New research shows how melting ice is affecting supplies of nutrients to the sea

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The findings of a research expedition to coastal Greenland which examined, for the first time, how melting ice is affecting supplies of nutrients to the oceans has been published in the journal *Progress in Oceanography*.

The European Research Council-funded expedition on board the RSS Discovery took place during the summer of 2017. It was led by Dr. Kate Hendry a geochemist from the University of Bristol's School of Earth Sciences.

The scientific crew spent about five weeks at sea in 2017, mostly near the western coast of Greenland, sampling waters, sediments and marine life using a range of cutting-edge technologies.

A Remotely Operated Vehicle (ROV) took high-definition, real time videos of the seafloor and collected samples of marine life, water and sediments which were then analysed by the scientists on board.

The paper highlights the importance of glacial meltwaters, combined with shelf currents and biological production, on biogeochemical cycling in these high-latitude regions over a range of timescales.

Previous work from the Bristol Glaciology Centre has shown that meltwaters released from underneath glaciers are rich in important nutrients. However, until now it's not been clear to what extent these nutrients reach the open ocean where they can 'fertilise' marine life.

Dr. Hendry said: "Vigorous biological uptake in the glacial fjords keeps the surface concentration of key dissolved nutrients needed for algae, such as nitrate, phosphate and silicon, very low.

"However, sediment particles from the glaciers reach the shelf waters, albeit in a patchy way, and are then rapidly transported away from the shore.

"These particles, together with the remains of algal shells and biological material, are rapidly dissolved and cycled through shallow marine sediments. This means that the seafloor is a very important source of

nutrients—especially silicon—to the overlying waters."

Future changes in the supply of these reactive, glacial sediments, as well as changes in the shelf currents that transport them, will have a profound impact on the nutrient balance and ecosystem structure in the fjords and coastal waters, and potentially even further afield.

Dr. Hendry added: "This study shows how geochemical and oceanographic analyses can be used together to probe not only modern nutrient cycling in this region, but also changes in glacial meltwater discharge through time."

More information: Katharine R. Hendry et al. The biogeochemical impact of glacial meltwater from Southwest Greenland, *Progress in Oceanography* (2019). DOI: 10.1016/j.pocean.2019.102126

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