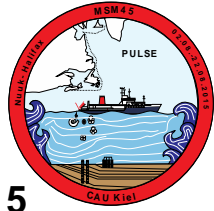




**FS MARIA S. MERIAN Cruise 45**  
**Nuuk, Greenland – Halifax, Canada**  
**Weekly report Nr. 2, August 10, - August 16, 2015**



More than 2500 nautical miles covered and more than 250m of sediment cores retrieved add up to the success of fourteen days at sea: 1cm of sediment per mile of ocean track. During the second week of MSM 45, we continued station work on the Labrador Shelf. Thanks to detailed and painstaking PARASOUND and EM122 multi-beam bathymetry surveys, we could identify the few shallow basins on the shelf that contain enough sediments of the most recent geological epoch, the Holocene interglacial, to allow for detailed reconstructions of the Labrador current variability during the last 12,000 years. From Monday to Friday, we sampled our way through five of the larger of these basins, and sampled both the sediment and water column at two to three stations each. All survey and sampling work proceeded without incidents, so that we were able to meet our ambitious goals for the week. This was made possible by the technical support and great flexibility of the ship's crew during the search for optimal core sites with the ship's internal sonar equipment, and during the deployment of continuously changing equipment on station.

Arguably the most exciting results are the more than 150 m of sediment cores recovered from the shallow shelf basins off Labrador. Based on preliminary stratigraphic identification, these cores will, for the first time, allow continuous reconstruction of climate variability of the Labrador Current during the 12,000 years of the last interglacial, including the preceding brief cold spell of the Younger Dryas. Colour scan images and core descriptions of our sediment cores, by comparison to published records, reveal repeated melt events of the glacial ice shield not only during the Younger Dryas but also during the subsequent Holocene warm period. In addition, ice-rafted detritus - glacial dropstones embedded in the soft Holocene mud – is evidence that during these periods the Labrador Current also carried ice bergs into the western N Atlantic. Even 10cm-diameter drop stones could not, however, prevent recovery of 10 to 15 m long gravity cores, which to our surprise show no obvious indication of sediment slumps or hiatuses. The latter is also owed to the detailed survey work at each station prior to core recovery, which guided us the few sites with undisturbed sedimentary successions. The many drop stones recovered from the sedimentary record will now add to our growing collection of billion year-old rocks, first started on the mountains of W Greenland. Only this time, the ancient rocks are of North-American origin.

Sampling and charting of the water column by CTD and water sampling rosette identified and captured the various surface and subsurface water masses of the western Labrador

Sea. We could thus identify a coastal water mass on the shelf, 4 to 5 degrees colder than its offshore counterpart in the Labrador Current. This water mass is either result of extensive ice berg melting, or outflow from Hudson Bay. Deployments of the multi net were also very successful. The aim here is to map the abundance and distribution of so-called pteropods. Due to their fragile aragonitic shells, these winged snails are thought to be sensitive indicators of the marine carbon cycle, which could faithfully record the increasing acidification of the polar oceans.



*Top: One out of an armada of floating icebergs in the coastal waters at Hamilton Bank (54°42 N / 56°28 W) a latitude similar to that of Kiel, N Germany*

*Bottom: Olive-green Holocene mud recovered from one of the sampled shelf basins containing hand-sized fragment (dropstone) scraped from the N-American basement rocks. (Fotos R. Schneider).*

Following this week's station work on the shelf, today we also completed sampling of the deeper continental slope of Hamilton Spur, at water depths around 3,300 m, where we collected sediment cores of more than 15 m. These cores possibly contain sediments of a preceding warm period, which would allow climate reconstructions of the Labrador Current covering the last 120,000 years.

If corroborated, these records could be directly compared to the climate records of the Greenland ice cores.

For the last week of the expedition, stations on the shelf off Newfoundland are planned. After that, we will embark on our 400-mile return to Halifax, where we will be met by the the last highlights of the expedition: "Open Ship" events on Saturday, and a reception on board with representatives from industry and government, and colleagues from Dalhousie University and Bedford Institute of Oceanography.

As we had wished for, we had again calm seas, sun or fog, and polar lights during our second week. Together with the scientific successes, this certainly contributed to the good mood on board. For the next week, we expect to complete our mission in equally good spirits.

Best regards from FS MARIA S. MERIAN

Ralph Schneider

August 16, 2015