RV ALKOR
Cruise AL595
GPF 21-2_037
31.05. – 20.06.2023
Kiel – Iceland – Kiel

AUV@Grimsey
Bathymetric and microbial investigations at the Grimsey Vent Field

Weekly Report No.3
13.06. – 19.06.2023

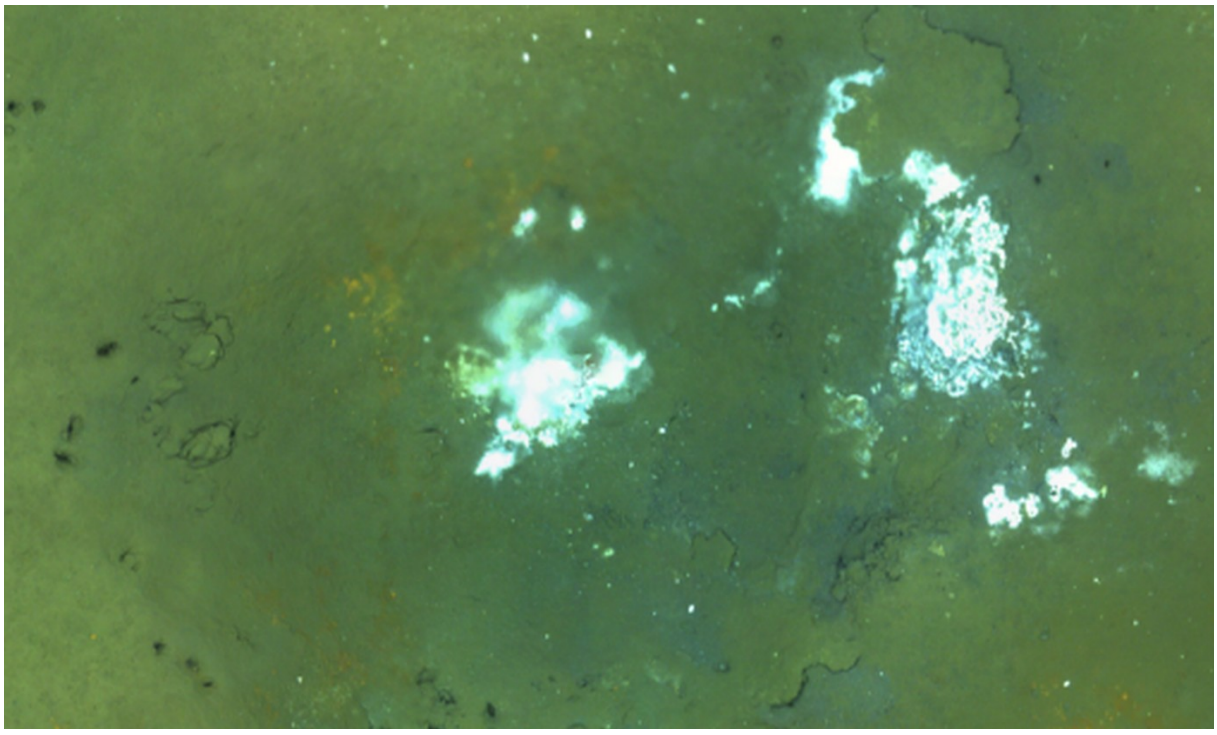

Fig. 1: Detailed view (approx. 2m x 3m) from the photo-mosaic recorded with the AUV Luise. The escape of hot fluids causes the upper area to appear partially blurred. The white deposits are probably anhydrite or other hydrothermal precipitations.

In the early hours of June 13th we left Dalvik, and arrived at the working area around 9:00 a.m. in bright sunshine and with the sea almost calmed down again. Based on last weeks experiences where our AUV Luise almost got lost, we decided to stay nearby during the dive so that the AUV crew could monitor *Luise* permanently. Targets during this dive were the first deployment site of the BIGO Lander, which was to be documented for later interpretations, and a flat "crater structure" about 50m north of it. The mosaic obtained after image processing contains an image of this “crater”, which in a zoomed view turns out to be an active venting site of hot fluids (Fig. 1). During

Luise's dive, samples were also taken with the CTD, the MUC and the gravity corer directly at a hydrothermal vent site in the immediate vicinity.

Around noon, *Luise* was recovered and *Anton* was sent on his mission to complete the mapping of the main work area. After completion, we now have an almost complete map with an area of approx. 1.2km^2 and a horizontal resolution of 40cm.

On the last day in the work area, *Anton's* last dive was used to examine a structure about 4km north of the active hydrothermal field. Around noon we returned to the main field and recovered the BIGO Lander. On deck, we found both chambers closed and filled with sediments, which continued to show strong degassing on deck for a long time. The material obtained here should be ideal for the subsequent analyzes of microbiology, natural product chemistry and geochemistry. The scientific program of this cruise was completed on the afternoon of June 14th by taking a last gravity corer on the western normal fault.

As summary for cruise AL595, we measured approx. 1.5km^2 of high-resolution bathymetry with the AUV *Anton*, recorded high-resolution photo-mosaics on approx. 50,000m^2 with the AUV *Luise*, obtained approx. 10m of core material in six attempts with the gravity corer, and retrieved sediment and fluid samples in two successful BIGO missions together with the experiments performed while BIGO was deployed to the seafloor.

The transit back to Germany was very calm for everyone with calm seas and increasingly better summer weather. It gave us the time to complete the laboratory work and the first processing of the AUV data, to view and save data and to start working on the cruise report. Yesterday, June 19th, 2023), we safely returned to Kiel.

On behalf of all involved scientists, I would like to sincerely thank Captain Marc Petrikowski and his crew for the good cooperation and working atmosphere on the RV Alkor. My personal thanks go to the scientific and technical colleagues who, with a lot of commitment, motivation and joy, ensured the positive outcome of this cruise.

With best regards on behalf of all cruise participants

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