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Methane seeps characterization on the Sinu basin continental shelf, Colombian Caribbean, through a multi-scale and multi method approach.

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When talking about gas in marine sediment, we refer to natural gas trapped in the sub-bottom sediments and escaping from the sub-seafloor into the marine environments. Among gases, methane is the most common one, and its origin may be various (e.g. thermogenic, microbial). Natural seepages can be found in various locations around the world, among which continental margins, where they significantly affect the local marine ecosystems and the surrounding substrate. There, Holocene sediments are most likely affected by such migrations, especially when methane move from a reservoir.

While exploring the marine realm, several signs may let you sense the presence of seeps, and applying a systematic approach during investigation can be key for their characterization. If the environment is depicted by a hydrocarbon reservoir, oil sleeks can be seen on the ocean surface by satellites. Multibeam Echosounder (MBES) investigations can detect seeps as acoustic anomalies in the water column, other than map typical submarine landforms (e.g., pockmarks, mud volcanoes) considered seabed/subseafloor manifestation of migrations. Possibly, Remotely Operated Vehicle (ROV) investigations can be performed for ground truthing.

Since the 1970s the Colombian region has been considered a gas province mainly dominated by methane, most likely generated by microbial/thermogenic activities. Nevertheless, there is still little knowledge of this area. Since methane is a potent greenhouse gas, it is important to

evaluate the contribution of seabed emissions to the global budget. Moreover, methane-enriched environments are peculiar habitats and hot-spot of biodiversity.

This work aims at characterizing methane seeps discovered in the Moñito continental shelf, Colombian Caribbean, through a multi-scale and multi method approach. MEBS data collection over 220 km^2 of seafloor revealed about 10.000 pockmarks, in addition to associated flares in the water column.