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## Discovery of a major seafloor methane release site in Europe: The Landsort deep, Baltic Sea.

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A recently acquired multidisciplinary dataset comprising acoustic surveys (high-resolution sub-bottom profiles, multi-beam bathymetry, and broad band mid-water echo sounder), geochemistry (gas chemical and isotopic composition, porewater chemistry), and sedimentology (core lithology and X-ray CT) in the area of the Landsort deep (450 m of depth), south of Stockholm Archipelago, revealed the existence of an extensive (20 km<sup>2</sup>) region of the seafloor where massive gas release is occurring in the form of multiple bubble streams. This new discovery represents a major seafloor methane release site in Europe and is comparable in area to other large sites worldwide such as the ones in Svalbard and in the South Atlantic Ocean associated with gas hydrate provinces. The gas is formed mostly by methane of microbial origin. Surprisingly, bubbles rise 100's of meters above the seafloor and reach surface waters above the halocline/oxycline at around 80 m of depth. Some bubbles appear to reach the sea-air interface and their potential methane contribution to the atmosphere is under investigation. Another surprising observation is the absence of major seafloor features like pockmarks in the gas release area. The reasons for the seafloor methane release in the Landsort deep are still not entirely clear, but our preliminary acoustic and sedimentological data suggest that bottom currents may have acted to facilitate the accumulation of organic-rich sediments in a thick drift deposit during the Holocene and the modern warm period (latest 100 years). Our data further suggest that the high sedimentation rate in the drift deposit continuously supplies fresh organic matter that is quickly buried below a thin sulphate reduction zone, fueling vigorous methanogenesis and abundant methane formation. Similar methane release sites might be discovered in other known large drift deposits in the Baltic Sea.