

Statistical Distributions of Hydrocarbon Column Heights For Gulf of Mexico Trap Types and Seals

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A statistical distribution of hydrocarbon column heights has been documented for Gulf of Mexico (GOM) oil and gas trap types based on a database of 804 reservoirs in 305 fields. The data clearly show that column heights follow a log normal distribution, assuming there is a sufficient population of reservoirs to analyze. Prospect economic analysis using probability distributions of column height in conjunction with structural maps appears to be valid for determination of the area extent of potential hydrocarbon accumulations. Five percent, 10%, 50%, 90% and 95% cumulative probability distributions have been calculated for a wide variety of traps and lateral seal combinations. Fault seal traps in sections with hydrostatic or low overpressure gradients (<14.8 kPa/m, <12.5 PPG), composing nearly half of all GOM traps in this study, show a relatively narrow distribution. However, distributions for trap types along salt flanks and for traps in sections with high-pressure gradients are significantly broader. The database can be used to analyze the effects on probability distributions of varied phenomena such as

salt, stratigraphic traps, supernormal pressure, fault timing, geologic age and single versus dual phase hydrocarbon reservoirs. These results suggest that other natural phenomena such as pay thickness and recovery factors can have log normal distributions as well and can be analyzed in a probabilistic manner also.