



Validation of ICESat-2 Data along CHINARE Route in East Antarctica

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NASA launched the Ice, Cloud, and Land Elevation Satellite-2 (ICESat-2) satellite on September 15, 2018. The photon counting altimeter of ICESat-2 is designed to provide centimeter-level accuracy surface elevation observations and is expected to reduce the uncertainty of the estimated sea level rise contribution from Antarctica. The ICESat-2 mission team has conducted a validation campaign and stated that the data released in the first year met the design requirements. In this study we designed and implemented an independent validation scheme along the 36th CHINARE (Chinese Antarctic Research Expedition) route in East Antarctica as a different validation site. 1) GNSS data collected during a week in December 2019 along the 500-km traverse from the Zhongshan Station to the Taishan Station are compared with the crossover ICESat-2 points. The GNSS receiver (CHC i70) was fixed on the roof of the Pisten Bully Polar 300 and cooperated with 5 GNSS base stations spaced every ~100 km. 2) To investigate photons reflectivity we used a rectangular area target for each site at three Chinese stations, with considerations of the reflectivity and satellite tracks. 22 upward-looking optical prisms were installed to capture photons with known ground elevations. 3) Finally, we utilized DJI Phantom 4 unmanned aerial vehicles (UAVs) to obtain centimeter-level DEMs of ice sheet surface and compare with the ICESat-2 points. The results are analyzed for several applications and compared against the published validation results of the mission team.