AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

Susanne Schmid[1], Richard H. Worden[1], Quentin J. Fisher[2] (1) University of Liverpool, Liverpool, United Kingdom (2) University of Leeds, Leeds, United Kingdom

Early Diagenetic Dolomite in Early Triassic Sandstones, Offshore West of Ireland

Early diagenetic carbonate cements are controlled by a large number of factors but they are generally controlled by palaeoclimate and, surprisingly, provenance in these fluvial-to-playa Early Triassic Sherwood Sandstones offshore west of Ireland. Dolomite, in a variety of habits, is the most important cement in these sandstones and plays a significant role in controlling reservoir quality and gas production. The majority of the dolomite formed very early in the diagenetic sequence in oxidised groundwater and soils.

Early diagenetic dolomite has been studied using petrography, cathodoluminescence, carbon and oxygen stable isotopes, SEM, XRD and wireline log analysis. This non-ferroan dolomite occurs as microcrystalline rhombs and poikilotopic patches and is present between 2 and 24% with a mean of 9%. Very minor ferroan dolomite is also present as rims to the non-ferroan forms of dolomite. In CL, the dolomite is very brightly luminescent with minor systematic zoning reflecting oxidised groundwater. Oxygen isotopes suggest that the water from which the dolomite formed was highly evaporated meteoric water.

The amount of dolomite correlates with provenance indicators including: type of detrital quartz, abundance of K-feldspar, and abundance of igneous rock fragments. This suggests that some of the components in the dolomite were locally supplied in the early diagenetic environment during continued geochemical alteration of reactive rock fragments in an active groundwater system. Palaeoclimate, reflected by carbon isotope and clay mineral data and degree of weathering indicators, apparently controlled the amount of early diagenetic dolomite with the greatest amount occurring when the climate was most dry.