

New Parameters on ATL04 for Data Release 002

Profile_x/low_rate/molec_bkscat_rh: Relative humidity every 30 m from 20 km to -1 km (700 bins)

ATL04 Issues in Release 001 that are fixed in Release 002

Profile_x/high_rate/backg_method1: The background computation has been changed as the spacecraft goes from night to day or day to night (during twilight conditions defined by the solar elevation angle between -7.0 and -1.0) to better handle the transition from computing the background from the data (which is done during daytime) to a constant value that is used during nighttime.

New Parameters on ATL09 for Data Release 002

Profile_x/high_rate/layer_conf_dens: Confidence value (0.0 (no confidence) - 1.0 (highest confidence)) for each layer detected.

Profile_x/low_rate/molec_bkscat_rh: Relative humidity every 30 m from 20 km to -1 km (700 bins)

ATL09 Issues in Release 001 that are fixed in Release 002

Profile_x/high_rate:

Bsnow_con: This is the blowing snow confidence, and has been corrected.

Bsnow_od: The ground contamination is now fixed and the blowing snow layer optical depth values are reasonable.

Cloud_flag_atm: is the number of layers found in each 25 Hz backscatter profile. In version 001 there were times when the ground return was either included in a low layer near the ground or itself misidentified as an atmospheric layer. This problem has been fixed in data release 002.

Dem_h: A new digital elevation model (DEM) is being used for release 002 and the problem seen in release 001 has been corrected.

Msw_flag This is the multiple scattering severity flag and has been corrected for data release 002.

Layer_flag: consolidated layer flag – this flag combines *cloud_flag_atm* and *cloud_flag_asr* into one 1/0 flag indicating the presence of cloud/no cloud. The coding problem affecting this parameter in release 001 is now fixed.

Surface_bin*, *surface_height* and *surface_sig were affected by the DEM problem in release 001. The fix to the DEM has corrected the problem with these parameters in release 002.

Profile_x/low_rate

Bsnow_con: This is the low rate (1 second) blowing snow confidence, and has been corrected.

ATL09 Known Issues for ASAS V5.2 (Data Release 002)

The following lists the known issues with the ASAS version 5.2 (release 002) ATL09 atmospheric parameters. We are actively working to correct the problems for the next release.

Profile_x/high_rate

Bsnow_dens* and *bsnow_hdens are currently undefined.

Cab_prof: this is the calibrated attenuated backscatter profile. The absolute calibration is fairly good, but the slope of the average signal in a cloud and aerosol-free region is somewhat less than molecular. This is caused by folding of molecular signal from above 15 km and will be addressed in the next release. Also, in an area east of Africa westward to over South America, the South Atlantic Anomaly (SAA) causes added noise to the lidar signal. This is only noticeable at night and is evident as an increase in background. For release 002 we have mitigated the effect by changing the way background is computed in the SAA area, though it is still noticeable. Also, in the transition from day to night or night to day, the calibration is not good. This occurs for solar elevation angles between about 0 and 3 degrees.

Cloud_flag_asr: works well over Antarctica, Greenland and ocean, but has problems over land. It tends to underestimate cloud cover over land.

Cloud_fold_flag: does not capture all instances of cloud folding (times when there are clouds above 15 km that are folded down to the -0.5 – 3 km region of the attenuated backscatter profile).

Layer_attr: this is the cloud aerosol discrimination for each atmospheric layer detected. It is of poor quality and does not accurately differentiate cloud from aerosol. Based on comparisons with CALIPSO, it tends to identify too many layers as aerosol. We are working on improving this for future releases.

Layer_top and layer_bot: For very optically thin layers such as elevated aerosol, at times instead of having 1 top and bottom to define the layer, there can be multiple tops and bottoms within the layer. This is caused by the layer finding algorithm picking up on small gradients of backscatter within the layer. This can also happen in thin cirrus clouds. We have substantially mitigated this problem in release 002.

Surface_h_dens: This is the height of the surface determined from the DDA (Density Dimension Algorithm). The values tend to jump around the actual surface and may lead to an error in the surface height of about 100 m. It is recommended to use the parameter *surface_height* instead. Note that a fundamental difference between *surface_h_dens* and *surface_height* is that when the ground cannot be found, the former is set to the DEM value at that location, while the latter is set to invalid.

Note for Nighttime data collection:

The ATLAS instrument performs calibrations that are used to optimize the altimetry retrievals during nighttime passes over parts of the oceans. During the calibration maneuvers, the atmospheric data are not collected. This results in areas where no data are collected as seen in the figure below (white areas north of 60S). This attribute was also present in the 001 data release, but not noted in the known issues document. We are working to reduce the size of the calibration regions in future data.

2018/12 - ZN

