KINGSTON, DAVE R., AAPG Distinguished Lecturer

World-wide Basin Classification and Oil-Play Prediction

A system is proposed which classifies sedimentary basins worldwide into specific as well as general categories. The system is based on the origin and evolution of basins in the context of their geologic history. The main elements used to classify basins are basin-forming tectonics, depositional cycles, and basin-modifying tectonics. Basin-forming tectonics are deduced by knowledge of the type of underlying crust, past plate tectonic history, basin location on the plate, and type of primary structural movement involved in the basin formation (such as sagging or faulting). The result is eight single tectonic-cycle or simple basin types: interior sag, margin sag, interior fracture, wrench, trench, trench associated, oceanic sag, and oceanic wrench.

Basin-modifying tectonics include episode wrenches, basin-adjacent foldbelts, and completely folded basins. These have been identified and placed on a scale of increasing magnitude, from movements of slight to major structural effects. More complex basins, called polyhistory basins, may contain several different tectonic cycles plus basin-modifying tectonic events. The eight simple basin types, their depositional fills, and tectonic modifiers have been given letter and number symbols so that the specific geologic history of each basin may be written as a formula. The formulas may then be compared between basins, and similarities or differences noted.

After the basins have been classified, major hydrocarbon plays are located, and the specific parameters that are responsible for these plays are noted. For example, certain types of basins commonly may be the site of rich source rock or clean reservoir sand deposition, or contain block fault or wrench type structures. From producing basins, these oil play parameters may be projected into frontier areas via the global basin classification system, and oil play predictions made.