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Tracking the thickness of the A68 Iceberg using CryoSat-2 and ICESat-2

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The A68 iceberg calved from the Larsen C ice shelf on the Antarctic Peninsula in July 2017 and has since been drifting northwards towards South Georgia. Originally covering an area of 5664 sq km, A68A's extent has been reduced to 2606 sq km (as of 23 December 2020) following the detachment of multiple smaller bergs. Using Satellite Altimetry data from CryoSat-2 and ICESat-2, we measure the thickness of the A68 iceberg. We use CryoSat-2 data acquired in the year before A68's calving from the Larsen C Ice Shelf in 2017 to create an initial thickness map. Following its calving, both CryoSat-2 and ICESat-2 tracks are geocoded onto the iceberg using imagery from MODIS and Sentinel-1. Comparing these measurements to the initial thickness allows us to track changes in A68's thickness. The thickness map reveals the presence of multiple 30m deep channels oriented along its narrow side, forming lines of weakness along which the iceberg shattered into multiple large fragments in December 2020. At the time of calving, its average thickness was 232m with a maximum thickness of 285m. Repeated measurements from satellite altimetry show the iceberg has thinned by an average of 32m, a thinning rate of 2.5cm per day. Combined with changes in area, we estimate that the iceberg has lost 64% of its original volume, or 941 cubic kilometres, representing a significant input of freshwater to the surrounding ocean.