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### *New measurements of water temperatures and seafloor depths using XBTs in a northwest Greenland fjord*

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#### **Abstract.**

We propose a light and fast expedition to a fjord in northern Greenland to help us better understand the cause of recent changes in the tidewater glaciers that terminate in these waters. In particular, we are interested in two fast flowing glaciers, Tracy and Heilprin, which lay at the head of Inglefield fjord. Using NASA Operation IceBridge (OIB) data, we have determined that Tracy has been losing mass much more quickly than Heilprin. By choosing neighboring glaciers, we can rule out disparate surface mass balances and so are left with different rates of basal melt and crevassing. Unfortunately, there are no estimates of the water temperatures in this fjord. Ocean models, which might have provided some guidance as to the properties we could expect at the ice-ocean interface, have insufficient resolution there, leaving us only to speculate on the ocean's role in melting these glaciers. The town of Qaanaaq, which lies at the mouth of the fjord, provides a convenient base for small boat measurements of the fjord water by means of expendable bathythermographs (XBTs). Additionally, bathymetry measurements along the fjord (also from the XBT deployment) will add further constraints for our ongoing effort to produce quality bathymetry estimates using inverted gravity measurements from the OIB campaign. Importantly, this campaign will assess the feasibility of involving the local Inuit population in the ongoing sampling of Inglefield fjord, of engaging other Greenlandic communities to sample their coastlines, and to take winter measurements through fishing and hunting holes drilled in the sea ice.