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Norwegian margin fluid escape structures - sedimentary environments and evolution

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TOPAS high-resolution seismic profiles and EM1002 bathymetric data, collected during a R/V G.O. Sars cruise in 2007, show that slope deposits within a local area nearby the northern flank of the Storegga Slide, south Vøring Plateau, are intensively perforated by pockmarks. More than 200 seabed depressions have been identified. The features have diameters of up to 200 m, maximum depths of c. 10 m, and they are situated in an area where gas hydrates and pre-Pliocene polygonal faults are found. Shallow cores indicate that some of the pockmarks are active at present. The pockmarks have evolved within a sedimentary package that is characterised by glacimarine and hemipelagic well-layered deposits. Glacigenic debris flow units, deposited during shelf edge glaciations, interfinger these sediments on the upper slope. The well-layered sediments are delivered to the continental slope by icebergs, suspension fall-out in front of an ice margin and from meltwater plumes released during the disintegration of the Fennoscandian Ice Sheet; and sediment rates may have been as high as 35 m/ky during deposition. It is questionable why only a very limited region on the Vøring Plateau is so highly influenced by fluid processes. However, from the combined use of a dense grid of multichannel seismic profiles, high-resolution TOPAS records and sediment cores we infer that the evolution of the pockmark field is strongly connected to local variations in sediment characteristics and structural settings.