Scientists report ocean data from under Greenland's Petermann Glacier

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Travel to these remote locations is strictly by helicopter, also critical in the transport of monitoring equipment. Pictured is oceanographer Keith Nicholls. Credit: University of Delaware

In August 2015, University of Delaware oceanographer Andreas Muenchow and colleagues deployed the first UD ocean sensors underneath Petermann Glacier in North Greenland, which connects the great Greenland ice sheet directly with the ocean.

Petermann Glacier is the second largest floating ice shelf in the northern hemisphere.

Located approximately 16 to 2,300 feet below the glacier, the five ocean sensors are connected to a weather station at the surface, creating the first cabled observatory on a floating, moving, and rapidly melting Greenland glacier.

The researchers recently reported in the journal *Oceanography* that sensor data from August 2015 to February 2016 confirms that that the floating ice shelf is strongly coupled, or tied, to the ocean below and to Nares Strait, and temperatures vary with the tides and seasons.

Specifically, the paper found that the same water that has been measured in the fjord is under the glacier, lending credence to the idea that the continuity of the glacier depends on the conditions outside the glacier in the fjord.

This water is warming an average of 0.03 degrees Celsius per year, with temperatures at the deepest ocean sensors sometimes exceeding 0.3 degrees Celsius or 33 degrees Fahrenheit, Muenchow said. These temperature values are consistent at various water depths, and match data from a 2003-09 study in adjacent Nares Strait, which connects to both the Arctic and Atlantic Oceans.

"This correlation tells us this is the same water and that this is what's causing the melting of the glacier, which could influence sea level rise," said Muenchow, an associate professor of oceanography in UD's School

of Marine Science and Policy, which is housed in the College of Earth, Ocean, and Environment (CEOE).

The scientists theorize that warmer Atlantic water will continue to arrive inside Petermann Fjord and below the ice shelf from Nares Strait in the next one-to-two years.

More information: Andreas Münchow et al, The Ice Shelf of Petermann Gletscher, North Greenland, and Its Connection to the Arctic and Atlantic Oceans, *Oceanography* (2016). DOI: 10.5670/oceanog.2016.101

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