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Threat assessment of Brunt Ice Shelf calving events to the Halley Research Station

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A comparison of satellite photos and historical maps show that the coastline of the Brunt Ice Shelf (BIS) is currently extended further into the Weddell sea than before its last calving event. The British Antarctic Survey has operated a series of "Halley" research stations on BIS since 1956. In part due to the potential of a BIS calving event, Halley 5 was abandoned and a new station, Halley 6, was built further inland, and the "Lifetime of Halley" programme was set up to better predict BIS stability. Remote sensing, and data from a network of GPS receivers surrounding Halley 6, are used to study the changing strain regime within BIS and the neighbouring Stancomb-Wills Glacier Tongue (SWIT). There are three potential causes of a BIS calving event: a repeating cycle of BIS extension into the Weddell sea followed by a calving event due to its over-extension, an iceberg colliding with BIS and causing a calving event, or a repeating cycle of SWIT extension into the Weddell sea followed by a calving event with the resulting iceberg colliding with BIS. Data from the GPS receivers suggests the first scenario is unlikely. Remote sensors have observed small portions of BIS calving off due to iceberg collisions, however it is the SWIT scenario we conclude to be the largest threat to future BIS stability and the Halley research station.