

Application of Exxonian style sequence stratigraphy to Devonian strata of the Western Canada Sedimentary Basin: A step in the wrong direction

J.C. Wendte*

Geological Survey of Canada, 3303-33 St. NW, Calgary, AB, Canada T2L 2A7
bchiang@nrcan.gc.ca

ABSTRACT

Potma et al. (2001) proposed a sequence stratigraphic framework for uppermost Givetian and Frasnian strata of the Western Canada Sedimentary Basin by recognizing nine depositional sequences bounded by unconformities and their correlative conformities. Potma et al. (2002) later divided the unconformable portion of the sequence boundary into subaerial and submarine segments and the correlative conformity into segments overlain by a downward shifted facies succession and by a normal facies succession.

The Potma et al. sequence analysis is not valid for two main reasons. Firstly, they did not present credible evidence for the identification of many of the subaerial unconformable portions of their sequence boundaries. Secondly, the criteria that the authors used to delineate the submarine portion of the sequence boundary are not theoretically viable. Concepts such as the geologically instantaneous downward shift of facies, with missing facies at the sequence boundary, and a submarine unconformity joined to a subaerial unconformity are pure fiction. In cross sections, they position the submarine portion of the sequence boundary to a contact between a shallow water, carbonate facies and an underlying deep water, argillaceous one. This surface varies from scoured to gradational and is not appropriate for use as a correlative conformity because it is highly diachronous and does not join the subaerial unconformity so as to form a single, through-going sequence boundary.

Not surprisingly, such a flawed analysis results in some bizarre interpretations. These problems can be remedied by correlating the transgressive surface to the subaerial unconformity so as to form a single, through-going sequence boundary.