

Campanian Through Paleocene Basin-fill Rates, Western Canada Basin: A Chronology Based Study

Arthur R. Sweet*
Natural Resources Canada, GSC Calgary
3303 33rd St. N.W. Calgary AB T2L 2A7

and

John (Jack) F. Lerbekmo
University of Alberta, Department of Earth and Atmospheric Sciences
Edmonton, AB T6G 2E3

An integrative, reiterative-feedback approach has been used in developing biostratigraphies and magnetostratigraphies for the late-stage foreland fill of the Western Canada Basin. Palynology based biostratigraphies for all or part of uppermost Campanian to Paleocene formations are known for east-west transects in south-central Alberta and southern Alberta through to Manitoba and a northwest transect extending from southwestern Alberta through to the Wapiti area of west central Alberta. The magnetostratigraphy for uppermost Campanian through Paleocene strata in central Alberta, and Maastrichtian through Paleocene magnetostratigraphies for southeastern Alberta, southern Saskatchewan and southwestern Manitoba have been established. These magnetostratigraphies, when linked with the geomagnetic polarity time scale, provide independent time constraints for the palynological zonations.

Together the bio- and magnetochronologies allow the late-stage fill of the foredeep to be divided into four widely correlative successions. The uppermost Campanian to upper Lower Maastrichtian interval is separated from the Upper Maastrichtian by a major hiatus. The Cretaceous-Tertiary boundary provides a precise time line for separating Upper Maastrichtian from Lower Paleocene strata. The Lower Paleocene is separated from the middle Paleocene by another major hiatus. The rates of accumulation of the preserved compacted sediments are compared with each other, to those of the Turtle Mountain area, Manitoba, and to those for the Campanian of southern Alberta. Accumulation rates from individual polarity chrons provide a check on rates calculated for longer time-intervals. Rates calculated range from about 15 to 250 meters per million years and, for the Maastrichtian and Paleocene, generally show an increase up section.