

EGU2020-9927

<https://doi.org/10.5194/egusphere-egu2020-9927>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Repeat Subglacial Lake Drainage and Filling Beneath Thwaites Glacier, West-Antarctic Ice Sheet

George Malczyk¹, Daniel Goldberg², Noel Gourmelen², Jan Wuite³, and Thomas Nagler³

¹University of Edinburgh, School of Geosciences, United Kingdom of Great Britain and Northern Ireland

(g.r.malczyk@sms.ed.ac.uk)

²University of Edinburgh, School of Geosciences, United Kingdom of Great Britain and Northern Ireland

³ENVEO, Innsbruck, Austria

Active subglacial lakes have been identified throughout Antarctica, offering a window into subglacial environments and into controls on ice dynamics. Between June 2013 and January 2014 a system of connected subglacial lakes drained in unison under the Thwaites glacier in the West Antarctic ice sheet, the first time that such a system has been observed in the Amundsen Sea Sector. Estimates based on catchment scale melt production suggested that lake drainages of this type should occur every 20 to 80 years. We collected elevations from January 2011 to December 2019 over the Thwaites lake region using the CryoSat-2 swath interferometric mode and ICESat-2 land ice elevations, as well as ice velocity from the Sentinel-1 SAR mission since 2014. Using various elevation time series approaches, we obtain time dependent elevations over each lake. Results indicate that the upstream lakes undertake a second episode of drainage during mid-2017, only 3 years after the previous event, and that a new lake drained. Unlike the 2013-2014 episode, this new drainage episode contributed to filling one of the downstream lake with no evidence of further downstream activity. This new sub-glacial lake activity under Thwaites offer the possibility to explore lake connectivity, subglacial melt production and the interaction with ice dynamics.