

EVAPORITIC/CLASTIC INTERACTIONS IN ARID CONTINENTAL ENVIRONMENTS: IMPLICATIONS FOR RESERVOIR QUALITY, CHARACTERISATION AND FLUID FLOW

Ross Pettigrew

Keele University, Basin Dynamics Research Group, School of Geography, Geology and the Environment, Keele, United Kingdom
r.p.pettigrew@keele.ac.uk

ABSTRACT

The sedimentary fill of arid continental basins may comprise deposits of aeolian, fluvial, and evaporitic environments. While the distribution and preservation of different facies associations within each environment are reasonably constrained from past studies, the relationships between deposits of co-existing environments, and the temporal evolution of sediment through environments, have received comparatively little attention despite their potential to affect both basin-scale migration and reservoir quality. We present results of studies of sedimentary interactions between arid environments of the Paradox Basin, USA, along with analysis of the allo-controls upon them. Our studies are based upon extensive regional fieldwork to examine sedimentology, and 3D photogrammetry to determine geometries & interactions. The margin of the Cedar Mesa erg preserves aeolian-evaporitic sediments. Interactions suggest a dominance of the evaporitic system, even during drier times, with extensive reworking of aeolian sediments into sabkha-related associations of poor reservoir quality. Interactions can be extensive, but sporadic, in space and time, preserving interbedded relationships of clean aeolian and evaporitic strata that can both compartmentalise and provide migration pathways to connect reservoir intervals.

This study provide evolutionary models that are applied to subsurface data from the arid Permian basins of the North Sea, UK – an active hydrocarbon province – in order to better characterise basin-scale migration and reservoir quality in terms of the evolving basin fill.

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