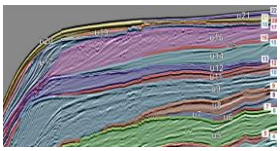
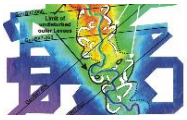
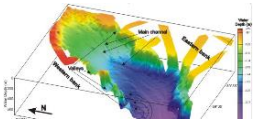
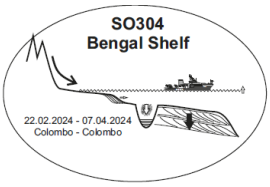


FS Sonne Cruise **SO304**
Bengal Schelf & Fan
Colombo - Colombo



Weekly Report No. **6**
25.3. - 31.3.2024





After we were able to leave Chittagong on the afternoon of March 24, we continued our work by sampling two alternative positions on the delta front. These had been approved shortly before, and there we achieved the expected sample quality and the necessary core lengths, so that we were able to achieve at least a minimum goal of the cruise. The delta front grows on average by a few centimeters per year, so that we can quantify and evaluate the growth at the already known locations. In particular, we are also interested in anthropogenic input, not only through microplastics, but also through chemicals such as PFAS and other contaminants. A transect along the delta front into the shelf canyon will also map the transport routes and document possible changes in inputs in space and time.

This station work was then followed by several days of seismic work on the morning of March 25, which we had previously had to interrupt. We worked our way across the shelf from east to west with several diagonal profiles. On March 28, we retrieved the seismic gear again and continued with a longer parasound survey, in the middle of which another sampling was planned for the evening. However, this was less successful, the combination of cohesive clay and sand prevented sampling with a gravity corer despite several attempts, only the multicorer again delivered a very good yield.

On the night of March 29, we reached the Swatch of No Ground shelf canyon again, this time taking another gravity corer and water samples at the shallow station in the thalweg. This was followed by the additionally requested Parasound survey of about 10 hours duration, with which we wanted to remeasure lines from 2006 in order to determine the sediment budget on decadal time scales. The results were amazing, especially in combination with the bathymetry, because there were considerable differences of more than 20 meters, on the one hand due to 'losses' of entire sediment packages, but also due to filling of existing surfaces, the morphology has changed significantly. This data set is certainly a highlight of our cruise, and in addition to the 2 stations, we will be able to carry out further sampling based on the surveys at the end of the working week.

At noon on March 29, we then deployed the seismic equipment one last time on the shelf to close any gaps in the profile network and complete the interrupted seismic line from the previous week. On the morning of March 31, the devices were then retrieved.

In combination, these profiles are intended to span a network over the entire shelf in order to record the spatial position of the sea-level-controlled sequences and erosion areas and to quantify the sediment deposits up to the shelf edge. We will also be able to gain further insights into the sedimentation processes on the shelf from the excellent Parasound profiles, the quality of which has improved by a whole order of magnitude compared to the earlier surveys. In addition to the excellent stability of the data acquisition, it is among all the higher penetration due to better signal processing, the availability of the phase-accurate signal and the higher data density that open up new possibilities for evaluation. In the canyon, we were able to look more than 150 m deep into the sediments in some places. As with the fan, these data will be of extraordinary value to the project.

The last chapter of the work in the EEZ of Bangladesh then started with the easy recovery of the mooring, which provided continuous data from CTD and ADCP for the two weeks. And a

daily sampling with a sediment trap yielded considerable amounts of sediment despite the short duration.

The mooring station was then sampled again with CTD, multicorer and gravity corer before moving on to an additional station where we could expect a high accumulation of several meters of sediment from the last 18 years. Despite the high signal penetration, however, we were only able to obtain cores of just 7 meters in length. And this despite the fact that the core barrel penetrated right up to the weight set (12 m). This once again showed a major current deficit in the sampling capabilities of German marine research, which no longer has a single functioning piston corer system. We therefore had to live with much shorter cores (50%) than on previous trips, where core lengths of 10 to 15 meters were not uncommon.

As the final work fell on Easter Sunday, we used the time between stations for an extensive Easter dinner together in a festive atmosphere, which was fun for the crew and scientists alike.

On the evening of March 31, we made our way back to Colombo through the Indian EEZ.

Volkhard Spieß, Tilmann Schwenk