
Sedimentology and chemostratigraphy of the Mabou Group from drill-core in the Penobscis area, New Brunswick: evidence of Gussow's unconformity?

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Post-Windsor Group strata from the Penobscis area, Sussex, New Brunswick, consist of Mabou Group sedimentary rocks that are only informally subdivided due to limited outcrop, the absence of significant marker beds, and poor biostratigraphic recovery. Examination of close to 5 km of drill core from the PotashCorp exploration program in the area has identified 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 succession gradually coarsen up into conglomerate, and are considered the result of active alluvial fan progradation across a floodplain/playa from the northeast. Also encountered in several of the cores is an interval of localized, horizontally laminated to cross-stratified bluish grey sandstone, containing carbonaceous plant fragments and siltstone intraclasts. The interval can also be recognized in wireline logs, and possibly by a correlative reflector in seismic.

A total of 185 samples from four boreholes have been analyzed using ICP, ICP-MS, and XRD. Chemostratigraphic analysis of elemental ratios (e.g., Al/Mg, Si/Na, Si/Al, Na/K, Ti/Nb, Rb/Cs, etc.) has revealed two packages bounded by an interval that correlates with the grey sandstone beds and rip-up clasts. Changes in the ratios are interpreted

to mark a broader population of mineral species and diagenetic phases in the upper package. This further implies variation in the provenance and substrate environment of the redbed succession either side of a disconformity that is also represented by rip-up clasts produced by sediment reworking along this boundary. Ongoing studies 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.