

Propagation of an active rift in the Ross Ice Shelf, Antarctica

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Understanding propagation behavior of large rifts in ice shelves is important for understanding shelf adjustments to change and for parameterizing calving in models. We use satellite images and a comparison of two epochs of the MOA (MODIS Mosaic of Antarctica) to study the propagation of an active rift within a rift system near the western front of the Ross Ice Shelf. Between 1992 and 2012, the most upstream rift within the rift system propagated over 90 km. We observe large jumps and two types of episodic propagation. We use a numerical model to study recent propagation behavior of test fractures within a stress field. Our observations and model simulations support findings on the Ross and other large ice shelves regarding the importance of lateral propagation and the roles of transverse compressive stress, fracture length, and material inhomogeneity in controlling propagation behavior.