Geophysical Research Abstracts
Vol. 21, EGU2019-15083, 2019
EGU General Assembly 2019

ROV submarine exploration of the proximal part of the Capbreton canyon (Bay of Biscay). Morphological surprises and discovery of cold seep-related authigenic carbonate structures

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The first submarine exploration of the proximal part of the Capbreton canyon was conducted in july 2017 using the new french Ariane H-ROV (Hybrid ROV). It was especially developed by Ifremer for coastal applications and is the only one French institutional ROV that can be deployed from a small coastal research vessel. During HaPoGe survey, the Ariane H-ROV was deployed from the R/V "Côtes de la Manche" (INSU). This survey involved scientist from Ifremer, Bordeaux and Pau universities. It had several objectives: i) to explore the morphology of the axial thalweg, side-slopes and rocky cliffs of the canyon, ii) to sample the rocky outcrops and characterize the benthic communities and iii) to determine the nature, concentrations and distribution of contaminants in sediments and water column.

Four distinct sites have been visited over five 3 to 6 hours long dives. All dives started in the canyon thalweg or in middle slope at depth ranging from 450 to 200 m. The ROV then explored bottom and slopes, climbing upslope up to the edge of the canyon at 100 m depth.

We present here the first results of the morphological and geological investigations on these sites: (i) unexpectedly, the lower part of the water column (up to 70 m above seabed) was systematically characterized by high turbidity. This avoided the exploration of the thalweg bottom and in-situ characterisation of the bedforms. (ii) The middle slope is characterised by awaited bioturbated muddy gentle slope, but also by surprising deep rough gullies and sharp slide scars, with vertical wall. (iii) Upper slope and canyon edge are characterised by both biocolonised stratified carbonate cemented sandstones and boulder field. (iv) More complex stratifications associated to vertical pipes were locally observed and sampled. These are interpreted as cold seep-related authigenic carbonate structures. Such system was unreported in this canyon and unexpected in a so close to the coast location.