

METHANE AND SULFATE DYNAMICS IN THE SEDIMENTS OF AARHUS BAY (DENMARK)

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Methane is observed in Aarhus Bay sediments in a wide concentration range from near saturation (i.e. gas bubble formation) close to the surface sediment to no detectable CH₄ in the top 4 m of the sediment. Therefore Aarhus Bay sediment is an interesting study area to learn more about what controls methane concentrations in marine sediments and thus the CH₄ flux towards the surface sediment - key questions in the EU project: METROL. Methane and sulfate concentration profiles were determined at five stations that was sampled by gravity coring (max. 4m) and Rumohrlot coring (max. 80 cm). One station was chosen in the central part of Aarhus Bay where the sulfate-methane transition zone (SMTZ, i.e. the depth where SO₄²⁻ and CH₄ co-exist) was observed at 150 - 220 cm over a wide area. The other four stations were sampled along a 1.5 mile transect where gas bubbles appeared gradually closer to the sediment surface with a concomitant raising of the SMTZ towards the sediment surface (i.e. from 200 to 20 cm below the sea floor). The chemical analyses of the SO₄²⁻ and CH₄ concentrations profiles were compared to acoustic/ seismic studies of the sea floor where gas bubble formation were observed from their reflection of the acoustic waves. The closer methane saturation (i.e. gas bubble formation) was observed towards the sediment surface the shorter the distance to the methane front above. The dimension of the SMTZ revealed no obvious dependency on the depth of the gas bubble front.