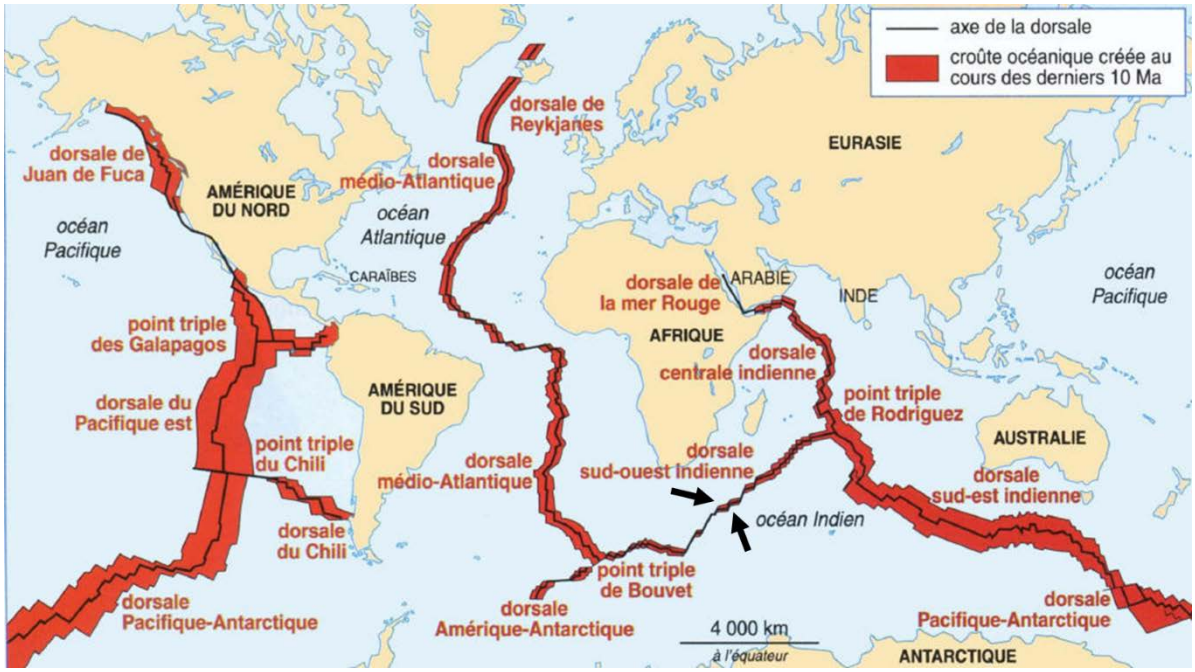
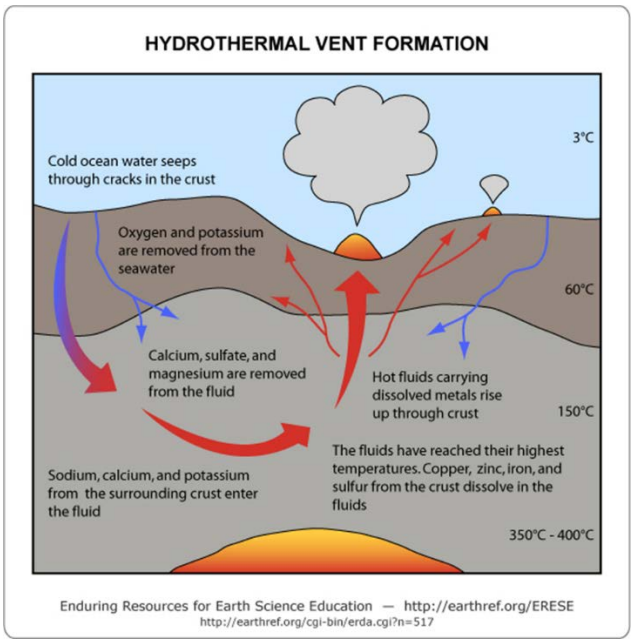
28, 29 et 30 of January: Exploration days!!

Hi all!

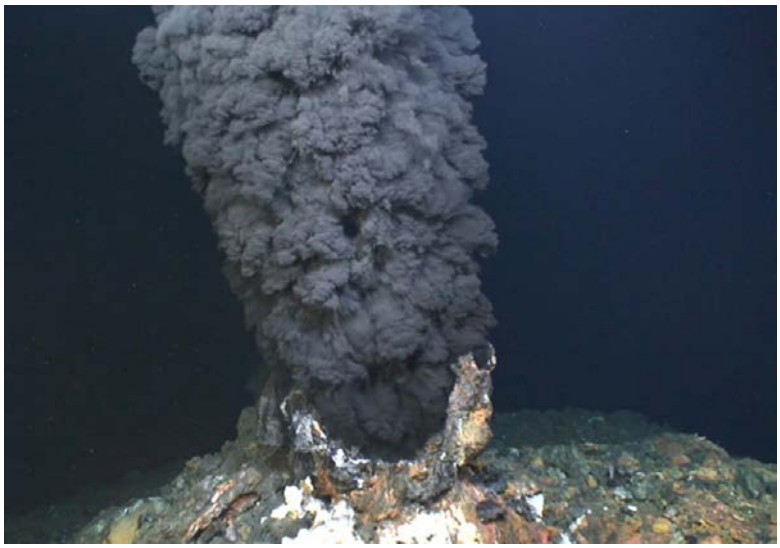
We sail above the Southwest Indian Ridge at the moment.



Ridges are at the origin of new oceanic crusts. The floor of these areas is characterized by small seamounts and that's exactly what we try to find! These small seamounts are badly mapped but we know they are extremely interesting in different topics of marine sciences: their geology is particular, there is some life while there is no light, and they represent important sources of different chemical elements (including those I am interested in).

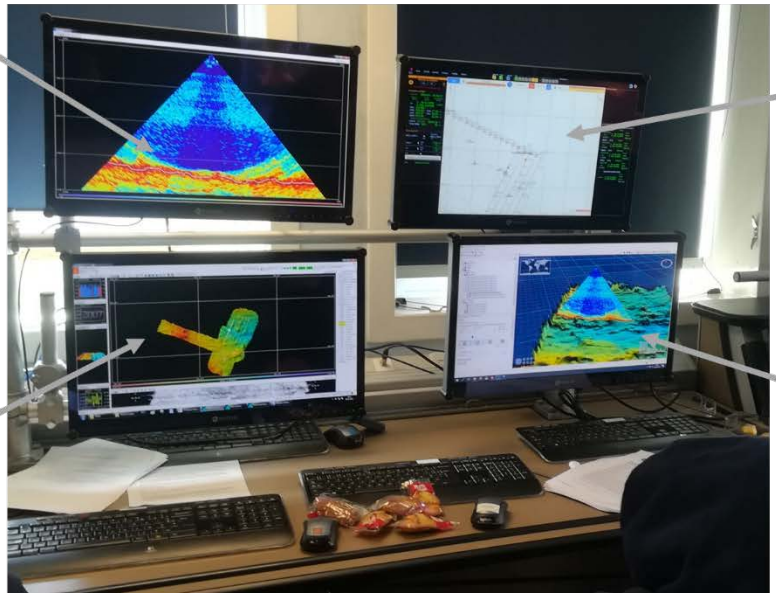


These seamounts are directly connected to the magma, which warms the crust up. Seawater penetrates the floor through the cracks of the ridge, travels through the oceanic floor which is at high temperature and accumulates different chemical elements (like metals, methane, helium, etc..) during its transport. This warm and chemical-rich seawater is then released to the ocean. These areas are called hydrothermal zones. In such areas, when the vent is very rich in chemicals, it is possible to find some 'smokers' (like the one on the picture below). It would be great to find some and to be able to sample them!



But it is not easy to find such areas with 2000m of depth! To do so, we use a multi-beam sounder. From the ship, we send series of acoustic waves that travel through the water column until the seafloor. The wave comes back to the ship after having reflected against something on its way: it can be the seafloor (hard rock that will show an intensive signal: red colour on the picture below) or bubbles (weak signal: in light blue on the image below). Teams of 3 people continuously check the screens looking for signals related to hydrothermal vents from seamounts.

Reflection of acoustic waves through the water column. Red colours indicate intense signals (hard rocks from the seafloor) and light blue colours indicate less intense signals (ie. bubbles). We try to find such signals but at proximity of small seamounts. Indeed, there would be many bubbles in a hydrothermal vent.



Trajectories of our ship exploring a small area

View of the beamer on the seafloor

Bathymetry determined from our ship

We stopped at a station because we were in an interesting area for finding hydrothermal vents and also because a big storm was coming (we cannot deploy if waves are too big). We stopped without being 100% sure of finding a hydrothermal plume but that was our only chance. The sampling bottles and our in-situ pumps were therefore deployed (again over night for us!). We collected our samples like we usually do but we did not observe any particular signs of hydrothermalism on our filters. We have to wait for the analyses in the lab to know if we really sampled a hydrothermal vent. But, in the meantime… (suspens!) Virginie, Morgane and Pieter, who are working on Radium (a radioactive chemical element) analyse their samples in-situ, on the ship. They detected a very high signal in Radium, which is unusual for seawater. This could be a hydrothermal signal!!! We will see what our results give in a few months but it is already very positive and we are all very happy to have collected samples at this station!

We are already at Station number 16 and samples start to accumulate! Super cool!

I hope you are all doing very well and I really hope this shitty Covid does not make your life too complicated. We feel very lucky here to be far from this and to enjoy life without a mask.

I send you many hugs! Take care :)

Nolwenn