

Stratigraphic Techniques Applied to the Upper Paleozoic and Triassic of the Western Canada Sedimentary Basin

Charles M. Henderson*

Department of Geology and Geophysics,
University of Calgary, 2500 University Drive NW, Calgary, AB, T2N 1N4
henderson@geo.ucalgary.ca

ABSTRACT

There are numerous applied stratigraphic techniques appropriate to understanding Upper Paleozoic and Triassic stratigraphy in Western Canada, including the use of wire-line logs, seismic, sedimentology from core and cuttings, organic and inorganic geochemistry, and ichnology within a sequence stratigraphic framework. All of these techniques work well on small-scale studies, but may fail in regional examinations because of the lack of a unique time component. Although geochronologic techniques are possible in ashes or condensed carbonates, biostratigraphy remains the most powerful tool providing the time correlation necessary to link local studies into a regional context. The distribution of fossils within the rock record is not random; biostratigraphic potential is enhanced when that distribution is linked to sequence stratigraphy, increasingly referred to as sequence biostratigraphy. This potential has been taken to another level in some fields, mostly in the North Sea, where horizontal drilling is controlled by biosteering.

Conodont biostratigraphy has been essential in unraveling the complex tectono-stratigraphic history exhibited by Pennsylvanian-Triassic strata in Western Canada. Several structural inversion events during this interval controlled deposition and preservation of various units resulting in different successions within different blocks. It is possible that some of these faults controlled the breakout of Laramide structures in the foothills, thereby compartmentalizing these different successions. The delineation of several time-slices within formations like the Belly and Montney have revealed trends unimagined when dealing with these formations as single units. Examples from these two formations will be examined to build the case that applied biostratigraphy remains a vital stratigraphic technique.