



## **The micromorphology of deformation below iceberg scour marks**

L.D. Linch

Queen Mary University of London, Department of Geography, London, United Kingdom (l.d.linch@qmul.ac.uk)

Icebergs plough through unconsolidated lake/sea sediments gouging out kilometre long grooves, 100s of metres wide and tens of metres deep. Although the surface morphology of iceberg scours is well documented, little is known about what scours look like in stratigraphic section, particularly where surface characteristics are absent (e.g. through deterioration or burial). This is exacerbated by their inaccessibility in modern settings, where they are often (up to) hundreds of metres below the surface of a lake/sea. Aside from coring, which is expensive and often unavailable, the only other way to observe stratigraphic detail of iceberg scours is to examine ancient, e.g. Pleistocene, examples found on land and use them as analogues for modern iceberg scours. Such information is important for 1) correctly reconstructing palaeoenvironmental information, e.g. calving glacial margins, wind direction, extent of subglacial environment etc. and 2) predicting future glacial dynamics. In addition, this information may eventually aid structural engineering on Arctic shelves, which could be of great value to oil and gas companies given the anticipated increase in number, size and frequency of icebergs within areas of petroleum exploration and extraction as a result of climate change.

The primary aim of this investigation is to establish a definitive set of diagnostic criteria for identifying iceberg scours in the Quaternary and pre-Quaternary rock record by macroscopically and microscopically (2D thin sections, 3D x-ray tomography and Metripol birefringence stress mapping) examining sediment deformation below iceberg scours. The following sites are currently under investigation: a) Late Pleistocene sediments from: former (on land) Glacial Lake Agassiz (Canada), ancestral (on land) Lake Ontario (Scarborough Bluffs, Canada) and cores from the North Sea; b) modern iceberg scoured sediments from: cores previously retrieved from Antarctica; and c) thin sections suspected of showing modern ice scoured sediments from Sweden.