



The heartbeat of Antarctic rifts

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Valuable insights into large-scale ice shelf calving have been gained from a variety of instruments set up around two active rifts on the Brunt Ice Shelf, Antarctica. We present novel data that include multi-year measurements of the rift width at timescales ranging from minutes to months, and frequent over-ice radar surveys to locate the rift tip. These data are supplemented by satellite radar data, which reveal a complex internal structure of the ice shelf and a strong influence on the trajectories and propagation rate of the rifts. A numerical ice-flow model and a simple fracture propagation criterion were successfully used to hindcast the observed trajectories, and to simulate future rift progression under different assumptions, showing a high likelihood of ice loss at the McDonald Ice Rumples, the only pinning point of the ice shelf. The nascent iceberg calving and associated reduction in pinning of the Brunt Ice Shelf may provide a uniquely monitored natural experiment of ice shelf variability, and provoke a deeper understanding of similar processes elsewhere in Antarctica.