

Fives decades of strong temporal variability in the flow of the Brunt Ice Shelf, Antarctica

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The Brunt Ice Shelf, East Antarctica, is a complex conglomerate of meteoric and marine ice, weakly connected to the much larger and faster-flowing Stancomb Wills Glacier Tongue to the east, and pinned down to the seabed in a small area around the McDonalds Ice Rumples in the north. The ice shelf is home to the UK research station Halley, from which changes to the ice shelf have been monitored closely since the 1960s. A unique 50-year record of the flow speed and an intense surveying programme over the past 10 years, have revealed a strong temporal variability in the flow. In particular, the speed of the ice shelf has increased by 10% each year over the past few years. In order to understand these rapid changes, we use a state-of-the-art flow model in combination with a range of satellite, ground-based and airborne radar data, to accurately simulate the historical flow and recent changes. In particular, we model the effects of a recently formed rift that is propagating at a speed of up to 600m/day and threatens to dislodge the ice shelf from its pinning point at the McDonalds Ice Rumples. We also report on the recent reactivation of a large chasm which has prompted the relocation of the station during the 2016/17 austral summer.