Reconstructing the rate and magnitude of Last Interglacial sea-level change in the North Sea and its global implications

PRESENTED BY

Dr. Graham Rush

School of Earth and Environment, University of Leeds

AUTHORS

1.Dr. Graham Rush[1]

2.Dr. Amy McGuire[1]

3.Dr. Víctor Cartelle[2]

4.Mr. Oliver Pollard[1]

5.Dr. Freek Busschers[3]

6.Dr. Kim M. Cohen[4]

7.Prof. David M. Hodgson[1]

8.Dr. Frank Wesselingh[5]

9.Dr. Rachel Smedley[6]

10. Prof. Natalya Gomez[7]

11. Dr. Lauren J. Gregoire[1]

12. Dr. Martina Conti[8]

13. Prof. Kirsty Penkman[8]

14. Prof. Brendan Keely[8]

15. Dr. Fumiko Nara[9]

16. Dr. Natasha Barlow[1]

1. School of Earth and Environment, University of Leeds, **2**. Flanders Marine Institute (VLIZ), **3**. TNO Geological Survey of the Netherlands, Utrecht, Netherlands, **4**. Dept. of Physical Geography, Faculty of Geosciences, Utrecht University, **5**. Nederlands Centrum voor Biodiversiteit Naturalis, **6**. University of Liverpool, School of Environmental Sciences, Department of Geography and Planning, **7**. McGill University, **8**. Department of Chemistry, University of York, United Kingdom, **9**. Department of Earth and Planetary Sciences, Nagoya University, Nagoya, Japan

ABSTRACT

Sea-level projections are poorly constrained beyond the 21st century because of limitations relating to data availability and understanding of the response of ice sheets to a warmer climate. Under future climate scenarios, the instability of the West Antarctic Ice Sheet and its potential contribution to global and regional sea levels is unresolved. Observations of past sea-level change provide limited scenarios to test climate models under a global climate at least 1.5°C warmer than present, yet during the Last Interglacial global mean temperatures were~1-2°C warmer and sea level was ~5-10 m higher than pre-industrial values. Therefore, the Last Interglacial provides a valuable palaeo-laboratory for studying the mechanisms of sea-level change forced by warmer global temperatures and, in turn, helping to resolve future uncertainties.

We present results of reconstructing changes in Last Interglacial sea-level in the North Sea. We collected a series of sediment cores from the seafloor of the North Sea and developed a novel approach to establish the timing and indicative meaning of transgressive contacts. By combining a suite of sedimentary information with biological and geochemical proxies and new ice sheet and GIA modelling we produce a series of sea-level index points, which reveal the rate of sea-level rise

in the North Sea during the Last Interglacial. We show evidence of high rates, with multiple meters of sea-level change in a few millennia during the peak warm period of the Last Interglacial. Because sea-level rise in north-west Europe is particularly sensitive to the source of melting ice, we our work can help constrain the contribution of the Antarctic Ice Sheet to global sea-level rise during the Last Interglacial.

Type of presentation: Poster