



Gas hydrates and fluid focussing in sediments of the Vestnesa Ridge on the W-Svalbard margin

S. Büinz, C.J. Petersen, S. Hustoft, and J. Mienert

Department of Geology, University of Tromsø, Norway; (Stefan.Buenz@ig.uit.no)

The gas hydrate system offshore western Svalbard is far more extensive (~3000km²) than previously assumed and includes the whole Vestnesa Ridge, a huge sediment drift north of the Molloy Transform and just east of the Molloy Ridge, one of the shortest segments of the ultra-slow spreading North-Atlantic Ridge system. In this peculiar setting gas hydrates occur within few km of a mid-oceanic ridge and transform fault. A strong cross-cutting BSR is visible, especially in areas of dipping seafloor. The base of gas-hydrate stability varies with distance from the ridge system, suggesting a strong temperature-controlled subsurface depth as the underlying young oceanic crust cools off eastward. High amplitude reflections over a depth range of up to 150m underneath the BSR indicate the presence of a considerable amount of free gas. The free gas is focused laterally upwards by the less-permeable hydrated sediments as the only fluid-escape features occur at the crest of the Vestnesa Ridge. The fluid migration system and its active plumbing system at the crest provide an efficient mechanism for gas escape from the base of the hydrate stability zone. Climatically-induced changes to hydrate stability could lead to massive release of free gas from an area much larger than the area of the crest.