New Parameters on ATL09 for Data Release 006

Group: **/profile_x/high_rate**

Cap_h

The **cap_h** parameter is new to release 006 and defines the clear air precipitation top height. Clear air precipitation is defined by high backscatter values that extend from the surface to above 500 m above the surface (and are thus not blowing snow). Clear air precipitation is searched for only over areas of snow or ice and is mainly intended to be used over Antarctica.

ATL09 Issues in Release 005 that are fixed in Release 006

Profile_x/high_rate

Bsnow_h: In data release 005, it was discovered that there were too many false positive blowing snow detections in daylight conditions. To alleviate this, a new daytime threshold has been implemented that is a function of solar elevation angle. Nighttime retrievals are unchanged.

Layer_attr: This is the cloud aerosol discrimination for each atmospheric layer detected. In the known issues document for the prior release (data product version 005) a problem was reported that was at the time thought to be related to cloud/aerosol discrimination. The problem manifested itself as step jumps of global aerosol fraction at various latitudes and times. It in fact was caused by an error in an instrument parameter called the receiver sensitivity that the ASAS code uses to compute calibrated backscatter. There were erroneous step jumps to this parameter at various times that caused erroneous calibrated backscatter. This problem was found and corrected in version 006.

ATL09 Known Issues for ASAS V6.0
(Data Product Release 006)

The following lists the known issues with the ASAS version 6.0 (data product release 006) ATL09 atmospheric parameters. We are actively working to correct the problems for the next release.

Note: The normal operation of ATLAS produces atmospheric profiles at the 25 Hz rate (400 shot sums). However, for a number of weeks shortly after launch, the instrument team conducted tests which produced 50 Hz (200 shot sums) atmospheric profiles. There are a total of 54 granules affected, all occurring in October or November of 2018. This does not cause noticeable

problems in the data processing or product parameters, but the user should be aware of this. These granules were released to the public for releases 001 and 002 but are being withheld for this release (006).

Profile_x/high_rate

***Bsnow_h_dens*:** The height of retrieved blowing snow layers is roughly 90 m too high. Currently, the algorithm is unable to detect blowing snow layers less than 90 m thick.

Bsnow_dens: This is the integrated density within the blowing snow layer. This parameter remains missing (has an invalid value) but will be populated in the next release.

Cab_prof: During twilight (solar elevation angles -7 to -1), the calibration can be very poor at times. 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. While calibration has been improved in this region, it can still have considerable error.

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 height due to the 10 KHz laser repetition rate – see the atmosphere ATBD for a complete discussion of this).

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 and or the effects of noise. This can also happen in thin cirrus clouds, but it is not as frequent there. Note also that ICESat-2 cannot detect clouds above 14 km which affects cloud amount in the tropical regions.

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 Figure 1 below (white areas). This affects data collected prior to March, 2019. After this date, the calibration strategy was changed, which greatly reduced this problem.

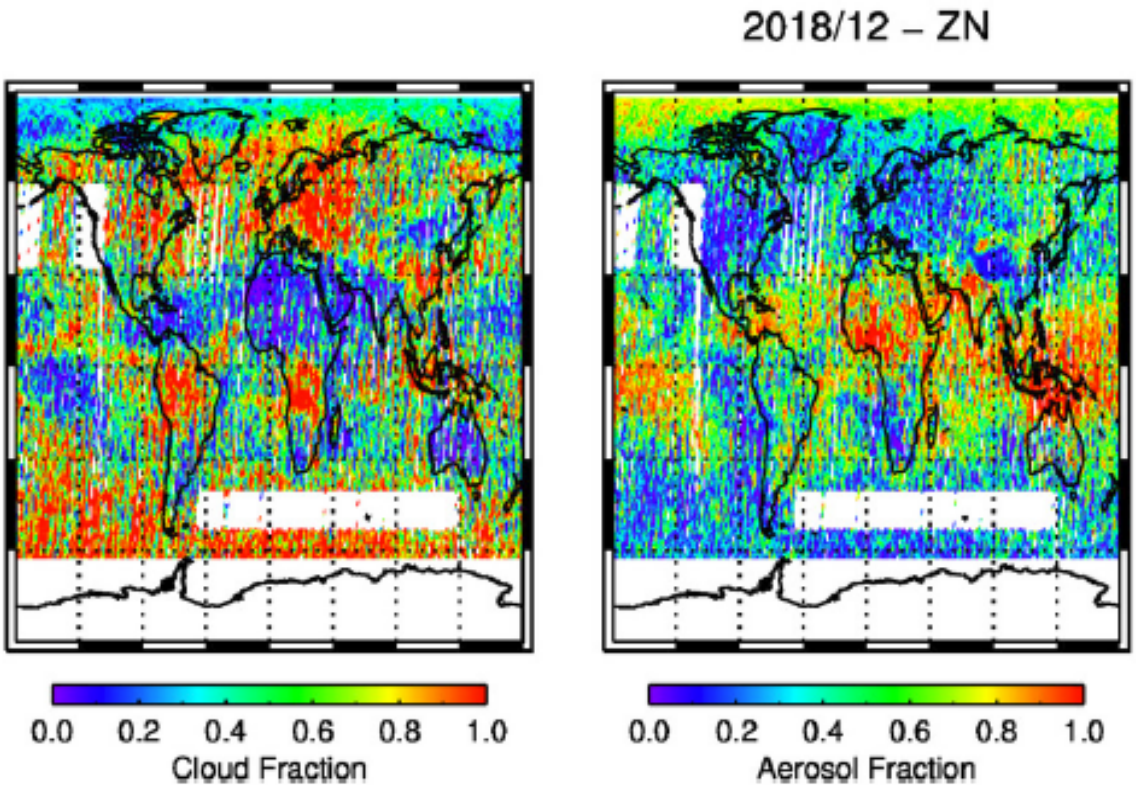
2018/12 – ZN
0.0 0.2 0.4 0.6 0.8 1.0
Cloud Fraction
0.0 0.2 0.4 0.6 0.8 1.0
Aerosol Fraction

Figure 1.