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

Charles E. Savrda[1] (1) Auburn University, Auburn, AL

Shallow- Versus Deep-water Mechanisms for Firmground Development at Transgressive Surfaces

Well-defined firmground ichnofabrics representing the *Glossifungites* ichnofacies typically proclaim the presence of coplanar sequence boundaries/transgressive surfaces (SB/TS) bounding shelf and foreland basin sequences. Firmground ichnofossil assemblages can be variable, reflecting differences in depositional facies immediately above erosional surfaces and in degree of substrate firmness. However, many SB/TS that bound shelf sequences (e.g., in the Gulf coastal plain) are dominated by crustacean burrow systems assignable to *Thalassinoides* or *Spongeliomorpha*. Virtually identical firmground ichnofabrics dominated by crustacean burrows have now been recognized at transgressive surfaces (TS) within deep-water clinoform-toe deposits beneath the present New Jersey slope (ODP Site 1073). Although firmgrounds at shelfal SB/TS and deep-water TS similarly reflect organism responses to the exhumation of consolidated substrates, they differ in their genesis. Development of firm substrates at SB/TS reflects exhumation due to subaerial erosion during lowstand and/or ravinement during subsequent transgression; burrowing likely occurs after erosion is complete. In contrast, the deep-water firmgrounds formed beneath water depths of several hundred meters where neither subaerial erosion nor ravinement had an impact. Instead, firmgrounds record rapid transgression and consequent extreme sediment starvation and winnowing. In this case, burrowers themselves likely played a significant role in the exhumation of firm substrates via bioerosion. Generation of loose, transportable particulate material during burrow excavation likely facilitated the removal of normally cohesive lowstand clays in the face of bottom currents. Comparison of shallow-water and deep-water occurrences highlight the broad utility of firmground ichnofabrics in recognizing transgressive events in marine sequences, but also indicate the need for caution in the genetic interpretation of firmground ichnofabrics where broader stratigraphic context is lacking.