

RV Maria S. Merian  
Cruise MSM103 (GPF 20-2-046)  
12.09. – 15.11.21, Emden – Emden

**PRINCE**  
**Groundwater resources offshore**  
**Prince Edward Island, Canada**

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At the beginning of last week, shortly before arriving in Newfoundland, we were hit by a small but powerful low pressure area. In waves of up to 7 m, the Merian rolled heavily and tilts reaching up to 20° tested our lashings and secured devices in the laboratories. However, since we had all checked them the evening before, there was no damage. Starting the next day, the weather could not have been more different during a short stopover in St. John's (Newfoundland) and during the subsequent transit through St. Lorenz Bay. In bright sunshine and summer temperatures, we arrived in the port of Charlottetown (Prince Edward Island – PEI) on September 23<sup>rd</sup>, finally reaching our working area after eleven days of transit.



*Figure 1: The entrance to harbor of St. John's (Newfoundland), protected by rock formations, is a spectacular sight.(Photo: Thies Bartels)*

While arriving in Charlottetown, we also finally received the last pending permit from the Canadian Department of Fisheries and Oceans (DFO), which defines areas closed for our work and mitigation measures for our experiments to protect endangered species. More specifically, the latter relates to the protection of marine animals (e.g. whales, sharks, turtles) from the harmful effects of sound emissions. The implementation of these measures is monitored by independent marine mammal observers (MMOs) who embarked the vessel in Charlottetown.

With the approval and the observers on board, we were finally able to set the profile planning in concrete terms and - after a short transit around the island - start our scientific work. After a short calibration of the hydroacoustic systems in the night of September 23<sup>rd</sup> to 24<sup>th</sup>, we started with the deployment of the OBEM (ocean bottom electromagnetic) receivers on the morning of September 24<sup>th</sup>. OBEM receiver stations record electrical and magnetic fields on the ocean floor. The fields can be of natural origin or they can be generated by active EM transmitters. As part of this project, we will use both types of sources in passive (natural sources) and active (with transmitters) EM

experiments. Due to shallow water depths between 25 - 60 m along the 60 km long profile, the deployment of the twelve OBEM stations was already finished in the early afternoon.

In the night of September 25<sup>th</sup> we carried out a first profile run with the hydroacoustic systems. In general, we want to create an exact bathymetry with the high-resolution multibeam echo-sounder (MBES), which will be important for the planning of our profiles. With the sediment echo-sounder (sub-bottom profiler - SBP), the structure of unconsolidated sediments can be mapped to a depth of several tens of meters. On the one hand, this is helpful for structural analysis, but will also be important for the search for suitable locations for sampling with the gravity corer. A review of the first recorded profiles shows that the areas of the bay examined thus far largely consist of solidified sediments / sedimentary rocks, which are most likely not suitable for sampling with the gravity corer. Here, subsidence structures to the NE of PEI seem to be more promising and we will investigate these structures in the upcoming week. The first hydroacoustic profiles were completed in the early morning hours of September 26<sup>th</sup>.

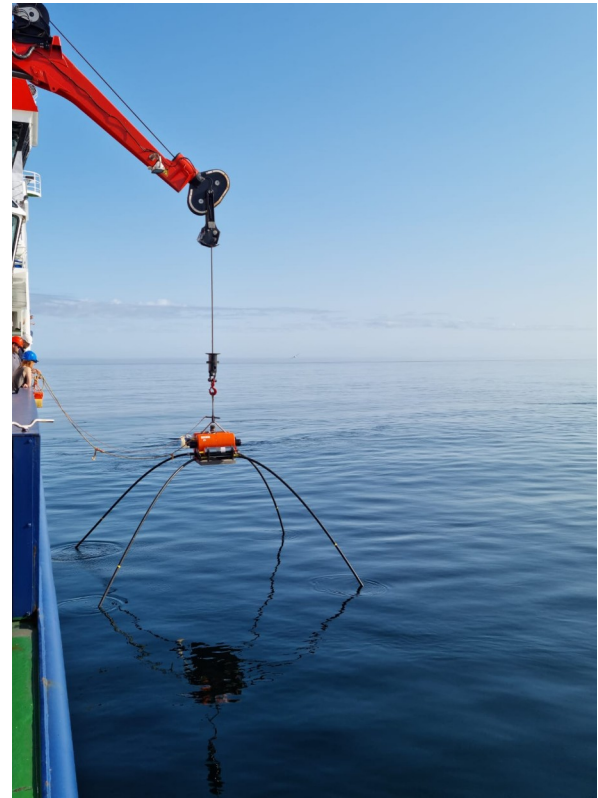


Figure 2: Deployment of OBEM stations.. (Photo: Irena Schulten)



Figure 3: Deployment of the seismic streamer. (Photo: S. Hölz)

After the subsequent deployment of the 2D seismic streamer, we have started measurements along a more than 800 km long profile that will cover most of the wells known to us in the area to the N of the PEI. Currently we have already finished about 300km of the profile.

First evaluations of the recently being measured data should soon give us first results and will guide our investigations in the following weeks.

With best regards on behalf of the crew of cruise MSM103

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