

Re-Examine the Beaufort Sea - Mackenzie Delta Basin Gas Hydrate Resource Potential Using a Petroleum Play Approach

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An environment favoring gas hydrate stability and a timely petroleum flux of appropriate composition are necessary conditions for gas hydrate accumulation. In the Beaufort Sea-Mackenzie Delta Basin (BMB), geological factors, such as the spatial distribution of permeable reservoir and the presence of conduits/faults connecting thermogenic gas sources in the kitchens and reservoir in the gas hydrate stability zone, control the accumulation characteristics which may affect recovery technology and production potential. It is desirable to classify the resource as a function of accumulation characteristics and geological settings. In this paper, we re-examine the BMB gas hydrate resource potential using a petroleum play approach with the intent to address the fundamental control of geological factors on the gas hydrate accumulations and to reveal the variability of volumetric estimates as a function of accumulation characteristics. In this study we divide the BMB into geologically homogenous plays. Each of the plays contains a number of known or/and inferred discrete gas hydrate accumulations that share common geological characteristics for hydrate accumulation. Essential volumetric parameters, such as gas hydrate saturation, reservoir porosity and thickness, are treated as random variables and represented by probabilistic distributions. The estimated result of gas resource in each play is a probabilistic distribution, representing the gas potential in hydrate with associated uncertainty. Economic assumptions, such as the cut-off values of gas hydrate saturation and other reservoir parameters, are incorporated into the assessment and provide scenarios for economic analysis.