

Expedition SO276 (MerMet17-06) – IceAGE3
 Emden – Emden
 Weekly Report No. 4
 13.07. - 19.7.2020



From the discovery of "clear smokers" on the Reykjanes Ridge and wide deep-sea plains South of Iceland

The fourth week was marked by the discovery of a hydrothermal vent field on the Reykjanes Ridge in about 650 m water depth. There are a series of chimneys arranged in a ring on the edge of a cone shaped volcano surrounded by lava covered with bacterial mats. The "IceAGE vent field" is the second of it's kind on the Reykjanes Ridge, which extends from Iceland from the Reykjanes Peninsula to the *Charlie Gibbs Fracture Zone* and at the same time forms the northern part of the *Mid Atlantic Ridge (MAR)*. So far, South of Iceland only *Steinahóll* is known for hydrothermal activity. Volcanism on the Reykjanes Ridge is very active and creates an enormous thickness of the ocean crust in this area. This large pile of cooled magma releases a large amount of heat. As a consequence, there should be a lot of hydrothermal activity. In fact, one expects hydrothermal activity as "pressure valves" along the Reykjanes Ridge about every 100 km, if not more often. So far only *Steinahóll* and the *IceAGE vent field* have been found and these two finds are more than 500 km apart.

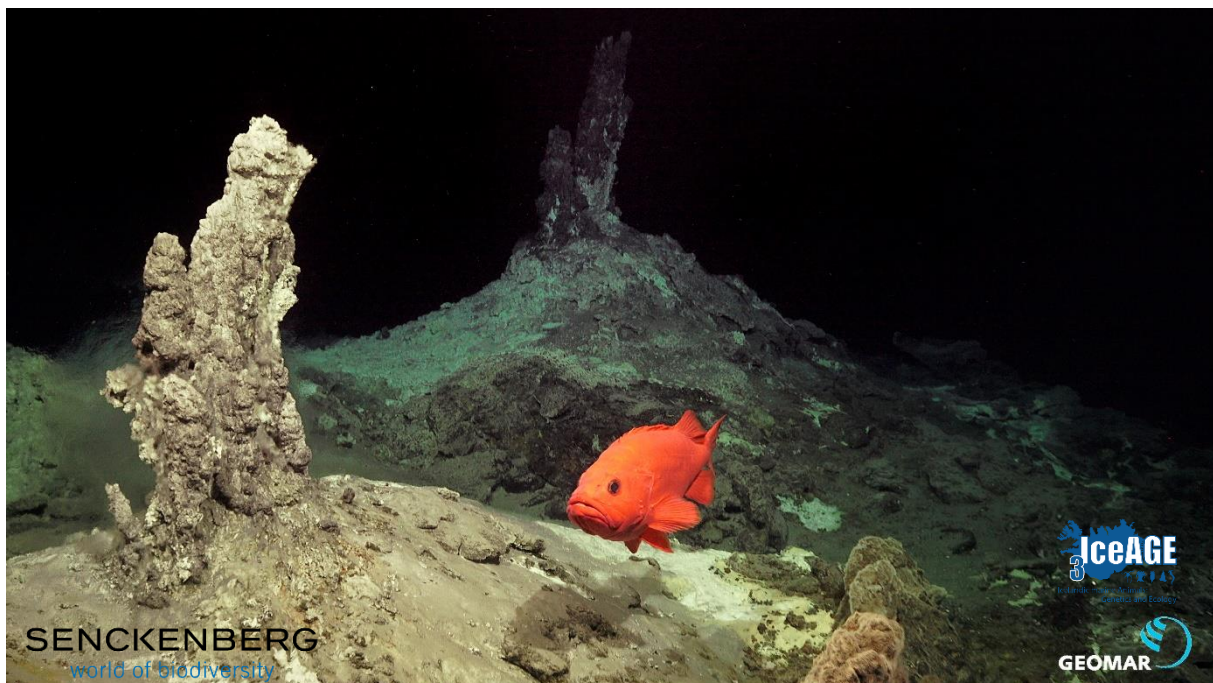


Figure 1: A *Sebastes norvegicus* (Ascanius, 1772) swims curiously past the "clear smokers" and seems to us, or KIEL 6000, to look us directly in the eye. The size of the animal was approximately 80 cm in length - impressively large!

On Monday and Tuesday we were able to do two more dives in our work area on the Reykjanes Ridge. Emerging bad weather conditions forced us to shorten the second dive considerably and to focus more on mapping trips "off axis". We also use the time before the next storm to

drive a CTD Toyo over the hydrothermal field to be able to say more about the temperature jumps and drift direction of the warm water.

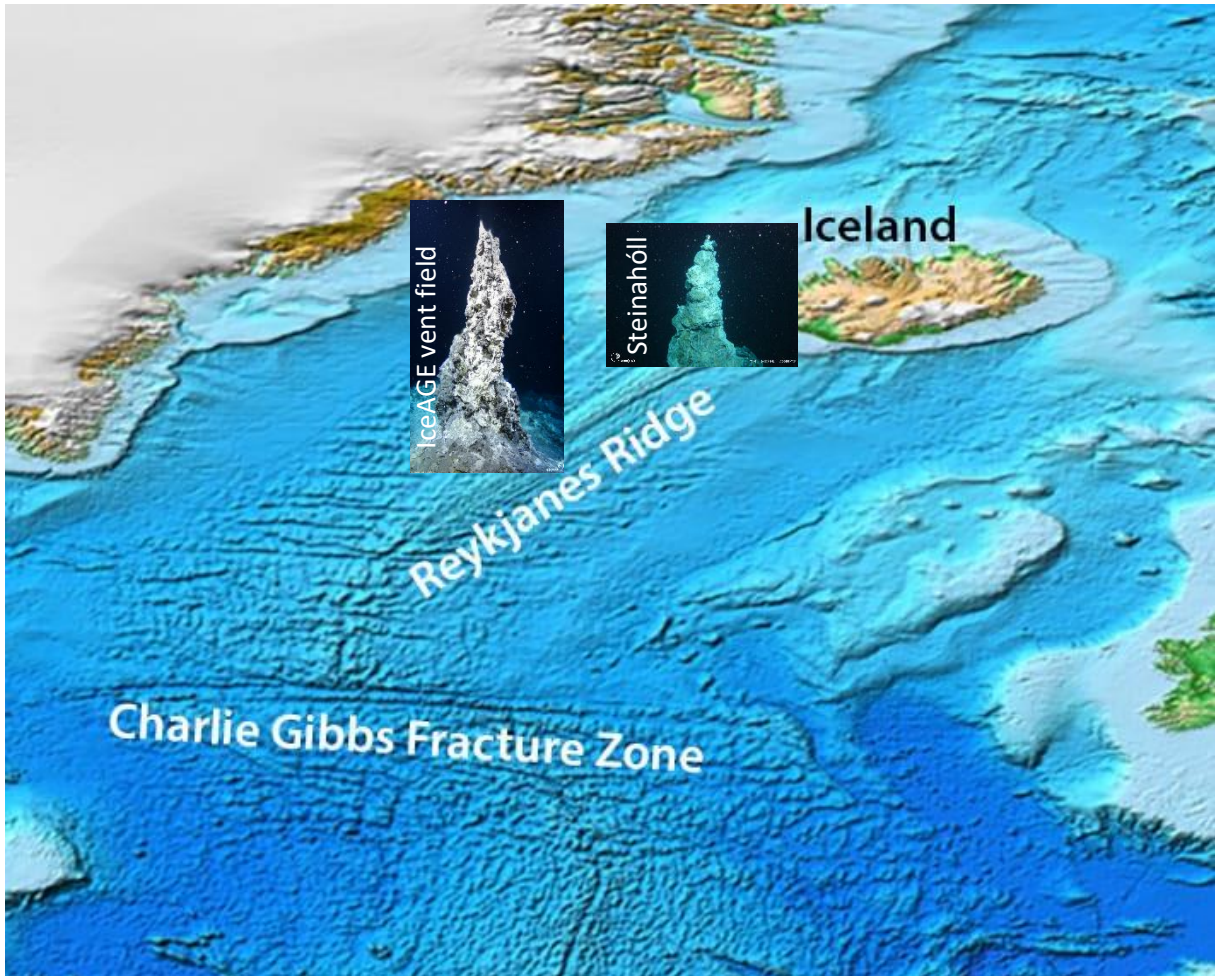


Figure 2: Close up of the seabed south of Iceland. The Charlie Gibbs fracture zone is a transformation zone that moves the MAR north about 350 km to the west. The MAR runs like a giant zip through the middle of the Atlantic. A new ocean crust forms here when the tectonic plates move apart - the North American plate in the west and the Eurasian plate in the east. If magma penetrates this gap, undersea volcanoes form in some places. Bathymetric images courtesy of NOAA / NGDC / ETOPO1 (Source: <https://www.iatlantic.eu/news/hunting-hydrothermal-vents-on-the-reykjanes-ridge/>).

Due to a very large storm over the entire area South of Iceland, we had to stop all station work on the back of Reykjanes Ridge early Tuesday evening and went full speed ahead to the further southern stations. However, it was not possible for us to completely avoid the weather. As a result, we had to skip our station work along the 3000 and 3500 m line and were only able to continue sampling on Thursday and Friday further South than originally planned at a depth of 3700 m.

After the Saturday transit, we were able to suspend the second of a total of three *ARGO floats* in working area 9 on the morning of Sunday. Tomorrow, at the beginning of the last week of travel, our last and deepest dive with ROV KIEL6000 will take place at 4500m. We are looking forward to this.

Sunday, 19th July 2020,

Saskia Brix, chief scientist
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