

Carbonate cycles: platform to basin

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The majority of carbonate successions, both shallow and deep-water, show a well-developed cyclicity which is on a variety of scales from a metre or less to several hundreds of metres. From the numerous published studies of carbonate cycles, it is clear that several mechanisms are involved in their generation: eustatic sea-level fluctuations on a range of time-scales, tectonic movements, also on a range of time-scales, sedimentary processes, and environmental and climatic changes. Different processes can affect the development of cycles on a shallow platform as opposed to a deep-water basin, where pelagic and resedimented carbonates are being deposited.

The application of sequence stratigraphy, dividing the succession into packages (sequences, systems tracts and parasequences - cycles by other names!) on the basis of key surfaces with chronostratigraphic significance, helps identify the major controls on sedimentation. Sequence stratigraphy is a useful tool for correlation, and in hydrocarbon exploration for the prediction of reservoir, source and seal distribution.

This presentation considers the stratigraphic architecture of carbonate successions from a range of locations and ages around the world, including the Cambro-Ordovician and Devonian of northern and southern China, the Cretaceous of western Europe and the Middle East, and the Miocene of the Middle East. The development of sequences and metre-scale cycles is examined, along with their controls, and the partition of facies within the successions, including the occurrence of typical reservoir rocks.