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Methane seeps features characterization on the Moñito continental shelf, Colombian Caribbean, through a multi-scale and multi-method approach

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When referring to gas in marine sediment, we mean 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 may have diverse origins, including both thermogenic or microbial sources. Natural seepages are globally distributed, with notable occurrences along continental margins. They significantly affect the local marine ecosystems and the surrounding substrate, other than being a wake-up call in terms of geohazards.

Since the discovery of the Chuchupa and Ballenas fields in the 1970s, the offshore Colombian Caribbean 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. This is particularly true when they are located in relative shallow waters since they represent an important source of the methane flux from lithosphere to hydrosphere and finally atmosphere. Moreover, methane-enriched environments are peculiar habitats and hot-spot of biodiversity.

The Colombian project “Methane Seep Hunting: a multi-scale and multi-method approach” aims at developing a multi-scale and multi method approach to detect methane seeps, determine their current/past seepage activity, and identify their source using the state of art technology in the Colombian Caribbean. Specifically, it aims at the characterization of the methane seeps discovered in the Moñito continental shelf.

Ship-based MEBS data collection over about 220 km^2 of seafloor performed in May 2022 revealed the presence of more than 20.000 pockmarks, at places associated to the presence of flares in the water column. In addition, other positive morphologies have been recognized, depicting the presence of a past and/or present fluid flow system.

Keywords: geomorphology; methane seeps; pockmarks; fluid flow system; Colombian Caribbean; tropics; climate change