AAPG International Conference
Barcelona, Spain
September 21-24, 2003

Teresa Polo[1], Manuel Segura[1], Beatriz Carenas[1], Javier Gil[1], Jose F. Garcia-Hidalgo[1], Alvaro García[2] (1) Universidad de Alcala, Alcalá de Henares, Spain (2) Universidad Complutense, Madrid, Spain

Outcrop and Hydrocarbon Well Correlation in Upper Cretaceous of Central Spain

Surface data and hydrocarbon exploration wells are mutually complementary. Well correlation can be enormously improved applying the depositional architecture reconstructed from surface data, that help to understand the arrangement of the thickness and facies changes. On the other hand, the well correlation allows to recognize units that poorly crop out in surface. The Upper Cretaceous of the center of the Iberian Peninsula (Central Spain) has been studied in surface outcrops in the southern border of the Central System and in three oil exploration wells (Pradillo-1, Baides-1 and Santa Bárbara) in the nearby Tajo Basin, in a parallel line to the surface outcrops line.

Surface lithologies, bed thickness, sedimentary and biogenic structures, and fossils remains allow recognition of Transgressive-Regressive cycles (2nd order), depositional sequences (3rd order) and parasequences (4th order, only in surface analysis). Sedimentary environments range from coastal to open marine in siliciclastic, carbonate and evaporite settings. These date permit a finest interpretation of the well data especially in the case of clays sediments than can be interpreted as shallow lagoon mudstones or deeper off-shore mudstones, related to sequence boundaries or to maximum flooding surfaces. On the other hand, the gamma-ray and sonic logs allow distinction of T-R cycles and depositional sequences in the wells, furthermore it also allow the identification and characterization of dolomites and gypsums that are recognized in the wells at the Cretaceous top, lithological units that poorly crop out in surface as dolomitic breccias and gypsy silts.

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