New Parameters on ATL09 for Data Release 007

Group: **/profile_x/high_rate**
Bsnow_dens and column_dens

The ***bsnow_dens*** and ***column_dens*** parameters were on prior releases of the ATL09 product but were unpopulated. ***Bsnow_dens*** is the integrated value of the density (computed from the DDA) within the blowing snow layer. ***Column_dens*** is the integrated value of the DDA computed density for the whole 14 km vertical profile. Both parameters are now populated.

ATL09 Issues in Release 006 that are fixed in Release 007

Profile_x/high_rate:

Layer_bot:

1. In data release 006, it was discovered that for some detected layers there was a layer top but no valid layer bottom. This is now fixed.
2. In data release 006, it was possible that some layer bottoms were below the ground surface return. Such bottoms have been changed to be 1 bin above the surface.

ATL09 Known Issues for ASAS V5.1
(Data Product Release 007)

The following lists the known issues with the ASAS version 5.1 (data product release 007) ATL09 atmospheric parameters. We are actively working to correct the problems for the next release.

Note: The normal operation of the 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.

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.

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: This parameter is much improved (captures more of the folding) for this version but still does not capture all instances of cloud folding (times when there are clouds above 15 km). This problem occurs mostly with daytime data.

Layer_top and layer_bot:

1. 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.
2. False positive layer detections can occur during daytime in high solar background conditions.
3. In very rough terrain (mountains) very occasionally the surface return can cause a false layer just above the surface.
4. Very optically thin atmospheric layers are sometimes not detected by the DDA.

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.

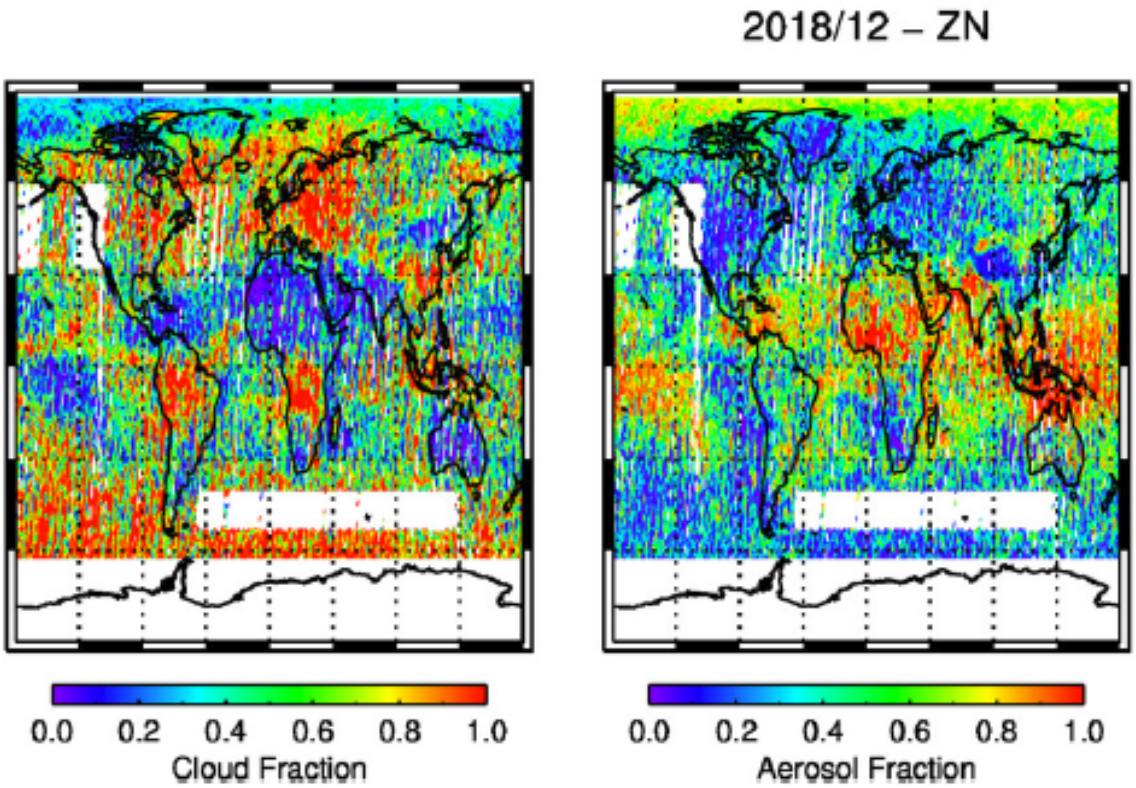
2018/12 – ZN
0.0 0.2 0.4 0.6 0.8 1.0
Cloud Fraction
0.0 0.2 0.4 0.6 0.8 1.0
Aerosol Fraction

Figure 1.