

## AAPG Annual Convention

May 11-14, 2003

Stephen T. Hasiotis<sup>1</sup>, Kelly Dilliard<sup>2</sup>, Michael C. Pope<sup>2</sup> (1) University of Kansas, Lawrence, KS  
(2) Washington State University, Pullman, WA

### Using Ichnofossils to Better Understand Depositional Processes, Facies Relationships, and Sequence Stratigraphy in the Early Cambrian Sekwi Formation

The Early Cambrian Sekwi Formation contains a surprisingly diverse assemblage of ichnofossils that are distributed in the interbedded carbonate, sandstone, and shale, representing a platform-to-basin succession. Thrombolites, stromatolites, and burrow-mottled dolomite have been reported from the carbonates. *Skolithos*, *Skolithos*-like burrows, *Cruziana*, *Rusophycus*, *Diplocraterion*, *Phycodes*, and *Planolites* have been previously reported from the sandstones. To a lesser extent, *Rhizocorallium*, *Rosselia*, *Cylindrichnus*, *Monomorphichnus*, *Dimorphichnus*, *Astropolithon*, and *Diplichnites* have also been reported. A number of these ichnotaxa also occur in interbedded calcisiltstone and sandstone. The strata least bioturbated were those interpreted to have been deposited by debris-flows. The dominant ichnotaxa by far were *Cruziana*, *Rusophycus*, and *Planolites*.

Preliminary research in the Mackenzie Mountains reveals that ichnofabric indices ranging from 1 to 5 occur in deposits that represent supratidal to intertidal, offshore shallow platform to slope, and deep basinal environments. The strata least bioturbated were those interpreted to have been deposited by debris-flows. Strata interpreted as the deepest water facies contained ichnofabric indices of 1 to 3 with relatively low biodiversity. These bioturbation patterns are very similar to those observed throughout most of the Phanerozoic. For example, surfaces developed in siliciclastic strata that indicated relatively longer periods of nondeposition or low sedimentation rates contained ichnofabric indices of 4 to 5+ with depths of mixing attaining greater than 1 meter. Strata deposited during higher sedimentation rates contained ichnofabric indices of 1 to 3, with some bedding planes completely burrowed, or nearly so by subhorizontal crawling trails. Similar patterns between ichnofabrics and sedimentation rates were observed for carbonates precipitated and reworked on the platform. Debris-flow deposits exhibited ichnofabric indices of 1-2; however the uppermost portion of some of these units contained indices of 3+.