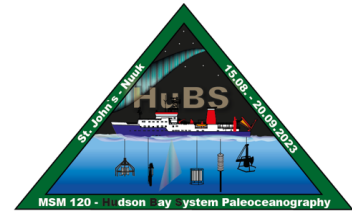




**FS MARIA S. MERIAN**  
**Cruise MSM120, St. John's - Nuuk**  
**Weekly Report Nr. 1, 14.08. - 20.08.2023**



## Hudson Bay System (HuBS)

Freshwater discharge through the Canadian Arctic Archipelago feeds into the Labrador Basin, thus affecting directly the ocean circulation pattern and deep-water formation in the Labrador Sea. This freshening is partly attributed to enhanced Greenland Ice Sheet melt and Arctic Ocean sea-ice retreat that might result in increased volume transport of arctic freshwater into the subpolar North Atlantic Ocean. A further increase of such a freshening of the North Atlantic may contribute to the hypothesized slowdown of the Atlantic Meridional Overturning Circulation (AMOC) during global warming. Expedition **MSM120** and its post-cruise work aims to improve our knowledge on the postglacial development within the **HuBS**, the Hudson Strait, Foxe Basin, and Hudson Bay System, by studying early to late Holocene variations in freshwater distribution and outflow as well as the related ecosystem changes recorded in sediments from shallow basins and channels in the HuBS.

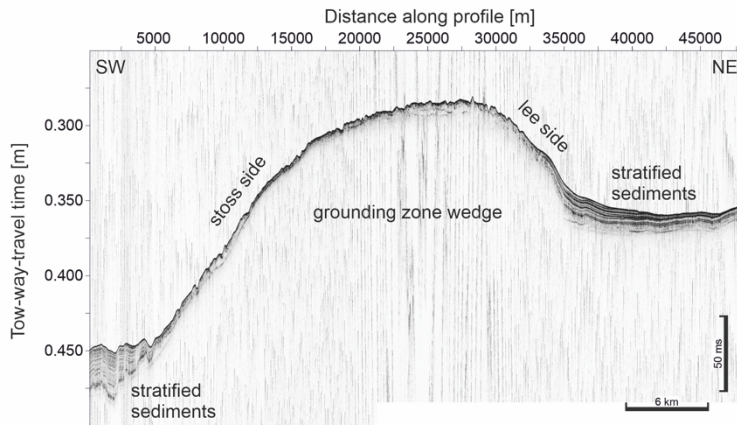


*Maria S. Merian leaving the narrow entrance of St. John's harbour, Newfoundland (Foto R. Schneider).*

Expedition MSM120 started at Tuesday, August 15<sup>th</sup> 2023, leaving the port of St. John's, Newfoundland, in the early afternoon. The day before, the scientific crew embarked the vessel after all the scientific equipment was taken onboard.

The first two days at sea, heading towards the Labrador Shelf, were spent preparing the laboratories for the hydroacoustic surveys, for the water column and geological sampling. On Thursday, August 17<sup>th</sup>, hydroacoustic surveys using the shipboard ADCP (Acoustic Doppler Current Profiler), seafloor multibeam swath bathymetry, and sediment echosounder systems were started along the southern Labrador Shelf, the first work area planned. ADCP data will be transferred and stored directly into the data archive of the German Alliance for Marine Research (DAM) on the PANGAEA platform at the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven. The new data from

multibeam swath bathymetry and sediment echosounder surveys will complete existing data sets already gained during the former Maria S. Merian cruises MSM45, 46, and 84. These were accomplished to reconstruct the extension of the land-based Laurentide Ice Sheet onto the Labrador Shelf at glacial sea-level low-stand by mapping out the grounding line wedges of the former ice margin.



*PARASOUND echosounder profile from the outer Labrador Shelf at 55°10'N / 057°20'W. The figure illustrates a morphological ridge, the grounding zone wedge, which at both flanks, is marked by well stratified postglacial marine sediments (Figure F. Lenz).*

Grounding zone wedges are crest-like landforms built at the grounding line of an ice sheet during a still stand position over decades to centuries. Therefore, these landforms are useful to reconstruct the ice dynamics in a submarine shelf area. Further, their wedge-shaped structure can be used to infer the direction of the ice movement. The steep side (lee side) is facing away from the ice rim, while the less steep side (stoss side) is facing the grounded ice.

The hydroacoustic surveying on the Labrador Shelf continued until Friday noon, August, 18<sup>th</sup>, in northerly direction. After a transit towards the next work area east of Hudson Strait, a first CTD station was performed in the Labrador Basin at 2200 m water depth on Sunday, August 20<sup>th</sup>. This station will provide the water mass properties characteristic for the central Labrador Sea, for comparison with those prevailing in the HuBS. Afterwards, we continued with the hydroacoustic surveying in order to identify geological sampling locations suitable for retrieving undisturbed postglacial sediment archives for paleoceanographic reconstructions in the deeper Labrador Basin.

After having successfully started the MSM120 scientific program during the last six days, the scientific and ship's crew are now looking forward to enter the Hudson Strait and Hudson Bay the coming week.

With best regards from FS MARIA S. MERIAN

Ralph Schneider

August 20<sup>th</sup>, 2023