ATL08 Land and Vegetation Data product -- Release 003 (March 15, 2020)

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The third release (Release 003) of ICESat-2 Land and Vegetation data product (ATL03) is now available from NSIDC.

Changes Implemented in Release 003

1. Added two flags, subet_te_flag and subset_can_flag to indicate 100 m segments that are populated by less than 100 m worth of data

2. Improved Ground Finding. For instances where the canopy density of the vegetation was relatively high, the ATL08 algorithm had issues identifying ground photons even though there were often visible with the eye. This improvement to ground finding will result in more accurate relative canopy heights. Figures 1 and 2 illustrate the improvements to the ground finding.
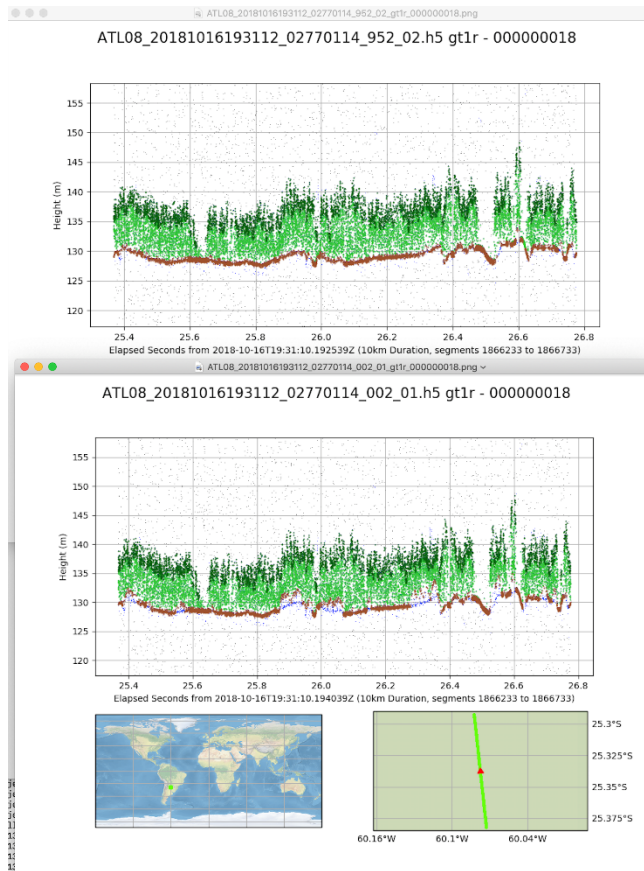
Figure 1. Example of improved ground finding in the ATL08 algorithm. The top panel shows the "after" and the bottom panel shows the "before". In this figure in Brazil, the ground is much better resolved than the previous version.

Figure 2. Another example of improved ground finding in the ATL08 algorithm. The top panel shows the "after" and the bottom panel shows the "before". In this figure in Brazil, the ground is much better resolved than the previous version.
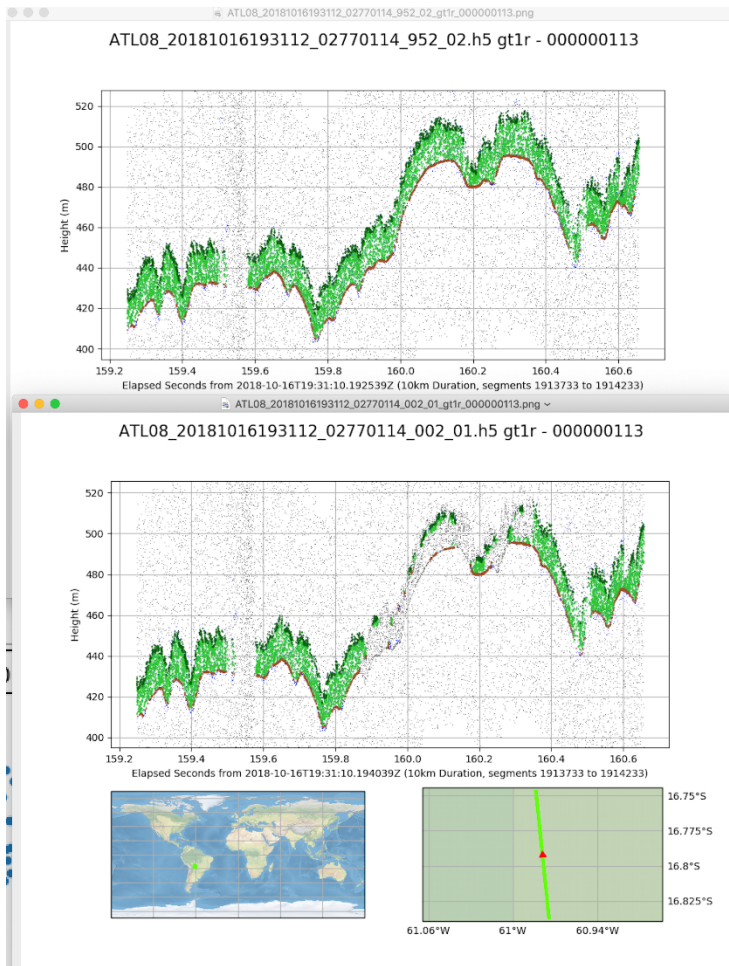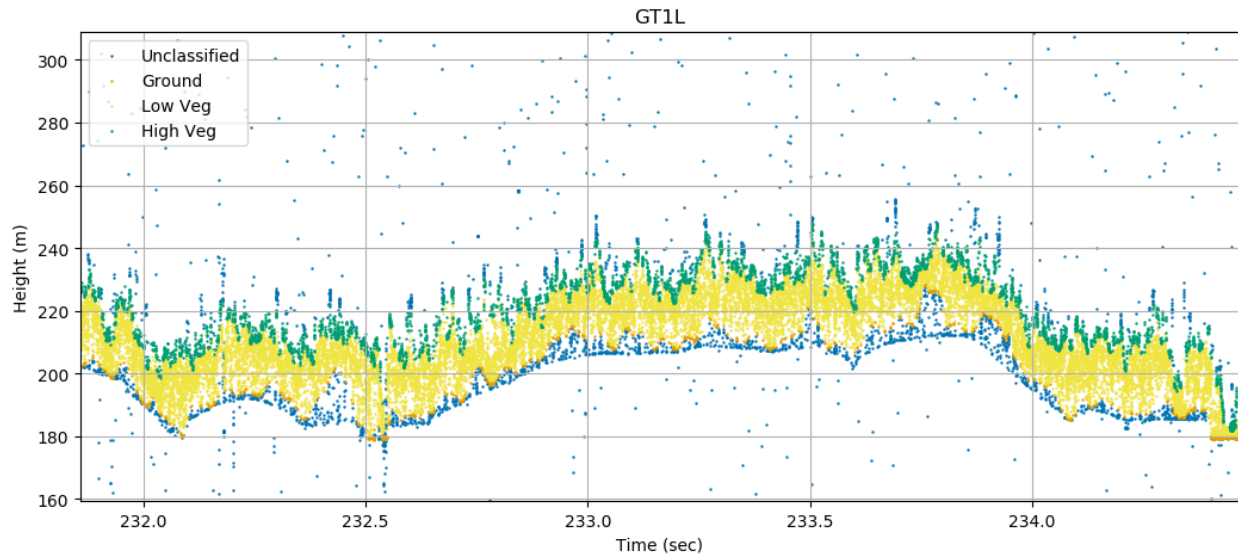
Known Issues

1. Urban elements mislabeled as ground or vegetation

A known issue with the production of the ATL08 data product concerns tropical forest. Due to the large amount of vegetation, the ATL08 algorithm will need to be adjusted to correctly identify the ground surface beneath the vegetation. This example, shown from Tropical forest in Brazil, highlights canopy photons misclassified as ground. The actual ground photons are labeled incorrectly as noise (blue dots). In this example, the ground height would be reported incorrectly by approximately 3-5 m, and the relative canopy height would be under-estimated by that same amount. Also, in this example, the top of emergent trees are not being correctly labeled as canopy photons. The expectation is that the ATL08 algorithm will be modified so this issue is resolved in upcoming data releases.

2. Sub-surface scattering

A known issue that has been observed over standing water, lakes, wetlands, etc. occurs as an abundance of sub-surface scattering photons, beyond the standard noise rate. Figure 2 illustrates the sub-surface scattering from a wetland in Argentina. The ICESat-2 project office feels that this effect is likely an instrument artifact and they are working on ways to detect these photons to they are not included as signal in the surface finding algorithms. In Release 002, it is possible that these sub-surface scattering photons are mislabeled as either ground or a combination of ground/canopy.
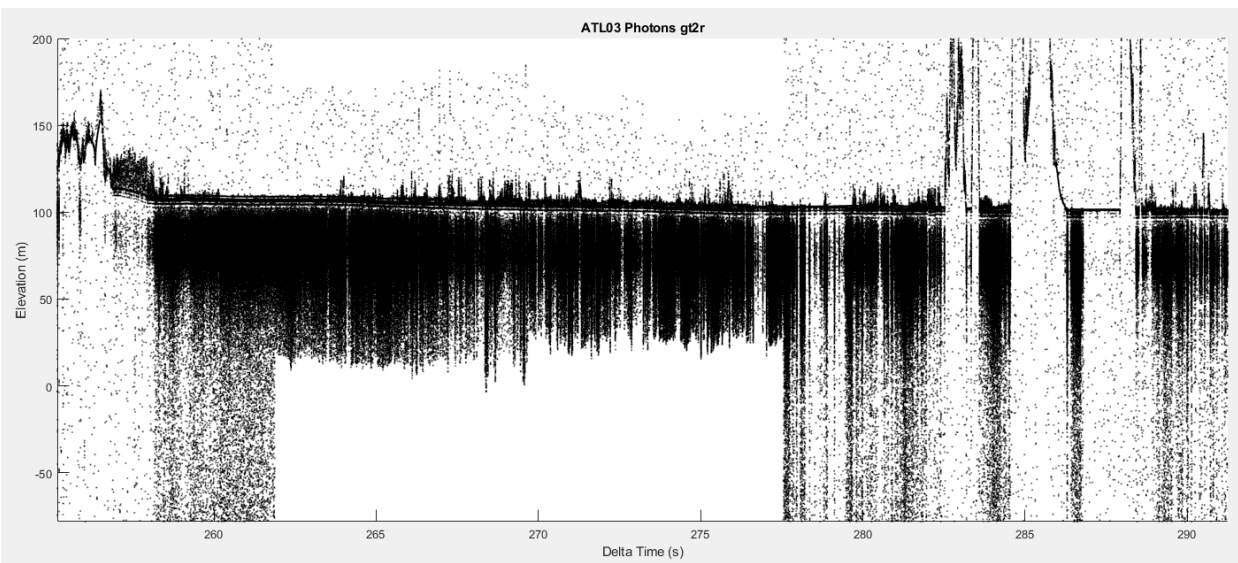
3. Data from July 2019

Data collected between 9-26 July 2019 have a small timing bias resulting from an erroneous Earth orientation parameter uploaded during the spacecraft's return to operations following a safehold event on 26 June 2020. This caused an error in spacecraft pointing, resulting in an extra approximately 1 degree of forward pitch, and shifted the onboard attitude control system interpretation of spacecraft time by roughly 19 seconds. The primary manifestation of this issue is telemetry band errors at steep coastal areas, at times resulting in loss of surface returns. We note that there may be some increased height errors from data collected during this time period, those errors are generally within the conservative estimates of geolocation and height uncertainty currently provided on the ATL03 product.