
mie_ref_pulse_quality_flag	integer*2	
rayleigh_ref_pulse_quality_flag	integer*2	
mie_alt_bin_wind_info	type(alt_bin_wind_info_type), dimension(:), pointer	STRUCTURE – see Table 1.49
rayleigh_alt_bin_wind_info	type(alt_bin_wind_info_type), dimension(:), pointer	STRUCTURE – see Table 1.49

Table 1.48: Definition of the structure **wind_profile_type**

Name	Variable type	Description
bin_quality_flag	integer*2	
wind_velocity	real*8	

Table 1.49: Definition of the structure **alt_bin_wind_info_type**

4.2.auxclim_datatype

Name	Variable type	Description

fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(auxclim_sph_type), pointer	STRUCTURE – see Table 2.6
auxclim_ds	type(auxclim_ds_type), pointer	STRUCTURE – see Table 2.8

Table 2.1: Definition of the structure **auxclim_datatype**

Name	Variable type	Description
file_name	character(len=maxlen_file_name)	
file_description	character(len=maxlen_file_description)	
notes	character(len=maxlen_notes)	
mission	character(len=maxlen_mission)	
file_class	character(len=maxlen_file_class)	
file_type	character(len=maxlen_file_type)	
validity_period	type(fh_validity_period_type)	STRUCTURE – see Table 2.3
file_version	integer*4	
source	type(fh_source_type)	STRUCTURE – see Table 2.4

Table 2.2: Definition of the structure **fh_type**

Name	Variable type	Description
validity_start	character(len=maxlen_validity_start)	
validity_stop	character(len=maxlen_validity_stop)	

Table 2.3: Definition of the structure **fh_validity_period_type**

Name	Variable type	Description
system	character(len=maxlen_system)	
creator	character(len=maxlen_creator)	
creator_version	character(len=maxlen_creator_version)	
creation_date	character(len=maxlen_creation_date)	

Table 2.4: Definition of the structure **fh_source_type**

Name	Variable type	Description
product	character(len=maxlen_product)	
proc_stage	character(len=maxlen_proc_stage)	
ref_doc	character(len=maxlen_ref_doc)	

acquisition_station	character(len=maxlen_acq_stat)	
proc_center	character(len=maxlen_proc_center)	
proc_time	character(len=maxlen_datetime_kvt)	
software_ver	character(len=maxlen_software_ver)	
sensing_start	character(len=maxlen_datetime_kvt)	
sensing_stop	character(len=maxlen_datetime_kvt)	
phase	character(len=maxlen_phase)	
cycle	character(len=maxlen_intauc)	
rel_orbit	character(len=maxlen_intas)	
abs_orbit	character(len=maxlen_intas)	
state_vector_time	character(len=maxlen_datetime_kvt)	
delta_ut1	character(len=maxlen_fado06)	
x_position	character(len=maxlen_fado73)	
y_position	character(len=maxlen_fado73)	
z_position	character(len=maxlen_fado73)	
x_velocity	character(len=maxlen_fado46)	
y_velocity	character(len=maxlen_fado46)	
z_velocity	character(len=maxlen_fado46)	
vector_source	character(len=maxlen_vecor_src)	not used by ADM_Aeolus
utc_sbt_time	character(len=maxlen_datetime_kvt)	not used by ADM_Aeolus
sat_binary_time	character(len=maxlen_intaul)	not used by ADM_Aeolus
clock_step	character(len=maxlen_intaul)	not used by ADM_Aeolus
leap_utc	character(len=maxlen_datetime_kvt)	
leap_sign	character(len=maxlen_intac)	
leap_err	character(len=maxlen_boolkvt)	
product_err	character(len=maxlen_boolkvt)	
tot_size	character(len=maxlen_intad)	
sph_size	character(len=maxlen_intal)	
num_dsd	character(len=maxlen_intal)	
dsd_size	character(len=maxlen_intal)	
num_data_sets	character(len=maxlen_intal)	

Table 2.5: Definition of the structure **mph_type**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
auxclim_ref_name	character(len=maxlen_auxclim_ref_name)	
auxclim_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7

Table 2.6: Definition of the structure **auxclim_sph_type**

Name	Variable type	Description

ds_name	character(len=maxlen_ds_name)	
ds_type	character(len=maxlen_ds_type)	
filename	character(len=maxlen_filename)	
ds_offset	character(len=maxlen_intad)	
ds_size	character(len=maxlen_intal)	
num_dsr	character(len=maxlen_intal)	
dsr_size	character(len=maxlen_intal)	
byte_order	character(len=maxlen_byte_order)	
start_of_ds	integer*8	= DS_Offset + 1
end_of_ds	integer*8	= DS_Offset+DS_SIZE
nr_of_dataset_records	integer*4	= NUM_DSR
size_of_one_dsr	integer*4	= DSR_SIZE
size_of_ds	integer*4	= DS_SIZE

Table 2.7: Definition of the structure **dsd_type**

Name	Variable type	Description
num_datetime_ranges	integer*2	
climlatlonalt	type(climlatlonalt_type), dimension(:), pointer	STRUCTURE – see Table 2.9

Table 2.8: Definition of the structure **auxclim_ds_type**

Name	Variable type	Description
startdatetime	type(datetimetype)	STRUCTURE – see Table 1.3
enddatetime	type(datetimetype)	STRUCTURE – see Table 1.3
num_latitude_ranges	integer*2	
climlonalt	type(climlonalt_type), dimension(:), pointer	STRUCTURE – see Table 2.10

Table 2.9: Definition of the structure **climlatlonalt_type**

Name	Variable type	Description
startlatitude	integer*4	
endlatitude	integer*4	
num_longitude_ranges	integer*2	
climalt	type(climalt_type), dimension(:), pointer	STRUCTURE – see Table 2.11

Table 2.10: Definition of the structure **climlonalt_type**

Name	Variable type	Description
startlongitude	integer*4	
endlongitude	integer*4	

num_altitude_ranges	integer*2	
climdata	type(climdata_type), dimension(:), pointer	STRUCTURE – see Table 2.12

Table 2.11: Definition of the structure **climalt_type**

Name	Variable type	Description
startaltitude	integer*4	
endaltitude	integer*4	
s	integer*4	
s_stdev	integer*4	

Table 2.12: Definition of the structure **climdata_type**

4.3. l2bc_brc_datatype

Name	Variable type	Description
nr_of_measurements	integer*4	
nr_of_observations	integer*4	
obs	type(l2b_observationtype), dimension(:), pointer	STRUCTURE – see Table 3.2
geoloc_ads	type(l2b_geoloc_ads_type), pointer	STRUCTURE – see Table 3.4
pcd_ads	type(l2b_pcd_ads_type), pointer	STRUCTURE – see Table 3.7
mie_mds	type(l2b_mie_mds_type), pointer	STRUCTURE – see Table 3.33
rayleigh_mds	type(l2b_rayleigh_mds_type), pointer	STRUCTURE – see Table 3.39
assim_pcd_ads	type(l2c_assimpcd_ads_type), pointer	STRUCTURE – see Table 3.42
mie_vecwind_mds	type(l2c_mievec_mds_type), pointer	STRUCTURE – see Table 3.52
rayleigh_vecwind_mds	type(l2c_rayleighvec_mds_type), pointer	STRUCTURE – see Table 3.55

Table 3.1: Definition of the structure **l2bc_brc_datatype**

Name	Variable type	Description
observation_type	integer*4	
nr_of_range_gates	integer*4	
rangegate	type(l2b_obsrangegatetype), dimension(:), pointer	STRUCTURE – see Table 3.3

Table 3.2: Definition of the structure **l2b_observationtype**

Name	Variable type	Description
alt_start	real*8	bottom altitude of this range gate
alt_cog	real*8	altitude for the center of gravity
alt_end	real*8	top altitude fo this range gate
nr_of_measurements	integer	
lat_start	real*8	
lat_stop	real*8	
lon_start	real*8	
lon_stop	real*8	
lat_cog	real*8	
lon_cog	real*8	
t_ref	real*8	
p_ref	real*8	
hlos_cog	real*8	

Table 3.3: Definition of the structure **l2b_obsrangegatetype**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
n_obs_mie_actual	integer*2	actual nr of Obs. for this BRC
n_obs_rayleigh_actual	integer*2	dito
mie_geolocation	type(geolocation_type), dimension(:), pointer	STRUCTURE – see Table 3.5
rayleigh_geolocation	type(geolocation_type), dimension(:), pointer	STRUCTURE – see Table 3.5
wgs84_to_geoid_altitude	integer*4	difference between the geoid and WGS-84 surface in [m]

Table 3.4: Definition of the structure **l2b_geoloc_ads_type**

Name	Variable type	Description
height_bin	type(geolocation_bin_type), dimension(:), pointer	STRUCTURE – see Table 3.6
lat_of_dem_intersection	integer*4	[10E-6 degN]
lon_of_dem_intersection	integer*4	[10E-6 degE]
alt_of_dem_intersection	integer*4	[m]

Table 3.5: Definition of the structure **geolocation_type**

Name	Variable type	Description

latitude_start	integer*4	[10E-6 degN]
latitude_stop	integer*4	[10E-6 degN]
latitude_cog	integer*4	[10E-6 degN]
longitude_start	integer*4	[10E-6 degE]
longitude_stop	integer*4	[10E-6 degE]
longitude_cog	integer*4	[10E-6 degE]
altitude_bottom	integer*4	[m]
altitude_top	integer*4	[m]
altitude_cog	integer*4	[m]
los_azimuth	real*8	[deg]
los_elevation	real*8	[deg]
los_sat_velocity	real*8	[m/s]

Table 3.6: Definition of the structure **geolocation_bin_type**

Name	Variable type	Description
n_meas	integer*2	actual nr of meas. for this BRC
n_obs_mie_actual	integer*2	actual nr of Obs. for this BRC
n_obs_rayleigh_actual	integer*2	dito
l1b_input_screening	type(l1b_input_screening_type)	STRUCTURE – see Table 3.8
l2b_amd_screening	type(l2b_amd_screening_type)	STRUCTURE – see Table 3.17
mie_classification_qc	type(mie_classification_qc_type)	STRUCTURE – see Table 3.19
rayl_classification_qc	type(rayl_classification_qc_type)	STRUCTURE – see Table 3.23
mie_processing_qc	type(mie_processing_qc_type)	STRUCTURE – see Table 3.27
rayleigh_processing_qc	type(rayleigh_processing_qc_type)	STRUCTURE – see Table 3.30

Table 3.7: Definition of the structure **l2b_pcd_ads_type**

Name	Variable type	Description
obs_screening	integer*2	
obs_screening_flags1	integer*2	
obs_screening_flags2	integer*2	
obs_screening_flags3	integer*2	
obs_screening_flags4	integer*2	
obs_screening_flags5	integer*2	
mie_meas	type(l1b_mie_meas_screening_type), dimension(:), pointer	STRUCTURE – see Table 3.9
rayl_meas	type(l1b_rayl_meas_screening_type), dimension(:), pointer	STRUCTURE – see Table 3.11

mrc_screening	type(l1b_mrc_screening_type)	STRUCTURE – see Table 3.13
rrc_screening	type(l1b_rrc_screening_type)	STRUCTURE – see Table 3.14
zwc_screening	type(l1b_zwc_screening_type)	STRUCTURE – see Table 3.15
rbc_screening	type(l1b_rbc_screening_type)	STRUCTURE – see Table 3.16

Table 3.8: Definition of the structure **l1b_input_screening_type**

Name	Variable type	Description
meas_qc	integer*2	
meas_qc_flags	integer*2	
bin_screening	type(l1b_mie_meas_bin_scr_type),dimension(:), pointer	STRUCTURE – see Table 3.10

Table 3.9: Definition of the structure **l1b_mie_meas_screening_type**

Name	Variable type	Description
bin_qc	integer*2	
bin_qc_flags	integer*2	

Table 3.10: Definition of the structure **l1b_mie_meas_bin_scr_type**

Name	Variable type	Description
meas_qc	integer*2	
meas_qc_flags	integer*2	
bin_screening	type(l1b_rayl_meas_bin_scr_type), dimension(:), pointer	STRUCTURE – see Table 3.12

Table 3.11: Definition of the structure **l1b_rayl_meas_screening_type**

Name	Variable type	Description
bin_qc	integer*2	
bin_qc_flags	integer*2	

Table 3.12: Definition of the structure **l1b_rayl_meas_bin_scr_type**

Name	Variable type	Description
calibration_valid	integer*2	overall validity

Table 3.13: Definition of the structure **l1b_mrc_screening_type**

Name	Variable type	Description

calibration_valid	integer*2	overall validity

Table 3.14: Definition of the structure **l1b_rrc_screening_type**

Name	Variable type	Description
calibration_valid	integer*2	overall validity

Table 3.15: Definition of the structure **l1b_zwc_screening_type**

Name	Variable type	Description
calibration_valid	integer*2	overall validity

Table 3.16: Definition of the structure **l1b_rbc_screening_type**

Name	Variable type	Description
l2b_amd_screening_qc	integer*2	enum field
l2b_amd_screening_qc_flags	integer*2	
l2b_amd_collocations	type(l2b_amd_collocations_type), dimension(:), pointer	STRUCTURE – see Table 3.18

Table 3.17: Definition of the structure **l2b_amd_screening_type**

Name	Variable type	Description
l2b_amd_collocation_qc	integer*2	enum field
l2b_amd_collocation_qc_flags	integer*2	

Table 3.18: Definition of the structure **l2b_amd_collocations_type**

Name	Variable type	Description
l2b_mie_meas_classific	type(l2b_mie_meas_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.20
l2b_mie_obs_classific	type(l2b_mie_obs_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.22

Table 3.19: Definition of the structure **mie_classification_qc_type**

Name	Variable type	Description
l2b_mie_meas_bin_classific	type(l2b_mie_bin_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.21

Table 3.20: Definition of the structure **l2b_mie_meas_classific_type**

Name	Variable type	Description
flag1	integer*2	

flag2	integer*2	
l2b_reliability	real*8	

<p align="center">Table 3.21: Definition of the structure l2b_mie_bin_classific_type</p>

Name	Variable type	Description
flag	integer*2	
l2b_mie_obs_bin_classific	type(l2b_mie_bin_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.21

<p align="center">Table 3.22: Definition of the structure l2b_mie_obs_classific_type</p>

Name	Variable type	Description
l2b_rayl_meas_classific	type(l2b_rayl_meas_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.24
l2b_rayl_obs_classific	type(l2b_rayl_obs_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.26

<p align="center">Table 3.23: Definition of the structure rayl_classification_qc_type</p>

Name	Variable type	Description
l2b_rayl_meas_bin_classific	type(l2b_rayl_bin_classific_type),dimension(:), pointer	STRUCTURE – see Table 3.25

<p align="center">Table 3.24: Definition of the structure l2b_rayl_meas_classific_type</p>

Name	Variable type	Description
flag1	integer*2	
flag2	integer*2	
l2b_reliability	real*8	

<p align="center">Table 3.25: Definition of the structure l2b_rayl_bin_classific_type</p>

Name	Variable type	Description
flag	integer*2	
l2b_rayl_obs_bin_classific	type(l2b_rayl_bin_classific_type), dimension(:), pointer	STRUCTURE – see Table 3.25

<p align="center">Table 3.26: Definition of the structure l2b_rayl_obs_classific_type</p>

Name	Variable type	Description
obs_mie_qc	type(obs_mie_qc_type), dimension(:), pointer	STRUCTURE – see Table 3.28
mie_background_high	integer*2	

Table 3.27: Definition of the structure **mie_processing_qc_type**

Name	Variable type	Description
obs_mie_bin_qc	type(obs_mie_bin_qc_type), dimension(:), pointer	STRUCTURE – see Table 3.29

Table 3.28: Definition of the structure **obs_mie_qc_type**

Name	Variable type	Description
hlos_error_estimate	real*8	[m/s]
reliability_number	real*8	
flags	integer*2	
fitting_amplitude	real*8	
fitting_residual	real*8	
fitting_offset	real*8	
fitting_fwhm	real*8	
mie_snr	real*8	
extinction	real*8	[1/m]
scattering_ratio	real*8	
variability_measure	real*8	

Table 3.29: Definition of the structure **obs_mie_bin_qc_type**

Name	Variable type	Description
obs_rayleigh_qc	type(obs_rayleigh_qc_type), dimension(:), pointer	STRUCTURE – see Table 3.31
rayleigh_background_high	integer*2	

Table 3.30: Definition of the structure **rayleigh_processing_qc_type**

Name	Variable type	Description
obs_rayleigh_bin_qc	type(obs_rayleigh_bin_qc_type),dimension(:), pointer	STRUCTURE – see Table 3.32

Table 3.31: Definition of the structure **obs_rayleigh_qc_type**

Name	Variable type	Description
hlos_error_estimate	real*8	[m/s]
flags1	integer*2	
flags2	integer*2	
flags3	integer*2	
extinction	real*8	[1/m]
scattering_ratio	real*8	
variability_measure	real*8	
extinction_method	integer*2	

| scattering_ratio_method | integer*2 | |

Table 3.32: Definition of the structure **obs_rayleigh_bin_qc_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
n_meas	integer*2	nr of Measurements in this product
n_obs_mie_actual	integer*2	actual nr of Obs. for this BRC
p	integer*2	total nr of laser pulses in one Meas.
map_of_l1b_measurements_used	type(meas_map_type), pointer	STRUCTURE – see Table 3.34
mie_profile	type(mie_profile_type), dimension(:), pointer	STRUCTURE – see Table 3.37

Table 3.33: Definition of the structure **l2b_mie_mds_type**

Name	Variable type	Description
row	type(meas_map_row_type), dimension(:), pointer	STRUCTURE – see Table 3.35

Table 3.34: Definition of the structure **meas_map_type**

Name	Variable type	Description
bin	type(meas_map_bin_type), dimension(:), pointer	STRUCTURE – see Table 3.36

Table 3.35: Definition of the structure **meas_map_row_type**

Name	Variable type	Description
which_l2b_obs	integer*2	store for each L1B measurement bin the L2B observation number to which it was assigned, or 0 if it was not used
weight	integer*4	value between 0-1000

Table 3.36: Definition of the structure **meas_map_bin_type**

Name	Variable type	Description
obs_type	integer*2	
height_bin	type(mie_height_bin_type), dimension(:), pointer	STRUCTURE – see Table 3.38

Table 3.37: Definition of the structure **mie_profile_type**

Name	Variable type	Description
validity_flag	logical	.true. = valid = 1
mie_wind_velocity	integer*2	[cm/s]
mie_error_quantifier	integer*4	[cm/s]
integration_length	integer*8	[m]

Table 3.38: Definition of the structure **mie_height_bin_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
n_meas	integer*2	nr of Measurements in this product
n_obs_rayleigh_actual	integer*2	actual nr Obs. for this BRC
p	integer*2	total nr of laser pulses in one Meas.
map_of_l1b_measurements_used	type(meas_map_type), pointer	STRUCTURE – see Table 3.34
rayleigh_profile	type(rayleigh_profile_type), dimension(:),pointer	STRUCTURE – see Table 3.40

Table 3.39: Definition of the structure **l2b_rayleigh_mds_type**

Name	Variable type	Description
obs_type	integer*2	
height_bin	type(rayleigh_height_bin_type), dimension(:), pointer	STRUCTURE – see Table 3.41

Table 3.40: Definition of the structure **rayleigh_profile_type**

Name	Variable type	Description
validity_flag	logical	.true. = valid = 1
rayleigh_wind_velocity	integer*2	[cm/s]
rayleigh_wind_to_pressure	integer*2	[10E-6 m/s/Pa]
rayleigh_wind_to_temperature	integer*2	[cm/s/K]
rayleigh_wind_to_backscat_ratio	integer*2	[cm/s]
reference_pressure	integer*8	[Pa]
reference_temperature	integer*4	[10E-2 K]
reference_backscatter_ratio	integer*8	[10E-6]
rayleigh_error_quantifier	integer*4	[cm/s]
integration_length	integer*8	[m]

Table 3.41: Definition of the structure **rayleigh_height_bin_type**

Name	Variable type	Description
n_meas	integer*2	number of measurements for this BRC
n_obs_mie_actual	integer*2	actual nr of Obs. for this BRC
n_obs_rayleigh_actual	integer*2	ditto
l2b_input_screening	type(l2b_input_screening_type)	STRUCTURE – see Table 3.43
l2c_mie_quality_params	type(l2c_mie_quality_params_type), dimension(:), pointer	STRUCTURE – see Table 3.44
l2c_rayleigh_quality_params	type(l2c_rayl_quality_params_type), dimension(:), pointer	STRUCTURE – see Table 3.49

Table 3.42: Definition of the structure **l2c_assimpcd_ads_type**

Name	Variable type	Description
l2b_obs_screening	integer*2	
l2b_obs_screening_flags1	integer*2	
l2b_obs_screening_flags2	integer*2	
l2b_obs_screening_flags3	integer*2	
l2b_obs_screening_flags4	integer*2	
l2b_obs_screening_flags5	integer*2	

Table 3.43: Definition of the structure **l2b_input_screening_type**

Name	Variable type	Description
obs_type	integer*2	
l2c_mie_bin_qc	type(l2c_mie_bin_qc_type), dimension(:), pointer	STRUCTURE – see Table 3.45

Table 3.44: Definition of the structure **l2c_mie_quality_params_type**

Name	Variable type	Description
l2b_mie_obs_screening	type(l2b_mie_obs_screening_type)	STRUCTURE – see Table 3.46
assimilation_model_pcd	type(assimilation_model_pcd_type)	STRUCTURE – see Table 3.47

Table 3.45: Definition of the structure **l2c_mie_bin_qc_type**

Name	Variable type	Description
l2b_mie_obs_qc	integer*2	
l2b_mie_obs_qc_flags	integer*2	

Table 3.46: Definition of the structure **l2b_mie_obs_screening_type**

Name	Variable type	Description
hlos_observation_errors	type(hlos_observation_errors_type)	STRUCTURE – see Table 3.48
background_hlos	integer*2	[cm/s]
background_hlos_error	integer*4	[cm/s]
l2b_hlos_reliability	real*8	[Between zero and one]
analysis_hlos	integer*2	[cm/s]
zonal_wind_background_error	integer*4	[cm/s]
meridional_wind_background_err	integer*4	[cm/s]

Table 3.47: Definition of the structure **assimilation_model_pcd_type**

Name	Variable type	Description
persistence_error	integer*4	[cm/s]
representativity_error	integer*4	[cm/s]
final_error	integer*4	[cm/s]
estimated_obs_bias	integer*2	[cm/s]

Table 3.48: Definition of the structure **hlos_observation_errors_type**

Name	Variable type	Description
obs_type	integer*2	
l2c_rayleigh_bin_qc	type(l2c_rayleigh_bin_qc_type), dimension(:), pointer	STRUCTURE – see Table 3.50

Table 3.49: Definition of the structure **l2c_rayl_quality_params_type**

Name	Variable type	Description
l2b_rayleigh_obs_screening	type(l2b_rayleigh_obs_screening_type)	STRUCTURE – see Table 3.51
assimilation_model_pcd	type(assimilation_model_pcd_type)	STRUCTURE – see Table 3.47

Table 3.50: Definition of the structure **l2c_rayleigh_bin_qc_type**

Name	Variable type	Description
l2b_rayleigh_obs_qc	integer*2	
l2b_rayleigh_obs_qc_flags	integer*2	

Table 3.51: Definition of the structure **l2b_rayleigh_obs_screening_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
n_meas	integer*2	nr of Measurements in this product
n_obs_mie_actual	integer*2	actual nr of Obs. for this BRC
mievec_profile	type(mievec_profile_type), dimension(:),pointer	STRUCTURE – see Table 3.53

Table 3.52: Definition of the structure **l2c_mievec_mds_type**

Name	Variable type	Description
obs_type	integer*1	
height_bin_vecwind	type(l2c_height_bin_vecwind_type), dimension(:), pointer	STRUCTURE – see Table 3.54

Table 3.53: Definition of the structure **mievec_profile_type**

Name	Variable type	Description
validity_flag	logical	.true. = valid = 1
background_zonal_windveloc	integer*2	[cm/s]
background_meridional_windveloc	integer*2	[cm/s]
analysis_zonal_windveloc	integer*2	[cm/s]
analysis_meridional_windveloc	integer*2	[cm/s]

Table 3.54: Definition of the structure **l2c_height_bin_vecwind_type**

Name	Variable type	Description
start_of_obs_datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
n_meas	integer*2	nr of Measurements in this product
n_obs_rayleigh_actual	integer*2	actual nr of Obs. for this BRC
rayleighvec_profile	type(rayleighvec_profile_type), dimension(:),pointer	STRUCTURE – see Table 3.56

Table 3.55: Definition of the structure **l2c_rayleighvec_mds_type**

Name	Variable type	Description
obs_type	integer*1	
height_bin_vecwind	type(l2c_height_bin_vecwind_type), dimension(:), pointer	STRUCTURE – see Table 3.54

Table 3.56: Definition of the structure **rayleighvec_profile_type**

4.4. l2bp_settings_type

Name	Variable type	Description
stdout_log_level	character(len=maxlen_log_level)	
stderr_log_level	character(len=maxlen_log_level)	
logfilename	character(len=maxlen_file_name)	
l1bfile	type(fileproperties)	STRUCTURE – see Table 4.2
l2bresultdir	character(len=maxlen_file_name)	
rbcfilename	character(len=maxlen_file_name)	
l2bauxpar_filename	character(len=maxlen_file_name)	
auxclm_filename	character(len=maxlen_file_name)	
auxcal_filename	character(len=maxlen_file_name)	
numnwpfiles	integer*4	
nwpfile	type(fileproperties), dimension(:), pointer	STRUCTURE – see Table 4.2
system	character(len=maxlen_system)	
creator	character(len=maxlen_creator)	
creator_Version	character(len=maxlen_creator_version)	
notes	character(len=maxlen_notes)	
file_class	character(len=maxlen_file_class)	
l2b_auxpar	type(l2b_auxpar_type)	STRUCTURE – see Table 4.3

Table 4.1: Definition of the structure **l2bp_settings_type**

Name	Variable type	Description
start	type(datetimetype)	STRUCTURE – see Table 1.3
stop	type(datetimetype)	STRUCTURE – see Table 1.3
name	character(len=maxlen_file_name)	

Table 4.2: Definition of the structure **fileproperties**

Name	Variable type	Description
fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(l2b_auxpar_sph_type), pointer	STRUCTURE – see Table 4.4
data	type(l2b_auxpardata_type), pointer	STRUCTURE – see Table 4.5

Table 4.3: Definition of the structure **l2b_auxpar_type**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
auxpar_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7

Table 4.4: Definition of the structure **l2b_auxpar_sph_type**

Name	Variable type	Description
fh_default_fields	type(fh_default_fields_type)	STRUCTURE – see Table 4.6
mph_default_fields	type(mph_default_fields_type)	STRUCTURE – see Table 4.7
wvm_params	type(wvm_params_type)	STRUCTURE – see Table 4.8
screening_params	type(screening_params_type)	STRUCTURE – see Table 4.20

Table 4.5: Definition of the structure **l2b_auxpardata_type**

Name	Variable type	Description
file_description	character(len=fh_maxlen_file_description)	
notes	character(len=fh_maxlen_notes)	
mission	character(len=fh_maxlen_mission)	
file_class	character(len=fh_maxlen_file_class)	
file_version	character(len=fh_maxlen_file_version)	
system	character(len=fh_maxlen_system)	
creator	character(len=fh_maxlen_creator)	
creator_version	character(len=fh_maxlen_creator_version)	

Table 4.6: Definition of the structure **fh_default_fields_type**

Name	Variable type	Description
ref_doc	character(len=mph_maxlen_ref_doc)	
software_ver	character(len=mph_maxlen_software_ver)	
proc_center	character(len=mph_maxlen_proc_center)	

Table 4.7: Definition of the structure **mph_default_fields_type**

Name	Variable type	Description
file_type	character(len=wvm_maxlen_file_type)	
sph_descriptor	character(len=wvm_maxlen_sph_descriptor)	

warmup_pulse_min_height	real*8	[m]
rangebin_mismatch_tolerance	real*8	[m]
line_of_sight_wind_flag	logical	
mie_groundcorr_weightingfactor	real*8	
rayl_groundcorr_weightingfactor	real*8	
n_obs_mie_max	integer*2	
n_obs_rayleigh_max	integer*2	
classification_params	type(classification_params_type)	STRUCTURE – see Table 4.9
optical_properties_params	type(optical_properties_params_type)	STRUCTURE – see Table 4.11
error_quantifier_params	type(error_quantifier_params_type)	STRUCTURE – see Table 4.12
common_processing_params	type(common_processing_params_type)	STRUCTURE – see Table 4.13
rbc_algorithm_params	type(rbc_algorithm_params_type)	STRUCTURE – see Table 4.17
amd_matchup_params	type(amd_matchup_params_type)	STRUCTURE – see Table 4.18
clm_matchup_params	type(clm_matchup_params_type)	STRUCTURE – see Table 4.19

Table 4.8: Definition of the structure **wvm_params_type**

Name	Variable type	Description
classification_type_mie	integer*2	
classification_type_rayleigh	integer*2	
threshold_backscatterratio	type(threshold_type), dimension(:), pointer	STRUCTURE – see Table 4.10
threshold_extinction	type(threshold_type), dimension(:), pointer	STRUCTURE – see Table 4.10

Table 4.9: Definition of the structure **classification_params_type**

Name	Variable type	Description
threshold_value	real*8	[none] or [m-1]
altitude	real*8	[km]

Table 4.10: Definition of the structure **threshold_type**

Name	Variable type	Description
scatratio_method	integer*2	
scatratio_method2	integer*2	

Table 4.11: Definition of the structure **optical_properties_params_type**

Name	Variable type	Description
errorquantmethod_mie	integer*2	
errorquantmethod_rayleigh	integer*2	

Table 4.12: Definition of the structure **error_quantifier_params_type**

Name	Variable type	Description
mie_pcd_params	type(mie_pcd_params_type)	STRUCTURE – see Table 4.14
mie_core_algorithm_params	type(mie_core_algorithm_params_type)	STRUCTURE – see Table 4.15
corrupt_data_detection_params	type(corrupt_data_detect_params_type)	STRUCTURE – see Table 4.16

Table 4.13: Definition of the structure **common_processing_params_type**

Name	Variable type	Description
alpha_correction	real*8	
summation_index	integer*2	

Table 4.14: Definition of the structure **mie_pcd_params_type**

Name	Variable type	Description
snr_threshold	real*8	= 8. ! [dB] !
start_fwhm	real*8	
residual_error_threshold	real*8	
max_iterations_lorentz_fit	integer*2	
fwhm_upper_threshold	real*8	
fwhm_lower_threshold	real*8	
peak_height_upper_threshold	real*8	
peak_height_lower_threshold	real*8	
peak_location_threshold	real*8	
nonlinear_optimization_thresh	real*8	
max_iter_nonlinear_optimization	integer*2	
num_spectral_sub_samples	integer*2	

Table 4.15: Definition of the structure **mie_core_algorithm_params_type**

Name	Variable type	Description
max_signal_derivative	integer*4	[PixelLevel]
pixel_saturation_threshold	integer*4	[PixelLevel]

Table 4.16: Definition of the structure **corrupt_data_detect_params_type**

Name	Variable type	Description

do_mie_decontamination	logical	

Table 4.17: Definition of the structure **rbc_algorithm_params_type**

Name	Variable type	Description
matchup_method	integer*2	
max_allowed_time_diff	integer*8	in [s]
max_allowed_distance	integer*8	in [km]

Table 4.18: Definition of the structure **amd_matchup_params_type**

Name	Variable type	Description
matchup_method	integer*2	

Table 4.19: Definition of the structure **clm_matchup_params_type**

Name	Variable type	Description
l1b_screening_params	type(l1b_screening_params_type)	STRUCTURE – see Table 4.21
l2b_amd_screening_params	type(l2b_amd_screening_params_type)	STRUCTURE – see Table 4.25

Table 4.20: Definition of the structure **screening_params_type**

Name	Variable type	Description
l1b_obs_screening_params	type(l1b_obs_scr_params_type)	STRUCTURE – see Table 4.22
l1b_mie_meas_screening_params	type(l1b_mie_meas_scr_params_type)	STRUCTURE – see Table 4.23
l1b_rayl_meas_screening_params	type(l1b_rayl_meas_scr_params_type)	STRUCTURE – see Table 4.24

Table 4.21: Definition of the structure **l1b_screening_params_type**

Name	Variable type	Description
l1b_laser_freq_unlocked_thresh	integer*4	
l1b_ref_pulses_unlocked_thresh	integer*4	
l1b_laser_freq_offset_thresh	real*8	[GHz]
l1b_laser_uv_energy_thresh	real*8	[mJ]
l1b_laser_freq_offs_stdevthresh	real*8	[GHz]
l1b_laser_uv_energy_stdevthresh	real*8	[mJ]

l1b_mie_mean_emit_freq_min	real*8	[GHz]
l1b_mie_mean_emit_freq_max	real*8	[GHz]
l1b_mie_emit_freq_stdev_thresh	real*8	[GHz]
l1b_rayleigh_mean_emit_freq_min	real*8	[GHz]
l1b_rayleigh_mean_emit_freq_max	real*8	[GHz]
l1b_rayleighemitfreqstdevthresh	real*8	[GHz]
l1b_sat_not_on_target_thresh	integer*4	
l1b_mie_corrupt_thresh	integer*4	
l1b_rayleigh_corrupt_thresh	integer*4	
l1b_mie_ref_pulsescorruptthresh	integer*4	
l1b_rayl_refpulsescorruptthresh	integer*4	
l1b_mie_invalid_meas_thresh	integer*4	
l1b_mie_invalid_refpulsesthresh	integer*4	
l1b_rayl_invalid_meas_thresh	integer*4	
l1b_rayl_invalidrefpulsesthresh	integer*4	

Table 4.22: Definition of the structure **l1b_obs_scr_params_type**

Name	Variable type	Description
l1b_miemeasinvalidrefplssthresh	integer*4	
l1b_avg_laser_freq_offset_min	real*8	[GHz]
l1b_avg_laser_freq_offset_max	real*8	[GHz]
l1b_avg_uv_energy_min	real*8	[mJ]
l1b_avg_uv_energy_max	real*8	[mJ]
l1b_laser_freqoffsetstdevthresh	real*8	[GHz]
l1b_uv_energy_stdev_thresh	real*8	[mJ]
l1b_velofattuncertaintyerrormin	real*8	[m/s]
l1b_velofattuncertaintyerrormax	real*8	[m/s]
l1b_mie_mean_emitted_freq_min	real*8	[GHz]
l1b_mie_mean_emitted_freq_max	real*8	[GHz]
l1b_mie_emitted_freqstdevthresh	real*8	[GHz]
l1b_scattering_ratio_min	real*8	
l1b_scattering_ratio_max	real*8	
l1b_mie_snr_thresh	real*8	
mie_ground_bin_thickness_thresh	real*8	[m]
max_signal_derivative	integer*2	[PixelLevel]
pixel_saturation_thresh	integer*2	[PixelLevel]

Table 4.23: Definition of the structure **l1b_mie_meas_scr_params_type**

Name	Variable type	Description
l1b_raymeasinvalidrefplssthresh	integer*4	
l1b_avg_laser_freq_offset_min	real*8	[GHz]
l1b_avg_laser_freq_offset_max	real*8	[GHz]
l1b_avg_uv_energy_min	real*8	[mJ]
l1b_avg_uv_energy_max	real*8	[mJ]
l1b_laser_freqoffsetstdevthresh	real*8	[GHz]

l1b_uv_energy_stdev_thresh	real*8	[mJ]
l1b_velofattuncertaintyerrormin	real*8	[m/s]
l1b_velofattuncertaintyerrormax	real*8	[m/s]
l1b_rayl_mean_emitted_freq_min	real*8	[GHz]
l1b_rayl_mean_emitted_freq_max	real*8	[GHz]
l1b_rayl_emittedfreqstdevthresh	real*8	[GHz]
l1b_rayleigh_snr_min	real*8	
l1b_rayleigh_snr_max	real*8	
rayl_ground_bin_thicknessthresh	real*8	[m]
pixel_saturation_thresh	integer*2	[PixelLevel]

Table 4.24: Definition of the structure **l1b_rayl_meas_scr_params_type**

Name	Variable type	Description
l2b_amd_p_min	real*8	[Pa]
l2b_amd_p_max	real*8	[Pa]
l2b_amd_t_min	real*8	[K]
l2b_amd_t_max	real*8	[K]

Table 4.25: Definition of the structure **l2b_amd_screening_params_type**

4.5. joborderdata_type

Name	Variable type	Description
global_configuration	type(global_configuration_type)	STRUCTURE – see Table 5.2
proc_instructions	type(proc_instructions_type)	STRUCTURE – see Table 5.3
special_settings	type(special_settings_type)	STRUCTURE – see Table 5.7

Table 5.1: Definition of the structure **joborderdata_type**

Name	Variable type	Description
processor_name	character(len=maxlen_proc_name)	
version	character(len=maxlen_version)	
order_type	character(len=maxlen_order_type)	
stdout_log_level	character(len=maxlen_log_level)	
stderr_log_level	character(len=maxlen_log_level)	
test	character(len=maxlen_boolean)	
breakpoint_enable	character(len=maxlen_boolean)	
acquisition_station	character(len=maxlen_acq_station)	
processing_station	character(len=maxlen_proc_station)	
sensing_time_start	character(len=maxlen_jobdatetime)	
sensing_time_stop	character(len=maxlen_jobdatetime)	

Table 5.2: Definition of the structure **global_configuration_type**

Name	Variable type	Description
task_name	character(len=maxlen_task_name)	
task_version	character(len=maxlen_version)	
input	type(input_type), dimension(:), pointer	STRUCTURE – see Table 5.4
output	type(output_type), dimension(:), pointer	STRUCTURE – see Table 5.6

Table 5.3: Definition of the structure **proc_instructions_type**

Name	Variable type	Description
file_type	character(len=maxlen_file_type)	
file_name_type	character(len=maxlen_file_name_type)	
file_name	character(len=maxlen_file_name), dimension(:), pointer	
time_interval	type(time_interval_type), dimension(:), pointer	STRUCTURE – see Table 5.5

Table 5.4: Definition of the structure **input_type**

Name	Variable type	Description
start	character(len=maxlen_jobdatetime)	
stop	character(len=maxlen_jobdatetime)	
file_name	character(len=maxlen_file_name)	

Table 5.5: Definition of the structure **time_interval_type**

Name	Variable type	Description
file_type	character(len=maxlen_file_type)	
file_name_type	character(len=maxlen_file_name_type)	
file_name	character(len=maxlen_file_name)	

Table 5.6: Definition of the structure **output_type**

Name	Variable type	Description
file_name	character(len=maxlen_file_name)	

Table 5.7: Definition of the structure **special_settings_type**

4.6.rbc_datatype

Name	Variable type	Description

fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(rbc_sph_type), pointer	STRUCTURE – see Table 6.2
rbc_ds	type(rbc_ds_type), pointer	STRUCTURE – see Table 6.3

Table 6.1: Definition of the structure **rbc_datatype**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
ref_rbc_suite	character(len=maxlen_ref_rbc_suite)	
num_p	character(len=maxlen_intas)	= 23
num_t	character(len=maxlen_intas)	= 161
num_f	character(len=maxlen_intas)	= 937
num_fp	character(len=maxlen_intas)	= 877
num_fd	character(len=maxlen_intas)	= 61
num_rr	character(len=maxlen_intas)	= 101
p_min	character(len=maxlen_intaul)	in [Pa]
p_max	character(len=maxlen_intaul)	in [Pa]
t_min	character(len=maxlen_intaus)	in [10E-2 K]
t_max	character(len=maxlen_intaus)	in [10E-2 K]
laser_freq_offset_start	character(len=maxlen_fado56)	
laser_freq_offset_stop	character(len=maxlen_fado56)	
total_num_of_observations	character(len=maxlen_intal)	
total_num_of_measurements	character(len=maxlen_intal)	
total_num_of_reference_pulses	character(len=maxlen_intal)	
total_num_of_corrupt_mie_meas	character(len=maxlen_intal)	
total_num_of_corrupt_ray_meas	character(len=maxlen_intal)	
total_num_of_corrupt_mie_refp	character(len=maxlen_intal)	
total_num_of_corrupt_ray_refp	character(len=maxlen_intal)	
average_error_fp_response_a	character(len=maxlen_fado36)	
average_error_fp_response_b	character(len=maxlen_fado36)	
rbc_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
fp_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7

Table 6.2: Definition of the structure **rbc_sph_type**

Name	Variable type	Description
p_grid	integer*8, dimension(:), pointer	

t_grid	integer*4, dimension(:), pointer	
f_gridtmp	integer*8, dimension(:), pointer	
spec_grid_ptf	type(spec_grid_ptf_type), dimension(:), pointer	STRUCTURE – see Table 6.4
f_fp	integer*8, dimension(:), pointer	
ta_fp	real*8, dimension(:), pointer	
tb_fp	real*8, dimension(:), pointer	
fd	integer*8, dimension(:), pointer	
rr	real*8, dimension(:), pointer	
fcalib_ptr	type(fcalib_ptr_type), dimension(:), pointer	STRUCTURE – see Table 6.6
nab_ptfd	type(nab_ptfd_type), dimension(:), pointer	STRUCTURE – see Table 6.8
fint_r	integer*8, dimension(:), pointer	

Table 6.3: Definition of the structure **rbc_ds_type**

Name	Variable type	Description
spec_grid_tf	type(spec_grid_tf_type), dimension(:), pointer	STRUCTURE – see Table 6.5

Table 6.4: Definition of the structure **spec_grid_ptf_type**

Name	Variable type	Description
spec_grid_f	real*8, dimension(:), pointer	

Table 6.5: Definition of the structure **spec_grid_tf_type**

Name	Variable type	Description
fcalib_tr	type(fcalib_tr_type), dimension(:), pointer	STRUCTURE – see Table 6.7

Table 6.6: Definition of the structure **fcalib_ptr_type**

Name	Variable type	Description
fcalib_r	real*8, dimension(:), pointer	
fcalib_r_error	real*8, dimension(:), pointer	

Table 6.7: Definition of the structure **fcalib_tr_type**

Name	Variable type	Description

| nab_tfd | type(nab_tfd_type), dimension(:), pointer | STRUCTURE – see Table 6.9 |

Table 6.8: Definition of the structure **nab_ptfd_type**

Name	Variable type	Description
na_fd	integer*8, dimension(:), pointer	
nb_fd	integer*8, dimension(:), pointer	

Table 6.9: Definition of the structure **nab_tfd_type**

4.7. amd_hdr_datatype

Name	Variable type	Description
fh_is_available	logical	
mph_is_available	logical	
sph_is_available	logical	
fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(l2b_amd_sph_type), pointer	STRUCTURE – see Table 7.2

Table 7.1: Definition of the structure **amd_hdr_datatype**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
ref_nwp_suite	character(len=maxlen_ref_nwp_suite)	
fcst_initial_time	character(len=maxlen_datetime_kvt)	
model_timestep	character(len=maxlen_intal)	
model_grid_type	character(len=maxlen_model_grid_type)	
model_resol_par1	character(len=maxlen_intas)	
model_resol_par2	character(len=maxlen_intas)	
num_of_model_layers	character(len=maxlen_intaus)	
num_records_in_ds1	character(len=maxlen_intal)	
num_records_in_ds2	character(len=maxlen_intal)	
num_avail_l1b_obs	character(len=maxlen_intal)	
num_missing_l1b_obs	character(len=maxlen_intal)	
num_computed_locations	character(len=maxlen_intal)	
num_input_files	character(len=maxlen_intaus)	
num_files_predict_orbit	character(len=maxlen_intaus)	
dsds_are_available	logical	set .true. when reading was suc-

		cessfull
geoads1_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
geoads2_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
mds1_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
mds2_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
input_dsd	type(dsd_type), dimension(:), pointer	STRUCTURE – see Table 2.7

Table 7.2: Definition of the structure **l2b_amd_sph_type**

4.8. amd_brc_datatype

Name	Variable type	Description
geoloc_ads_off_nadir	type(amd_geoloc_ads_type), pointer	STRUCTURE – see Table 8.2
geoloc_ads_nadir	type(amd_geoloc_ads_type), pointer	STRUCTURE – see Table 8.2
met_mds_off_nadir	type(amd_met_mds_type), pointer	STRUCTURE – see Table 8.3
met_mds_nadir	type(amd_met_mds_type), pointer	STRUCTURE – see Table 8.3

Table 8.1: Definition of the structure **amd_brc_datatype**

Name	Variable type	Description
datetime	type(datetimetype)	utc ,STRUCTURE – see Table 1.3
latitude	integer*4	[10E-6 degN]
longitude	integer*4	[10E-6 degE]
geoid_height	integer*4	[cm]

Table 8.2: Definition of the structure **amd_geoloc_ads_type**

Name	Variable type	Description
us	integer*2	east-west "surface" wind in cm/s
vs	integer*2	north-south "surface" wind in cm/s
ps	integer*8	surface pressure in Pa
err_ps	real*8	error for surface pressure in Pa
zs	integer*4	surface geopotential height

		in cm
met_layer	type(amd_met_layer_type), dimension(:),pointer	STRUCTURE – see Table 8.4

Table 8.3: Definition of the structure **amd_met_mds_type**

Name	Variable type	Description
validity_flag	integer*1	
pbase	integer*8	pressure at base of layer in Pa
ptop	integer*8	pressure at top of layer in Pa
pnom	integer*8	nominal pressure of layer in Pa
zbase	integer*4	height at base of layer in cm
ztop	integer*4	height at top of layer in cm
znom	integer*4	nominal height of layer in cm
t	integer*4	temperature at pnom in 0.01K
err_t	integer*4	Std error for T in 0.01K
u	integer*2	east-west wind in cm/s
v	integer*2	north-south wind in cm/s
rh	integer*2	Relative humidity at pnom
err_rh	real*8	Std error for rh
q	real*8	Specific humidity at pnom
cc	integer*2	Cloud cover
clwc	real*8	Cloud liquid water content
ciwc	real*8	Cloud ice water content

Table 8.4: Definition of the structure **amd_met_layer_type**

4.9.l1b_hdr_datatype

Name	Variable type	Description
headers_are_available	logical	
fh_is_available	logical	
mph_is_available	logical	
sph_is_available	logical	
fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(l1b_sph_type), pointer	STRUCTURE – see Table 9.2

Table 9.1: Definition of the structure **l1b_hdr_datatype**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
intersect_start_lat	character(len=maxlen_intal)	
intersect_start_long	character(len=maxlen_intal)	
intersect_stop_lat	character(len=maxlen_intal)	
intersect_stop_long	character(len=maxlen_intal)	
sat_track	character(len=maxlen_fadoxy)	
base_laser_frequency	character(len=maxlen_fadoxy)	
n_max	character(len=maxlen_intal)	
n_max_actual	character(len=maxlen_intal)	
total_num_of_observations	character(len=maxlen_intal)	
total_num_of_measurements	character(len=maxlen_intal)	
total_num_of_reference_pulses	character(len=maxlen_intal)	
num_of_mie_obs_used	character(len=maxlen_intal)	
num_of_rayleigh_obs_used	character(len=maxlen_intal)	
num_of_mie_meas_used	character(len=maxlen_intal)	
num_of_rayleigh_meas_used	character(len=maxlen_intal)	
num_of_mie_ref_pulses_used	character(len=maxlen_intal)	
num_of_rayleigh_ref_pulses_used	character(len=maxlen_intal)	
num_of_mie_zero_wind_detected	character(len=maxlen_intal)	
num_of_rayleigh_zero_wind_det	character(len=maxlen_intal)	
num_of_mie_ground_echo_bins	character(len=maxlen_intal)	
num_of_rayleigh_grnd_echo_bins	character(len=maxlen_intal)	
tnum_of_meas_laser_fr_unlocked	character(len=maxlen_intal)	
tnum_of_ref_pls_lsr_fr_unlocked	character(len=maxlen_intal)	
tnum_of_sat_not_on_target_meas	character(len=maxlen_intal)	
tnum_of_corrupt_mie_meas	character(len=maxlen_intal)	
tnum_of_corrupt_rayleigh_meas	character(len=maxlen_intal)	
tnum_of_corrupt_mie_ref_pulses	character(len=maxlen_intal)	
tnum_of_corr_rayleigh_ref_pulss	character(len=maxlen_intal)	
nf_order	character(len=maxlen_intal)	
dsds_are_available	logical	set .true. when reading was successfull
geolocation_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
product_conf_data_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
ground_wind_detection_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
measurement_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
cal_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
useful_signal_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
wind_velocity_dsd	type(dsd_type), pointer	STRUCTURE – see

		Table 2.7
aeolus_l1a_product_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
aeolus_mrc_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
aeolus_rrc_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
aeolus_zwc_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
l1b_proc_params_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
sat_characterisation_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
orbit_scenario_file_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
digital_elevation_model_dsd	type(dsd_type), pointer	added in v1.06 ,STRUCTURE – see Table 2.7
geoid_model_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
n_meas_max	integer*4	corresponds to N_Max
nf_order_max	integer*4	

Table 9.2: Definition of the structure **l1b_sph_type**

4.10. l2bc_hdr_datatype

Name	Variable type	Description
fh_is_available	logical	
mph_is_available	logical	
sph_is_available	logical	
fh	type(fh_type), pointer	STRUCTURE – see Table 2.2
mph	type(mph_type), pointer	STRUCTURE – see Table 2.5
sph	type(l2bc_sph_type), pointer	STRUCTURE – see Table 10.2

Table 10.1: Definition of the structure **l2bc_hdr_datatype**

Name	Variable type	Description
sph_descriptor	character(len=maxlen_sph_descriptor)	
num_brc	character(len=maxlen_intaus)	
intersect_start_lat	character(len=maxlen_intal)	
intersect_start_long	character(len=maxlen_intal)	

intersect_stop_lat	character(len=maxlen_intal)	
intersect_stop_long	character(len=maxlen_intal)	
sat_track	character(len=maxlen_fado36)	
m_mie	character(len=maxlen_intauc)	
m_rayleigh	character(len=maxlen_intauc)	
m_meas	character(len=maxlen_intauc)	added 22-3-2006, JK
num_valid_mie_profiles	character(len=maxlen_intaus)	
num_valid_rayleigh_profiles	character(len=maxlen_intaus)	
num_clear_mie_profiles	character(len=maxlen_intaus)	
num_clear_rayleigh_profiles	character(len=maxlen_intaus)	
num_cloud_mie_profiles	character(len=maxlen_intaus)	
num_cloud_rayleigh_profiles	character(len=maxlen_intaus)	
num_mie_prof_warm_pulses	character(len=maxlen_intaus)	
num_rayleigh_prof_warm_pulses	character(len=maxlen_intaus)	
num_profiles_surface_mie	character(len=maxlen_intaus)	
num_profiles_surface_ray	character(len=maxlen_intaus)	
num_valid_obs_prof_l1b_mie	character(len=maxlen_intaus)	
num_valid_obs_prof_l1b_ray	character(len=maxlen_intaus)	
num_valid_meas_prof_l1b_mie	character(len=maxlen_intaus)	
num_valid_meas_prof_l1b_ray	character(len=maxlen_intaus)	
num_valid_obs_bins_l1b_mie	character(len=maxlen_intaus)	
num_valid_obs_bins_l1b_ray	character(len=maxlen_intaus)	
num_valid_meas_bins_l1b_mie	character(len=maxlen_intaus)	
num_valid_meas_bins_l1b_ray	character(len=maxlen_intaus)	
num_invalid_meas_prof_l1b_mie	character(len=maxlen_intaus)	
num_invalid_meas_prof_l1b_ray	character(len=maxlen_intaus)	
num_invalid_meas_prof_l2b_mie	character(len=maxlen_intaus)	
num_invalid_meas_prof_l2b_ray	character(len=maxlen_intaus)	
num_invalid_meas_bins_l1b_mie	character(len=maxlen_intaus)	
num_invalid_meas_bins_l1b_ray	character(len=maxlen_intaus)	
num_invalid_meas_bins_l2b_mie	character(len=maxlen_intaus)	
num_invalid_meas_bins_l2b_ray	character(len=maxlen_intaus)	
num_valid_obs_l2b_mie	character(len=maxlen_intaus)	
num_valid_obs_l2b_ray	character(len=maxlen_intaus)	
num_invalid_obs_l2c_mie	character(len=maxlen_intaus)	(L2C only)
num_invalid_obs_l2c_ray	character(len=maxlen_intaus)	(L2C only)
geolocation_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
pcd_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
mie_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
rayleigh_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
assim_pcd_dsd	type(dsd_type), pointer	(l2c only) ,STRUCTURE – see Table 2.7
mie_vecwind_dsd	type(dsd_type), pointer	(l2c only) ,STRUCTURE – see Table

		2.7
rayleigh_vecwind_dsd	type(dsd_type), pointer	(l2c only) ,STRUCTURE – see Table 2.7
l1b_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
met_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
rbc_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
clm_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
cal_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
l2b_param_dsd	type(dsd_type), pointer	STRUCTURE – see Table 2.7
l2b_dsd	type(dsd_type), pointer	(l2c only) ,STRUCTURE – see Table 2.7
l2c_param_dsd	type(dsd_type), pointer	(l2c only) ,STRUCTURE – see Table 2.7

Table 10.2: Definition of the structure **l2bc_sph_type**

4.11. workingdatatype

Name	Variable type	Description
nr_of_range_gates	integer*2	
nr_of_measurements	integer*2	
nr_of_observations_mie_max	integer*2	
nr_of_observations_mie_actual	integer*2	
nr_of_observations_rayleigh_max	integer*2	
nr_of_observations_rayl_actual	integer*2	
miemeas	type(miemeasurementtype), dimension(:), pointer	STRUCTURE – see Table 11.2
rayleighmeas	type(rayleighmeasurementtype), dimension(:), pointer	STRUCTURE – see Table 11.4
mieobs	type(mieobservationtype), dimension(:), pointer	STRUCTURE – see Table 11.6
rayleighobs	type(rayleighobservationtype), dimension(:), pointer	STRUCTURE – see Table 11.8

Table 11.1: Definition of the structure **workingdatatype**

Name	Variable type	Description
nr_of_range_gates	integer*2	

| datetime | type(datetimetype) | STRUCTURE – see Table 1.3 |
| **rangegate** | type(mierangegatetype), dimension(:), pointer | STRUCTURE – see Table 11.3 |

Table 11.2: Definition of the structure **miemeasurementtype**

Name	Variable type	Description
satrange	real*8	[m] value in the centre of the range-bin
incangle	real*8	[deg] value in the centre of the range-bin
aziangle	real*8	[deg] value in the centre of the range-bin
lat	real*8	[deg] latitude
lon	real*8	[deg] longitude
alt_start	real*8	[m] bottom altitude of this range gate
alt_end	real*8	[m] top altitude fo this range gate
obs_signal_level	real*8	signal level as observed
p	real*8	[Pa] value in the centre of the range-bin
t	real*8	[K] value in the centre of the range-bin
u	real*8	[m/s] value in the centre of the range-bin
v	real*8	[m/s] value in the centre of the range-bin
first_rayleigh_rangebin	integer*2	
last_rayleigh_rangebin	integer*2	
alt_vcog	real*8	
attenuation_above	real*8	
attenuation_this_bin	real*8	
extinction	real*8	
backscatter_ratio	real*8	
rho_ok	logical	
class	integer*4	classification result
weight	real*8	

Table 11.3: Definition of the structure **mierangegatetype**

Name	Variable type	Description
nr_of_range_gates	integer*2	
datetime	type(datetimetype)	STRUCTURE – see Table 1.3
rangegate	type(rayleighrangegatetype), dimension(:), pointer	STRUCTURE – see Table 11.5

Table 11.4: Definition of the structure **rayleighmeasurementtype**

Name	Variable type	Description
satrange	real*8	[m] value in the centre of the range-bin
incangle	real*8	[deg] value in the centre of the range-bin
aziangle	real*8	[deg] value in the centre of the range-bin
lat	real*8	[deg] latitude
lon	real*8	[deg] longitude
alt_start	real*8	[m] bottom altitude of this range gate
alt_end	real*8	[m] top altitude fo this range gate
obs_signal_level	real*8	signal level as observed
p	real*8	[Pa] value in the centre of the range-bin
t	real*8	[K] value in the centre of the range-bin
u	real*8	[m/s] value in the centre of the range-bin
v	real*8	[m/s] value in the centre of the range-bin
first_mie_rangebin	integer*2	
last_mie_rangebin	integer*2	
alt_vcog	real*8	
calc_mol_backscatter	real*8	can be calculated from P and T
calc_mol_extinction	real*8	can be calculated from P and T
attenuation_above	real*8	
attenuation_this_bin	real*8	
extinction	real*8	
backscatter_ratio	real*8	
rho_ok	logical	
class	integer*4	classification result
weight	real*8	

Table 11.5: Definition of the structure **rayleighrangegatetype**

Name	Variable type	Description
observation_type	integer*2	cloud/no_cloud etc.
nr_of_range_gates	integer*2	
rangegate	type(mieobsrangegatetype), dimension(:), pointer	STRUCTURE – see Table 11.7

Table 11.6: Definition of the structure **mieobservationtype**

Name	Variable type	Description
alt_start	real*8	[m] bottom altitude of this range gate
alt_cog	real*8	[m] altitude for the center of gravity
alt_end	real*8	[m] top altitude fo this range gate
lat_start	real*8	[deg]
lat_cog	real*8	[deg]
lat_stop	real*8	[deg]
lon_start	real*8	[deg]
lon_cog	real*8	[deg]
lon_stop	real*8	[deg]
nr_of_measurements	integer*2	
t_ref	real*8	
p_ref	real*8	
hlos_cog	real*8	

Table 11.7: Definition of the structure **mieobsrangegatetype**

Name	Variable type	Description
observation_type	integer*2	cloud/no_cloud etc.
nr_of_range_gates	integer*2	
rangegate	type(rayleighobsrangegatetype), dimension(:), pointer	STRUCTURE – see Table 11.9

Table 11.8: Definition of the structure **rayleighobservationtype**

Name	Variable type	Description
alt_start	real*8	[m] bottom altitude of this range gate
alt_cog	real*8	[m] altitude for the center of gravity
alt_end	real*8	[m] top altitude fo this range gate
lat_start	real*8	[deg]
lat_cog	real*8	[deg]
lat_stop	real*8	[deg]
lon_start	real*8	[deg]
lon_cog	real*8	[deg]
lon_stop	real*8	[deg]
nr_of_measurements	integer*2	
t_ref	real*8	
p_ref	real*8	
hlos_cog	real*8	

Table 11.9: Definition of the structure **rayleighobsrangegatetype**