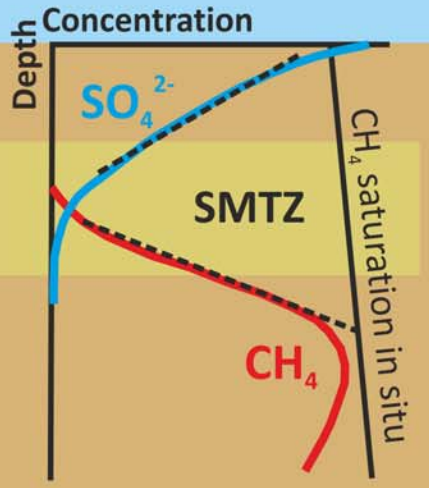
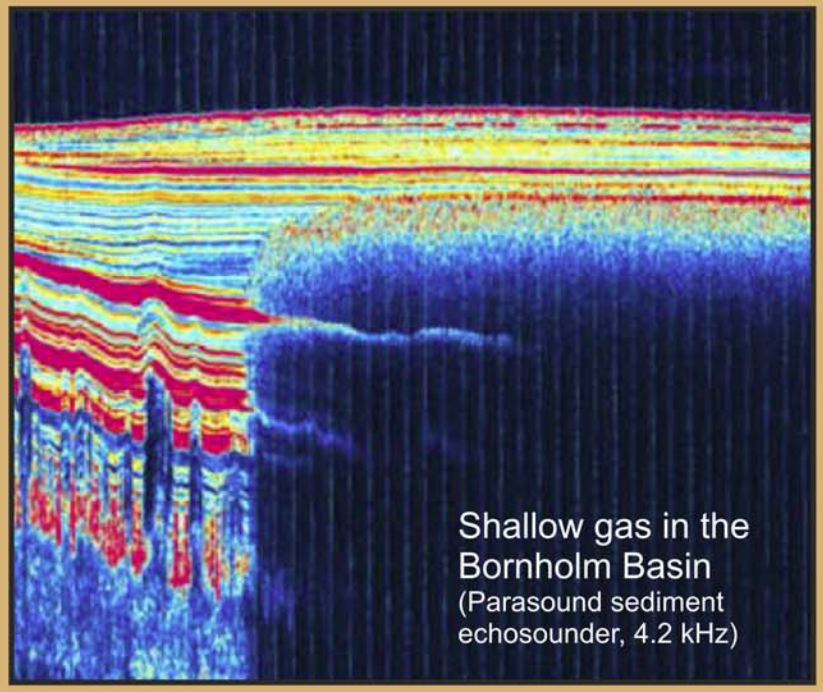
Shallow methane gas in the sediments of the Baltic Sea



At the seafloor in ocean margin sediments, vast amount of **methane (CH_4)** is produced continuously through the microbial degradation of buried organic matter. Most of this shallow gas is oxidized at the depth to which sulphate from the sea water penetrates down into the sediment, at the sulphate-methane transition zone. Even though on a global scale, it is estimated that less than 10% of the CH_4 is released and most of the methane is broken down before reaching the seafloor, **free gas bubbles** can develop and accumulate at sediment depths where the methane concentration exceeds saturation at the ambient hydrostatic pressure. Occasionally, methane escapes the seabed, sometimes in an eruptive manner, and can reach the atmosphere, where it acts as a greenhouse gas with an efficiency 25 times that of carbon dioxide.

With seismo-acoustic methods, shallow free methane gas can be easily detected, because the gas bubbles in the sediment severely **affect the propagation of acoustic energy** and create various features on seismic profiles. This way, extensive shallow gas patches have been observed and mapped in hundreds of square kilometers of the Baltic seafloor. The amount of methane stored in the Holocene mud, however, still has to be assessed, especially after recent times, during which organic matter input from rivers and the coastal population has been considerably increased.

My research aims at providing **estimates of the methane gas volume** in the sediments of the Baltic Sea and for that I use different seismic attributes that are sensitive to changes in the gas/fluid content.


Shallow gas in the Bornholm Basin
(Parasound sediment echosounder, 4.2 kHz)

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