

NOTIFICATION OF PROPOSED RESEARCH CRUISE

PART A – GENERAL

1. *Name of Ship*

R/V Poseidon, Cruise No. POS524

2. *Dates of Cruise*

7.6.18 (Reykjavik, Iceland) – 26.6.18 (Bergen, Norway)

3. *Operating Authority*

GEOMAR - Helmholtz-Zentrum für Ozeanforschung Kiel

Wischhofstraße 1-3

24148 Kiel

Germany

Telephone **+49 431 600 2132**

Telefax +49 431 600 1601

E-Mail klackschewitz@geomar.de

4. *Owner*

(if different from para 3)

See above.

5. *Particulars of Ship*

Name	R/V POSEIDON
Nationality	German
Overall length	60,80 metres
Maximal draught	4,90 metres
BRT	1105 BRT
Propulsion	Diesel Electric
Call Sign	DBKV
IMO no.	7427518
MMSI no.	211204360
Telephone	INMARSAT 00870761651773
Telefax	INMARSAT 00870600273636
E-Mail	bruecke.poseidon@brieserresearch.de

6. *Crew*

Name of master Matthias Günther

Number of crew 15

Scientific personnel 10

7. *Name & Address of Scientist in Charge*

Dr. Sebastian Hölz

GF

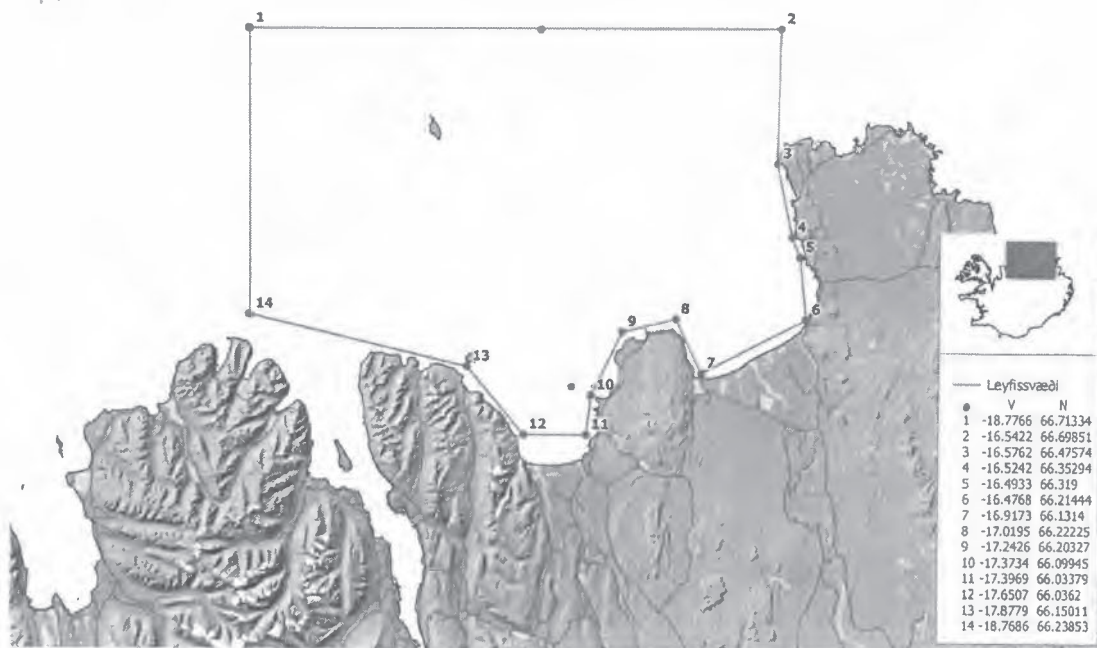


Fig. 1: Area around Grimsey Island covered by exclusive licence for hydrothermal exploration granted to NTE. Map is taken from the licence report. More detailed working program is described in Fig. 2.

(blue frames) within permit area outlined in Fig. 1. Working areas are located to the NE (WA1) and to the SW (WA2) of the Island of Grimsey, which is located off the northern coast of Iceland (see inlay upper right). Investigations in working areas would be carried out in cooperation with „Northern Tech Energy“, who has recently been granted an exploration licence in this area.

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8. Geographical areas in which ship will operate

(with reference in latitude and longitude)

Work is planned in working areas within a larger area, for which the company North Tech Energy (NTE) has recently been granted an exclusive exploration licence in Spring 2017 by Orkustofnun. Since we envision our scientific work to be carried out in cooperation with NTE, we apply to operate the ship within the area outlined within the licence and therefore ask to be granted a general permission to work in this area (see Fig. 1).

Currently, detailed work is planned in one main working area (WA1), where previous work was performed during several research cruises (POS229, POS253, POS291) by GEOMAR in the late

1990s (Fig. 2, the inlay in the lower right (Hannington et al., Marine Geology, 2011) shows the main target within WA1).

Additional work may be carried out in a second working area (WA2) to the SW of Grimsey or in alternative working areas within the licence area (see Fig. 1) to be determined in coordination with NTE.

Both work areas are located in the vicinity of the island Grimsey off the Northern coast of Iceland:

- WA1: 66° 33'N – 66° 38'N 17° 30'W – 17° 55'W
- WA2: to be determined in cooperation with NTE (possible outline in Fig. 2)

9. Brief Description of Purpose of Cruise

Study of active hydrothermal systems in the vicinity of the Grimsey Vent Field and potentially to the SW of the island of Grimsey by means of electromagnetic (EM) methods. EM investigations will not only give insight into the hydrothermal structure, but could also reveal potential covered mineralizations at depth. EM investigations are to be accompanied by geophysical (heat probe) and geological (gravity core) measurements to aid the interpretation of EM data, for ground truthing and to gain further structural insight.

10. Dates and Names of Intended Ports of Call

Reykjavik (Iceland) 4.6. - 7.6.2018 for 72 hours
Bergen (Norway) 26.6. - 29.6.2018 for 72 hours

11. Special Logistic Requirements at Ports of Call

None

Part B – Details

1. Name of Ship

R/V Poseidon, Cruise No. POS524

2. Dates of Cruise

7.6.18 (Reykjavik) – 26.6.18 (Bergen, Norway)

3. Purpose of Research and General Operational Methods

Study of active hydrothermal systems in the vicinity of the Grimsey Vent Field and potentially to the SW of the island of Grimsey by means of electromagnetic (EM) methods. EM investigations will not only give insight into the hydrothermal structure, but could also reveal potential covered mineralizations at depth. EM investigations are to be accompanied by geophysical (heat probe) and geological (gravity core) measurements to aid the interpretation of EM data, for ground truthing and to gain further structural insight.

4. Working Areas

Attach a chart showing (on an appropriate scale) geographical area of the intended work, positions of intended stations, tracks of survey lines, positions of moored / seabed equipment.

Work in workarea WA1 (see Fig. 2 for overview) is planned to be carried out in two stages:

1. Detailed work in the primary workarea WA1 (Fig. 3) will be carried out in the vicinity of the Grimsey Vent Field, which had previously been investigated by Hannington et al. (Marine Geology, 2001). Twelve OBEM (ocean bottom electromagnetic) receiver nodes (red squares) are planned to be deployed temporary to the seafloor in a regular grid. The exact positions of the receivers might need to be adjusted prior to the experiment. The experiment will then be carried out by flying a transmitter along profile lines across the structure (blue lines). The true extent of profiles will be extended a few hundred meters (~300 – 400m) to either side of the rectangle depicted in Fig. 3. Samples and measurements of the seafloors temperature will also be taken at suitable locations within the area outlined.
2. After detailed work will be finished in the proposed workarea WA1, the OBEM receivers will be recovered and redeployed to the positions outlined in Fig. 4. Again, the exact positions of the receivers might need to be adjusted prior to the experiment. The experiment will then be carried out by flying a transmitter along profile lines across the structure (blue lines). Depending on the progress of the experiments, additional

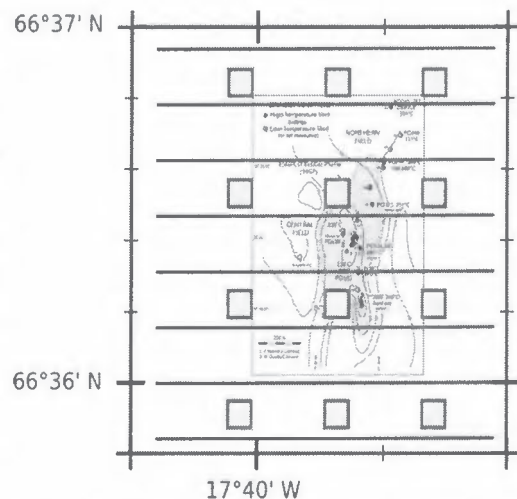


Fig. 3: Map for detailed investigations in WA1 with proposed profile lines (blue) and locations of OBEM receivers (red squares). Please refer to Fig. 2 for overview.

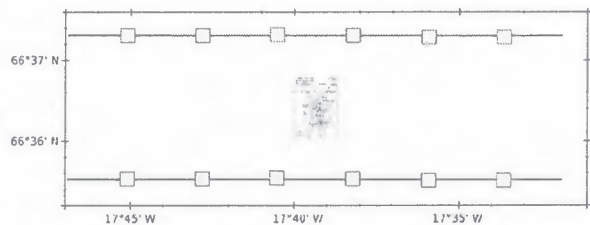


Fig. 4: Map for regional investigations in WA1 with proposed profile lines (blue) and locations of OBEM receivers (red squares). Please refer to Fig. 2 for overview.

profile lines might be added not exceeding the depicted rectangle by at most a few hundred meters (~300 – 400m) to either side.

Additionally, work may be planned in cooperation with NTE within the claim granted for exclusive hydrothermal exploration as outlined in Fig. 1.

5. Types of Samples Required

(e.g. Geological / Water / Plankton / Fish / Radioactivity / Isotope)

Gravity cores of a maximum length of 220cm length will be taken for the analysis of sediments and the pore fluids contained therein.

6. Methods of Sampling

(including dredging / coring / drilling)

Gravity coring (220cm length maximum)

7. Details of Moored Equipment

None

8. Explosives

No explosives or seismic sources will be used during this cruise.

9. Detail and reference of ...

9.1. ... any relevant previous / future cruises

The Grimsey Vent Field, main target within proposed working area WA1, has been studied during the following previous research cruises by GEOMAR with the research vessel R/V Poseidon:

- POS229 (1997)
- POS253 (1999)
- POS291 (2002)

9.2. ... any previous published research data relating to the proposed cruise *(attach separate sheet if necessary)*

- Atkins, D. & Dunson, H., 2013: Exploration Techniques for Locating Offshore Geothermal Energy Near Iceland. Proceedings of the 38. Workshop on Geothermal Reservoir Engineering, Stanford University, 11-13.2.2013, SGP-TR-198.
- Botz, R., Winckler, G., Bayer, R., Schmitt, M., Schmidt, M., Garbe-Schönberg, D., Stoffers, P. & Kristjánsson, J.K., 1999: Origin of trace gases in submarine hydrothermal vents of the Kolbeinsey Ridge, north Iceland. EPSL, 171, 83 – 93.
- Dekov, V., Scholten, J., Garbe-Schönberg, C.D. & Botz, R., 2008: Hydrothermal sediment alteration at a seafloor vent field: Grimsey Graben, Tjörnes Fracture Zone, north of Iceland. JGR, 113, B11101.
- Gudmundsdóttir, E.R., Eiríksson, J. & Larsen, G., 2011: Identification and definition of primary and reworked tephra in Late glacial and Holocene marine shelf sediments off North Iceland. J. Quat. Sci., 26, 589–602.
- Hannington, M., Herzig, P., Stoffers, P., Scholten J., Botz, R. Garbe-Schönberg, D., Jonasson, I.R., Roest, W. & Shipboard Scientific Party, 2001: First observations of high-temperature submarine hydrothermal vents and massive anhydrite deposits off the north coast of Iceland. Marine Geology, 177, 199 – 220.
- Lackschewitz, K.S., Botz, R., Garbe-Schönberg, D., Scholten, J. & Stoffers, P., 2006: Mineralogy and geochemistry of clay samples from active hydrothermal vents off the north coast of Iceland. Marine Geology, 225, 177 – 190.
- Magnúsdóttir, S., Brandsdóttir, B. Driscoll, N. & Detrick, R., 2015: Postglacial tectonic activity within the Skjálfandajúp Basin, Tjörnes Fracture Zone, offshore Northern Iceland, based on high resolution seismic stratigraphy. Marine Geology, 367, 159 – 170.

10. Names and addresses of scientists of the coastal state in whose waters the proposed cruise takes place with whom previous contact has been made

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North Tech Energy	ISOR – Iceland Geosurvey (Director Geothermal Energy)
Tel:+354 5711711	Telephone: +354 528 1526
Mobile: +354 8999780	Mobile phone: +354 896 9336
E-Mail: geir@nte.is	E-Mail: br@isor.is

11. State ...

- a) ... whether visits to the ship in port by scientists of the coastal state concerned will be acceptable:
Yes
- b) ... whether it will be acceptable to carry on board an observer from the coastal state for any part of the cruise and dates and ports of embarkation / disembarkation:
Yes
7.6.18 (Reykjavik) – 26.6.18 (Bergen, Norway)
- c) ... when research data from intended cruise is likely to be made available to the coastal state and if so by what means:
- Cruise report three months after finishing the research cruise
 - Scientific publication within the following three years

12. Scientific Equipment

Complete the following table - SEPARATE COPY FOR EACH COASTAL STATE

List of all major marine scientific equipment it is proposed to use and indicate waters in which it will be deployed	Fisheries	Research concerning	Within	Between	Between	Between
	Research within	Continental Shelf out to Coastal State's Margin	3	3 - 12	12 - 50	50 - 200
	Fishing Limits		NM	NM	NM	NM

	COASTAL STATE:		Iceland			
Hydroacoustic mapping (vessel mounted)	No	No	No	Yes	Yes	No
OBEM receiver	No	No	No	Yes	Yes	No
MARTEMIS coil system	No	No	No	Yes	Yes	No
Gravity coring	No	No	No	Yes	Yes	No
Heat probe	No	No	No	Yes	Yes	No


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