AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003

Peter J. Sixsmith[1], Sanjeev Gupta[2], Gary Hampson[3] (1) Imperial College, London, England (2) Imperial College, London, United Kingdom (3) Imperial College of Science, Technology and Medicine, London, United Kingdom

Unravelling Transgressive Depositional Systems Using Detailed Outcrop Analogues: The Cretaceous Hosta Sandstone, New Mexico, U.S.A

Exceptional outcrop of the Cretaceous Hosta Sandstone in New Mexico has permitted the detailed study of transgressive sandstones from a process-driven and reservoir-geology standpoint. Investigation of this system reveals a complex interdigitation of wave and tidal influences. Tidal channel-fills and tidal sand bars make up the stratigraphy in the up-dip part of the system and these pass abruptly down-dip into wave dominated shoreface sands. Facies are partitioned both vertically and laterally by a series of transgressive ravinement surfaces which can be physically traced at outcrop for several kilometers, and the understanding of such surfaces is critical to resolving sand body architectures and facies partitioning at these high-resolution (sub-reservoir) scales.

This study addresses the processes responsible for the formation, preservation and facies character of transgressive sandstones through detailed, outcrop-based studies of this exceptional analogue. In particular we investigate the processes responsible for shoreline migration in a net transgressive system, and propose that punctuated regression in this system may not necessarily be controlled by relative sea level change, more by autocyclic processes controlling localized accommodation space variation.

In subsurface reservoirs, due to the high net:gross nature of these systems, many facies variations are masked. Many transgressive successions have excellent reservoir potential, but with the increased understanding of controls on sandbody type, sandbody distribution and stratigraphic architecture in these successions, the increased geological accuracy within reservoir models can only benefit production from such reservoirs.