Preliminary chemostratigraphy of the Mabou Group in the Penobsquis area, Sussex, New Brunswick

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Lithostratigraphic subdivision for the Mabou Group in New Brunswick has previously met with little success due to limited outcrop, the absence of significant marker beds, and poor biostratigraphic control. The present study considers the post-Windsor Group section from drill core PCS-02-05 in the Penobsquis area to help subdivide the Group. Here, Mabou Group sedimentary rock consists of a variety of sandstone facies, gravel facies, and fine-grained facies. Most are brown, greyish-brown or reddish-brown coloured, 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 coarsens up into conglomerate, and considered the result of active alluvial fan progradation However, horizontally laminated to cross-stratified bluish grey sandstone containing carbonaceous plant fragments and siltstone rip-up clasts occur between ~666–686 metres depth.

Bulk geochemical analysis (ICP-MS, XRD) of 59 samples from PCS-02-05 indicates anomalously high concentrations of Sr between 615–655 m, whereas the Si/Na and Cs/Rb ratios increase and Ga/Rb ratio decreases above 655 m. Coinciding with these trends, petrographic analyses indicate localized concentration of anhydrite concretions at this depth interval. The preliminary interpretation is that an unconformity, identified by the rip-up clasts, is also manifest in the overlying succession by changing detrital mineralogy and diagenetic phases. Ongoing studies of adjacent drill cores will attempt to confirm these trends and the validity of an unconformity-based subdivision of the post-Windsor red-beds, first postulated by Gussow nearly 60 years ago.