

Research vessel METEOR

M134:

Port Stanley – Punta Arenas

Fifth and last weekly report: 13 – 17 February 2017



The last week of our expedition involved the transit from South Georgia to Punta Arenas in Chile. Based on a weather forecast predicting bad weather for this leg of the expedition, we departed in good time on the weekend. The route was hard to calculate because of the strong winds of the West Wind Drift and the forecasted gale. While all station work had stopped, apart from the deployment of two XBTs to determine the sound velocity profile of the water column, the survey systems Parasound and multibeam echosounder were still running. Also the air and water measurements for CO₂ and methane continued.

The transit enabled us scientists time for more detailed analyses of the data and to finalised the chapters for the cruise report. The hydroacoustic team was able to process all multibeam echosounder data and to produce a first overview map (Fig. 2). A large part of the Parasound data, especially the water column data, had been processed. In total more than 1600 locations with gas emissions were registered by the sounders. As we have mapped 8 of the shelf troughs almost along their entire length to the outer shelf edge with at least one line, we can prove that the gas emissions occur predominantly in the inner troughs of the island and only very occasional in the outer shelf areas. This distribution pattern we can see, not only based on the flares in the water column, but also the gas emissions also correlate clearly with gas pockets in the sediment which we can see in the sediment layer plots as 'blankening' zones (Fig. 1).

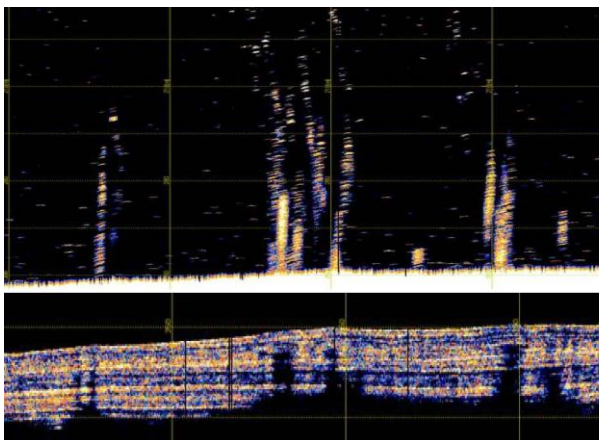


Fig 1: Parasound plots from a shelf trough in South Georgia. The bottom plot shows the sediments beneath the seafloor with dark zones of gas pockets. The upper plot shows the flares in the water column for the same area.

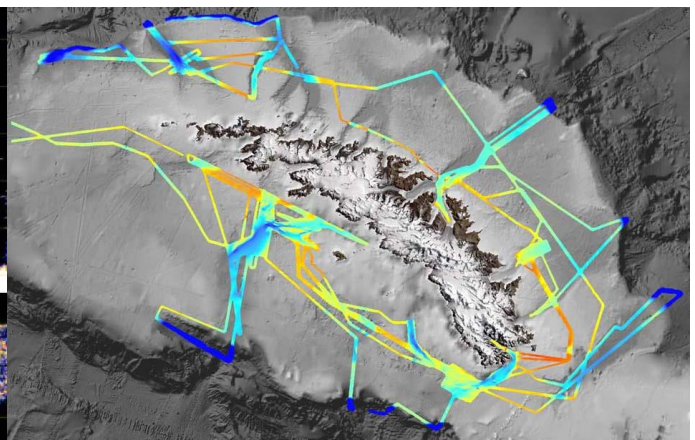


Fig 2: Bathymetric map of South Georgia's shelf with its troughs (© Hogg et al. 2016) and the coloured survey lines the M134 Expedition of RV METEOR.

On Monday, 13th February, the vessel sailed at 06:18 UTC over a special coordinate: 52°S und 52°W. It does not happen often that a point is crossed were geographic latitude and longitude are equal. As is happened at 4:18 ship's time, only the people on the bridge and on watch in the hydro-acoustic lab noticed it. At the end of the expedition we can say that we had a very successful expedition; within the 33 days at sea we mapped, sampled, discovered and gained new insights which we will in the future publish in scientific lectures and publications. The success of the scientific work is only possible through the outstanding and friendly support by the ship's crew, their company and MARUM Logistik. For this we give our sincere thanks to Captain Rainer Hammacher and his entire crew.

Based on the unforeseen brilliant weather we were able to reach the entrance to the Strait of Magellan on Thursday, 16 February. The wide entrance to this passage is unusual with its flat land after our eyes got used to the high mountains of South Georgia. Several rigs of the petroleum

industry remind us of our return to civilisation. For the transit to Punta Arenas we picked up a pilot at 19:00 on the 16 February, who sailed with us for the next 110 nautical miles until we reached our anchorage at Punta Arenas on 17 February. Most of us will depart the vessel on Sunday morning to catch an afternoon flight to Santiago. From Santiago we fly across the Atlantic and most of the scientists will arrive at home on Monday.



Fig 3: Scientific party of RV Meteor-Expedition M134 in front of Nordenskjöld glacier in Cumberland Bay East (© Christian Rohleder).

Farewell on behalf of everyone on board,

Gerhard Bohrmann

FS METEOR Friday, 17 February 2017

Introductions of our four youngest science team members:

Mirko Lange: I am 23 year old and a Master's student at the University of Bremen. On board I measured the methane concentrations in water samples with the ICOS analyser. Water samples were taken by water rosette and bottom water sampler and analysed on board. I also looked after the continuous measurements of methane and CO₂ concentrations in the atmosphere. I will analyse the resulting data in my Master's thesis back in Bremen. **Nikolas Stange:** As a Master's student in my last year it was a unique experience for me to enter into the exciting work area of South Georgia and be part of this enthusiastic science and nautical team. In my daily on board routine I covered a day and night hydroacoustic shift to map the seafloor, helped evaluate the enormous resulting acoustic dataset and was responsible for the probes measuring the seafloor temperatures. **Viola Bihler:** As a casual labourer I had previously worked with many sediment samples which had been taken on expeditions. I was therefore full of joy to be able to be directly involved in collecting samples on this expedition and to experience more of the scientific background. My tasks on board shifted to the hydroacoustic team: a completely new subject for me but with thanks to Miriam Römer, Paul Wintersteller and Willi Weinrebe we got a good introduced to the world of mapping and experienced exciting times in the bathymetry lab. **Maximilian Grah:** This expedition was the ideal chance to deepen my study interests and experience, and to actively be involved in gathering the data for my Bachelor's thesis which I will do following this expedition. As team member in the hydroacoustic group my main task was to work shifts in the bathymetry lab as well as to process data. Next to this, on a daily basis I sampled water for DNA analyses which had been taken by bottom water sampler and CTD. This has been the biggest experience of my life.