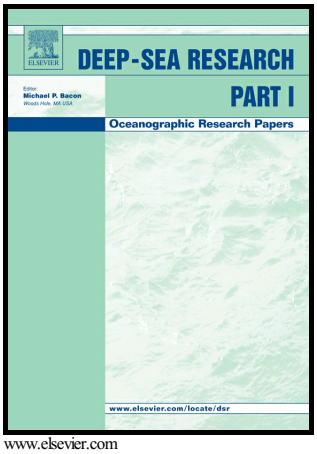

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Seafloor sealing, doming, and collapse associated with gas seeps and authigenic carbonate structures at Venere mud volcano, Central Mediterranean

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Abstract

Methane release from the seafloor is commonly associated with chemosynthesis-based cold-seep ecosystems that facilitate the precipitation of authigenic carbonates. It has been proposed that carbonate growth results in self-sealing, but little is known regarding the evolution of cold-seep structures in relation to fluid migration pathways. This study investigates structures resulting from gas seepage along ring faults peripheral to Venere mud volcano (1600 m water depth), based on multibeam bathymetry and seafloor backscatter data collected by an autonomous underwater vehicle, together with photomosaics, video observations, and samples obtained by a remotely operated vehicle. Sites of focused fluid flow are identified by gas bubble streams rising from the seafloor while anaerobic oxidation of methane over wider areas is indicated by the occurrence of chemosynthesis-based organisms (microbial mats, vesicomyid clams, vestimentiferan tube worms). At some sites,