Observation of a giant tabular iceberg calved from Amery Ice shelf based on multiple remote sensing data

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Amery Ice Shelf is the largest ice shelf in East Antarctica. Large calving event occurs every thirty to forty years as recorded. The latest calving event happened in September 2019, leading to the birth of a giant tabular iceberg. We used satellite imagery and altimeter data from multiple sources to monitor the evolution of the iceberg from October 2019 to October 2020. The evolution of iceberg area is measured with Sentinel-1 images, and the change of freeboards was derived from CryoSat-2, Sentinel-3 SRAL, and ICESat-2 profiles. Compared with topography of Amery Front before calving, we found the temporal freeboards of the iceberg show a trend of descending after calved from Amery Ice Shelf, which indicates overall basal melting process. While the freeboards of Amery Front remain stable within a year before calving. We also calculated the freeboard changes of 30 footstep intersections from different altimeter profiles on the iceberg. The results show different changing patterns of freeboards, varying from 4.72m to -3.1m, which indicates there is basal re-freezing process as well as basal melting at the bottom of the iceberg. Furthermore, we studied the correlation between freeboard change and sea surface temperature. This study reveals that the use of different remote sensing data can provide more detailed observations on Antarctic icebergs.