

Observations of Subsurface Meltwater Lake Collapse on an East Antarctic Ice Shelf

Dunmire, Devon R.; Lhermitte, Stef; Drews, Reinhard; Lenaerts, Jan; Mangel, Adam R.

Publication date

2018

Document Version

Final published version

Citation (APA)

Dunmire, D. R., Lhermitte, S., Drews, R., Lenaerts, J., & Mangel, A. R. (2018). *Observations of Subsurface Meltwater Lake Collapse on an East Antarctic Ice Shelf*. Abstract from AGU Fall Meeting 2018, Washington, District of Columbia, United States.

Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.

C41A-02: Observations of Subsurface Meltwater Lake Collapse on an East Antarctic Ice Shelf

Thursday, 13 December 2018

08:15 - 08:30

📍 *Walter E Washington Convention Center - Salon H*

The presence of meltwater influences Antarctic ice shelf dynamics in a way that is poorly understood. In addition to surface meltwater, subsurface meltwater lakes have been discovered close to the ice shelf grounding line. Drainage and collapse of these subsurface lakes may induce hydrofracturing and poses a potential threat to ice shelf stability. Here, we present direct observations of the near-surface firn and ice shelf structure before and after the collapse of a subsurface meltwater lake near the grounding line of the Roi Baudouin Ice Shelf (RBIS). In February 2016, ground penetrating radar (GPR) data were collected of the subsurface lake, highlighting its depth and extent. Surprisingly, when the field team returned to the site in December 2017 to repeat the GPR surveying, they found that the lake had collapsed. These unique GPR and GPS observations highlight the heterogeneity of the lake structure after collapse and allow us to see structural differences before and after collapse. Continued geophysical monitoring and analysis could provide important information to estimate the volume and hydrodynamics of the interglacial lake (e.g. horizontal vs. vertical drainage). In addition to field data, we use a regional climate model and remote sensing observations to provide an analysis of the climate forcing that may have contributed to the lake collapse. We show that anomalously high surface melting in the summer season of 2016-2017 likely contributed to the collapse. Our results shed light on the impact of subsurface lake collapse on the ice shelf structure, dynamics, and surface height changes, which is essential to understand the impact of meltwater drainage on ice shelf stability.

Authors

Devon R Dunmire

University of Colorado Boulder

Jan Lenaerts

University of Colorado Boulder

Stef Lhermitte

Delft University of Technology

Adam R Mangel

Colorado School of Mines

Reinhard Drews

University of Tübingen

[Find Similar](#)

View Related Events

Day: [Thursday, 13 December 2018](#)