



Dr Hong Chin Ng
BSc(Bristol), PhD

Research Associate in Isotope Biogeochemistry

Area of research

Investigate ocean changes during rapid climate transitions using isotope geochemistry

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Summary

The climate, ocean and ice caps are changing at an unprecedented rate. I am interested in investigating the interactions between these Earth systems during such rapid transitions, and how these affect the natural ecosystems and the human society. I mainly employ chemistry methods to address research questions of interest - my favourites are natural silicon isotopes and uranium-series isotopes, which can provide information on a range of natural processes such as biological productivity, continental weathering, and ocean circulation.

My recent research focuses on the acceleration of glacier retreat in Greenland with climate change, and its impact on the delivery of nutrients to proximal fjord and marine ecosystem (ICY-LAB project). Glacier is an important agent of rock weathering, which releases nutrients such as silicon (Si) that can stimulate diatom phytoplankton bloom in fjord and coastal area. Using the stable isotopes of Si, I aim to examine the evolution of the high-latitude Si cycle - its supply, transport, uptake by biology and sediment burial, in the light of accelerated glacial melting. The project findings will have important implications for Greenland fisheries, and future regulation of carbon dioxide as diatoms account for about half of carbon burial in marine sediments. I am also involved in a similar exercise that is carried out on the Patagonia Ice Fields (PISCES project).

Many climate change research rely on studies of past events to improve future predictions of environmental changes. The climate system experienced a particularly dynamic period during the last deglaciation (20-10 thousand years before present). It was characterized by abrupt, millennial-scale climate events and substantial shifts in atmospheric carbon dioxide, which was linked to changes in ice sheet extent and ocean circulation. Previously on my PhD project I investigated these links by testing and applying a proxy of rate of Atlantic Ocean circulation - $^{231}\text{Pa}/^{230}\text{Th}$ ratio in the sediment. One of the main findings was on the role of ice sheet and iceberg melting in driving and sustaining slowdown in Atlantic circulation. This has potential implications for future long-term behaviour of Atlantic circulation, given the ongoing acceleration of ice melting at the northern high latitudes caused by climate change.

Biography

Education

2009-2012 Bachelor of Science Environmental Geoscience, University of Bristol.

Keywords

- Marine chemistry Climate change Isotope geochemistry Ocean circulation Paleoceanography Paleoclimate

Memberships

Organisations

[School of Earth Sciences](#)

Research groups

- [Geochemistry](#)
- [Marine & Terrestrial Environments](#)

Research themes

- [Earth Surface Processes](#)

Interdisciplinary groups

- [Bristol Isotope Group](#)

Recent publications

- Ng, HC, Cassarino, LA, Pickering, RA, Woodward, EMS, Hammond, S & Hendry, K, 2020, '[Sediment efflux of silicon on the Greenland margin and implications for the marine silicon cycle](#)'. *Earth and Planetary Science Letters*, vol 529.
- Hendry, KR, Huvenne, VA, Robinson, LF, Annett, A, Badger, M, Jacobel, AW, Ng, HC, Opher, J, Pickering, RA, Taylor, ML, Bates, SL, Cooper, A, Cushman, GG, Goodwin, C, Hoy, S, Rowland, G, Samperiz, A, Williams, JA, Achterberg, EP, Arrowsmith, C, Brearley, JA, Henley, SF, Krause, JW, Leng, MJ, Li, T, McManus, JF, Meredith, MP, Perkins, R & Woodward, EMS, 2019, '[The biogeochemical impact of glacial meltwater from Southwest Greenland](#)'. *Progress in Oceanography*, vol 176.
- Ivanovic, R, Gregoire, LJ, Burke, A, Wickert, AD, Valdes, P, Ng, HC, Robinson, L, McManus, J, Mitrovica, J, Lee, L & Dentith, J, 2018, '[Acceleration of Northern Ice Sheet Melt Induces AMOC Slowdown and Northern Cooling in Simulations of the Early Last Deglaciation](#)'. *Paleoceanography and Paleoclimatology*, vol 33., pp. 807-824
- Ng, HC, Robinson, LF, McManus, JF, Mohamed, KJ, Jacobel, AW, Ivanovic, RF, Gregoire, LJ & Chen, T, 2018, '[Coherent deglacial changes in western Atlantic Ocean circulation](#)'. *Nature Communications*, vol 9.
- Rowland, GH, Ng, HC, Robinson, LF, McManus, JF, Mohamed, KJ & McGee, D, 2017, '[Investigating the use of ²³²Th/²³⁰Th as a dust proxy using co-located seawater and sediment samples from the low-latitude North Atlantic](#)'. *Geochimica et Cosmochimica Acta*, vol 214., pp. 143-156
- Chen, T, Robinson, LF, Burke, A, Southon, J, Spooner, P, Morris, PJ & Ng, HC, 2015, '[Synchronous centennial abrupt events in the ocean and atmosphere during the last deglaciation](#)'. *Science*, vol 349., pp. 1537-1541

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