



Fluid flow from deep reservoirs into shallow strata: a case study from the southwestern Barents Sea

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The Barents Sea is a part of the Arctic Ocean located north of Norway and Russia. The occurrence of shallow gas, gas hydrates and seafloor expulsion features is reported from several areas of the western Barents Sea. Most of the gas is assumed to be leaking from Jurassic hydrocarbon reservoirs. Leakage of gas into the shallow sediments was probably a result of the profound Cenozoic erosion of the Barents Sea Shelf. Here, we utilize 3-D seismic data from the southwestern Barents Sea to investigate the distribution of shallow gas, migration pathways from deep-seated reservoirs and timing of fluid flow. The overall goal of this study is to understand and quantify geological processes that govern fluid flow on a basin scale. The first results show a patchy distribution of high-amplitude reflections at shallow depth indicating the presence of free gas. The gas occurs mostly along sedimentary layers. At few locations high-amplitudes are terminated at the sub-bottom depth of the gas-hydrate stability zone suggesting the presence of gas hydrates. The distribution of shallow gas might be explained by the location of deep-seated faults. However, the flow of fluids along individual faults appears to be focussed along specific zones. Those weakness zones occur preferably at fault intersections. In other places the faults appear to be sealed. Fluids migrate further upward by diapiric mechanisms before they are channelled into sedimentary layers.