



Methane-leaking Arctic pingo-like features

Karin Andreassen, Henry Patton, Sunil Vadakkepuliambatta, Pavel Serov, Alun Hubbard, and Monica Winsborrow

CAGE – Centre for Arctic Gas Hydrate, Environment and Climate, Department of Geology, UiT – The Arctic University of Norway, N-9037 Tromsø, Norway

Large-scale releases of methane from thawing gas hydrates and permafrost is a major concern in a warming Arctic, yet the processes, sources and fluxes involved remain unconstrained. Recent studies from the Barents Sea and Russian Arctic have indicated that giant craters both on the seafloor and on land are imprints of massive methane expulsions from collapsing pingo-like features.

Here we combine state-of-the-art marine geophysics with high-resolution ice sheet numerical modelling to investigate how advance and retreat of successive ice sheets of the Barents and Kara Sea areas have influenced deeper hydrocarbon sources, fluid flow plumbing and methane storage and release systems. Case studies will be presented to elucidate the evolution of craters and pingo-like features within different Arctic settings and environments, and to evaluate the sensitivity of methane release to future climate warming. Our new understanding has implications for the prediction of greenhouse gas release from a warming Arctic and the retreating Greenland and Antarctic ice sheets.