



PP12C-01: The Petermann Glacier Experiment, NW Greenland

Monday, 12 December 2016

10:20 - 10:35

📍 *Moscone West - 2012*

The Petermann Glacier Experiment is a comprehensive study on land, ocean, and ice in Northwest Greenland, staged from Swedish Icebreaker Oden in 2015 as a collaboration between the US, Sweden, UK, and Denmark. This talk introduces the strategic goals of the experiment and connects the various scientific results. Petermann Glacier drains a significant marine-based sector of the northern Greenland Ice Sheet and terminates in a floating ice tongue, one of the largest remaining systems of its kind in the northern hemisphere. Records of the modern state of Petermann Glacier and its past variations are of interest to understand the sensitivity of marine terminating outlet glaciers to change, and to constrain the rates and extent of changes that have actually occurred. With this case study we are learning the rules of large scale dynamics that cannot be understood from modern observations alone. Although past behavior is not a simple analog for the future, and no single system captures all possible behaviors, insights from these case studies can be applied through models to better project how similar systems may change in the future. The Petermann Expedition developed the first comprehensive bathymetric maps of the region, drilled through the floating ice tongue to obtain sub-shelf sediment cores near the grounding line and to monitor sub-ice conditions, recovered a broad array of sediment cores documenting changing oceanic conditions in Petermann Fjord, Hall Basin, and Nares Strait, measured watercolumn properties to trace subsurface water masses that bring heat from the Arctic Ocean into deep Petermann Fjord to melt the base of the floating ice tongue, developed a detailed record of relative sealevel change on land to constrain past ice loads, and recovered pristine boulders for cosmogenic exposure dating of areal ice retreat on land. Together, these studies are shedding new light on the dynamics of past glaciation in Northwest Greenland, and contributing to fundamental understanding of large marine-terminating outlet glacier systems, which are threatened by global warming and poised to contribute to global sealevel rise in the future. Further information in the Petermann Glacier Experiment is available at <https://petermannsglacialhistory.wordpress.com>

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