

EGU24-8780, updated on 11 May 2024

<https://doi.org/10.5194/egusphere-egu24-8780>

EGU General Assembly 2024

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



Assessing the influence of climate on Antarctic submarine gully evolution

Jenny Gales¹, Robert McKay², Laura De Santis³, Michele Rebesco³, Jan Sverre Laberg⁴, Denise Kulhanek^{5,6}, Molly patterson⁶, Maxine King¹, and Sookwan Kim⁷

¹University of Plymouth, Biological and Marine Sciences, Plymouth, United Kingdom of Great Britain

(jenny.gales@plymouth.ac.uk)

²Antarctic Research Centre, Victoria University of Wellington, Wellington, New Zealand

³National Institute of Oceanography and Applied Geophysics – OGS, Trieste, Italy

⁴Department of Geosciences, UIT – The Arctic University of Norway, Tromsø, Norway

⁵Institute of Geosciences, Christian-Albrechts-University of Kiel, Kiel, Germany

⁶Department of Geological Sciences and Environmental Studies, Binghamton University, State University of New York, Binghamton, NY, USA

⁷Ocean Climate Response & Ecosystem Research Department, Korea Institute of Ocean Science and Technology, Busan, Republic of Korea

Antarctica's continental slopes hold invaluable insights for understanding past climate, ice-sheet dynamics, ocean circulation, erosional and depositional processes, and submarine geohazards over millennial timescales. We present a multidisciplinary dataset from the Ross Sea continental margin, Antarctica from the EUROFLEETS-funded ANTSSS expedition and International Ocean Discovery Program Expedition 374, including core records spanning ~3 Ma, multibeam echosounder and single-channel seismic data and legacy seismic data available through the Antarctic Seismic Data Library System. Here, gully and channel systems occur at the head of the Hillary Canyon, with palaeo-gullies evident in seismic data. New sediment core-seismic correlations show that palaeo-gullies evolved on the Ross Sea continental margin over multiple glacial cycles, filling and reforming associated with glacial advances, cold dense water cascading and other processes. We show multidisciplinary datasets that constrain the signature of down and along-slope processes and examine factors driving their timing, frequency, and impact on gully evolution. We discuss the implications of these findings in relation to Neogene and Quaternary West Antarctic Ice Sheet expansions to the shelf edge.