



New 3D modelling of methane hydrate accumulations in PetroMod: application at the Alaska North Slope

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Within the German project SUGAR – Submarine Gas Hydrate Reservoirs, a new tool for the 3D prediction of gas hydrate accumulations has been developed and included in the commercial petroleum systems modelling software PetroMod. This new tool calculates the evolution of the stability of gas hydrates as a function of P and T over time. It also includes the kinetics for methane hydrate formation, as well as a new kinetic formulation for the degradation of organic carbon at low temperature, specially designed for marine settings. The tool considers the specific thermal conditions of permafrost, as well as the permeability reduction due to its formation. With the aim of calibrating the new tool and testing its validity, we have used the available model of the Alaska North Slope, originally developed by the USGS and AaTC-Schlumberger (formerly IES). The model so far predicts correctly the extension and evolution of the GHSZ in relation with the development of the permafrost conditions in Alaska during the last 1.5 Ma. The model predicts accumulations of gas hydrate between 450-700 m and 450-920 m at the Mount Elbert and Ignik Sikumi test wells, respectively, which is in complete agreement with direct measurements at the wells. Saturations of gas hydrates of up to 10% (of pore volume) are predicted for the Ignik Sikumi test well, which is also in good agreement with the test-well data. During the meeting we will present further results of our model and compare them to observations in the test wells, as well as regional quantifications including the potential total accumulation of gas hydrates at the Alaska North Slope.