
The microbial methane fluid system of the Aquitaine Shelf

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Résumé

Unprecedented high-resolution acoustic data have confirmed the existence of persistent gas releases and Methane-Derived Authigenic Carbonates (MDAC) at the Aquitaine Shelf edge (Dupré et al. 2014). This has made way to the discovery of an unknown widespread active and fossil fluid system exclusively associated with microbial methane (Pierre et al. 2017; Ruffine et al. 2017). MDACs are present over an area of 375 km² and are associated with more than 2600 gas bubble streams. The ecosystems at the Aquitaine Shelf are characterized by microbial mats including archaea involved in anaerobic oxidation of methane, a scarce chemosynthetic megafauna and numerous fixed (sponges) and mobile organisms (fishes). Based on *in situ* flux measurements and acoustic data, and assuming steady and continuous fluxes over time, the methane entering the water column reaches 144 Mg yr⁻¹. This discovery highlights the importance of microbial methane generation, disconnected from deep thermogenic sources and gas hydrates, at continental shelves. The shelf edge may be viewed as a focus area for methane circulation and release and related diagenesis, all having an impact on the shaping of continental shelves and potentially on the oceanic and atmospheric carbon budget.

The GAZCOGNE project is co-funded by TOTAL and IFREMER as part of the PAMELA (Passive Margin Exploration Laboratories) scientific project.

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