Pockmarks in the Arctic Ocean: Recent insights

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Résumé

Methane emissions from seafloor are phenomenon that occur globally and very often recognized by the presence of morphological expressions like pockmarks. In the Arctic Ocean, pockmarks are found in fjords (< 150 m) and deep oceans (1300m), and the mechanisms for their formations are faults and fractures that act as a pathway for fluid migrations as well as climate-change induced destabilization of gas hydrates.
The Vestnesa Ridge, in the eastern Fram Strait west of Svalbard (_˜79◦N, 1200 m water depth), hosts a subsurface gas hydrate system that has been mapped via a widespread bottom-simulating reflector (BSR), together with significant amount of trapped biogenic and thermogenic methane. The methane is susceptible to seepage in response to tectonic stress. The crest of Vestnesa Ridge is pierced by active and inactive pockmarks up to 700 m in diameter and as deep as 10 m, occurring above chimney structures. The active pockmarks exhibit episodic seepage of gas at the seafloor that has been repeatedly documented as emanating from individual pits within the pockmarks and imaged as hydroacoustic anomalies in the water column. The pockmarks host extensive chemosynthetic communities that include filamentous sulfide-oxidizing bacteria and siboglinid tubeworms and carbonate deposits that represent a long history of precipitation and/or exhumation of carbonate deposits are indicated by scattered blocks of various size, pavements, and massive carbonate blocks.

This presentation will focus on recent investigations on micropaleontology and biomarkers, microfracture array, carbonates and sediment cores collected with the deep-sea drill rig MARUM-MeBo70 which allow to better understand the sources, migration pathways and carbon cycling processes at Vestnesa Ridge.
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