The rate of decomposition of organic matter (i.e., kinetic data) is used in basin modeling to predict organic matter transformation to oil and gas in different geological settings and under variable pressure and temperature conditions. These predictive capabilities are used to examine the likelihood of hydrocarbon charge as well as the type, phase, and quality hydrocarbons that might be discovered in a trap. While there are many unknowns and by necessity, assumptions that are input into a basin model, the rate of decomposition of organic matter into oil and gas and decomposition of oil to gas can be measured experimentally in the laboratory or derived empirically.

The goal of this paper is to test the sensitivity of basin models based on the inherent variables associated with kinetic parameters. The primary kinetic variables that affect basin modeling predictions are differences in organic matter type and secondary (oil) cracking parameters. Further variability can arise from variation in organic facies of source rocks to experimental techniques, which can be overcome by oil asphaltene kinetic measurements. Methods of calculation are also a source of variability.

Using a consistent burial history, these parameters demonstrate that the assessment of the onset and peak generation temperatures, hydrocarbon composition, phase behavior and reservoired fluid properties (i.e., API gravities and GOR’s) are very sensitive to the variables cited above. The occurrence of high level of thermal stress tends to decrease these differences in some cases as does the geologic history (e.g., rift versus intramontane basin) of the modeled section.