



## **MeBo seabed drilling operation in the Amundsen Sea Embayment and early results on West Antarctic Ice Sheet dynamics**

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The West Antarctic Ice Sheet (WAIS) has been subject to a very dynamic history as most of its base is grounded below present sea level and, thus, sensitive to climatic changes. Its collapse would result in a global sea-level rise of 3.4 to 5 m. The reconstruction and quantification of WAIS collapses in warm periods in the geological past will provide constraints required for ice sheet models predicting its future behaviour and resulting sea-level rise. Large uncertainties exist regarding the chronology, extent, rates, and spatial and temporal variability of past advances and retreats of the WAIS across continental shelves. The Amundsen Sea drainage sector in particular has shown unusual rapid retreat and dramatic changes over the last decades, which has been suggested to be a precursor to the behaviour of the entire WAIS. The main objective during the RV Polarstern expedition PS104 in early 2017 was the application of the MARUM-MeBo70 seabed drilling system to recover a series of long sediment cores at sites from the oldest to the youngest sedimentary sequences of the Amundsen Sea Embayment shelf. The expectation is that these cores will provide sample material for proxy analyses required to reconstruct the development and past dynamics of the WAIS in the Amundsen Sea sector. The drill locations lie primarily along the central glacial troughs of Pine Island Bay and in front of Pine Island Glacier. Further drill sites target grounding zone wedges in order to understand the processes that controlled ice retreat following the last glacial maximum, and Neogene sequences outcropping at the seafloor in order to investigate the greenhouse-to-icehouse transition in West Antarctica. We will present an overview of the expedition, our experiences of seabed drilling in a glacial shelf environment and preliminary results from the drilled cores.