
The Mabou Group in the Penobscus area, Sussex, New Brunswick: preliminary chemostratigraphy and correlation

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Lithostratigraphic subdivision of the Mabou Group has previously met with little success due to limited outcrop, the absence of significant marker beds, and poor biostratigraphic control. This study focuses on drill cores in the Penobscus area, where sedimentary rocks of the Mabou Group comprise a variety of sandstone, gravel, and fine-grained facies. Most are brown, greyish-brown or reddish-brown, poor to moderately sorted, moderately compacted, ferruginous or calcareous, and mainly horizontally laminated or cross-stratified. Broadly, sandstone, siltstone, and mudstone at the base of the section gradually coarsen upward into conglomerate; this upward coarsening is considered to be the result of active alluvial fan progradation. However, localized horizontally laminated to cross-stratified bluish grey sandstone, containing carbonaceous plant fragments and siltstone rip-up clasts, was also encountered in several cores.

A total of 89 samples from two cores (PCS-02-05 and PCS-02-01) have so far been analyzed using ICP, ICP-MS, and XRD. Chemostratigraphic analysis of elemental ratios (e.g., Ti/Na, Mg/Al, Fe/K, Cr/Na, Nb/Ti, Ta/U, Cr/Sm, and Rb/Cs) has revealed two packages bounded by an interval that correlates with bluish-grey sandstone. The preliminary interpretation is that the upper package accumulated on an unconformity (disconformity), U1, identified by rip-up clasts. Changes in detrital mineralogy and diagenetic phases suggest variation in the provenance and substrate environment of the alluvial-fan sediment on either side of U1. Ongoing studies of adjacent drill cores will attempt to confirm these trends and the validity of an unconformity-based subdivision of the post-Windsor redbeds, first postulated by Gussow nearly 60 years ago.