CHRONOSTRATIGRAPHY AND TECTONOSTRATIGRAPHY OF THE LATE PALEOZOIC CRATONIC SUCCESSION IN EAST-CENTRAL BRITISH COLUMBIA AND IMPLICATIONS FOR PERICRATONIC TERRANE GEOLOGY

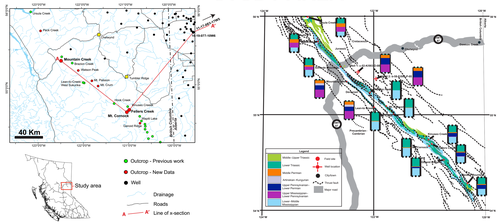
Charles M. Henderson, Kate Zubin-Stathopoulos and Greg Dean

Department of Geoscience, University of Calgary

CONCLUSIONS

1. The Late Paleozoic succession of east-central BC comprises numerous unconformities that are interpreted largely as a product of tectonism.
2. The margin the NW Pangea craton includes numerous fault bounded basins that display tectonic signatures in the form of angular unconformities to structural inversion.
3. One Lower Permian (Asselian) basin includes a warm-water succession because it was protected from cool upwelling waters in the Panthalassic Ocean.
4. The cool-water lithofacies is comparable to lithofacies found in the Barkerville Terrane which includes a carbonate unit (Sugar Lst) that may have been deposited on a high in the Slide Mt Ocean; tectonics in this ocean may have affected the craton margin.

STUDY AREA



Figures 1 and 2. Study area, east-central British Columbia. Cross-section is depicted in figure 4. Figure on right shows studied section locations (not restored palinspastically) as well as generalized stratigraphy. Note that preserved successions differ within individual thrust sheets with the most complete succession furthest west at Mountain Creek and Lean-to-Creek. Note missing Early Permian strata at Watson Peak, Mount Palsson, Mount Crum and Mount Cornock, defining a southeast trending Paleo-High.

STRATIGRAPHY

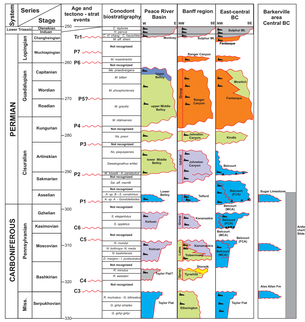


Figure 3. Stratigraphy and tectonostratigraphic sequences of east-central British Columbia, Peace River Basin and the 'Banff Region' of the southwestern Alberta Rockies. Colours represent primary lithology. Blue=limestone, purple=dolostone, orange=chert, yellow=quartz arenite, green=bioturbated/bioclastic sandstone and grey=silty shale. C=Carboniferous, P=Permian. Tectonostratigraphic sequences modified from Snyder et al., 2002 and Trexler et al., 2004. Stratigraphy modified from Zubin-Stathopoulos et al., 2011.

CHRONOSTRATIGRAPHY

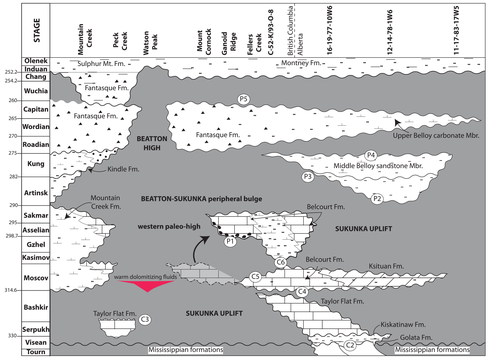


Figure 7. Chronostratigraphic diagram showing temporal and spatial distribution of major units in east-central BC to west-central Alberta. The C6 event resulted in a western Paleo-High that caused erosion of the underlying Moscovian succession and deposition locally of Moscovian aged clasts within Early Permian sediments. The Beatton-Sukunka peripheral bulge is interpreted to have formed during P2 deformation, which also potentially drove warm dolomitizing fluids into the underlying succession.

LITHOFACIES

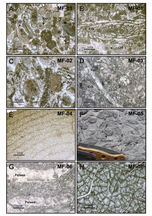


Figure 8. Belcourt Formation microfacies (Fellers Creek Facies Assemblage) photomicrographs taken in plain polarized light. All measurements are from the base of the Belcourt Formation (basal conglomerate) at the Fellers Creek section. (a) MF-01, Fellers Creek at 12.35 m (b) MF-01, 11.25 m. (c) MF-02, 18.15 m. (d) MF-03, 40.95 m. (e) MF-04, 27.75 m. (f) Outcrop photograph, knife is 10 cm long. MF-05, 26.25 m. (g) MF-06, 5.9 m. (H) MF-07, 39.1 m. Ech=echinoderm, Bch=brachiopod, Bry=bryozoan, Fus=Fusulinacean, Da=Dasycladacean algae, Paleo=Palaeoaplysina.

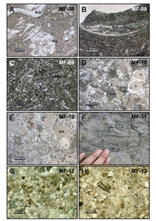


Figure 9. Belcourt Formation microfacies (Mountain Creek Facies Assemblage) photomicrographs taken in plain polarized light. All measurements are from the base of the Mountain Creek section. (a) MF-08, 9 m. (b) MF-08, 104.5 m (c) MF-09, abundant sponge spicules at 107 m (d) MF-10, 140 m (e) MF-10, 140 m, from the same thin section indicating possible storm event (f) Outcrop photograph, finger lips for scale, MF-11. (g) MF-12, 80.7 m. (h) MF-12, 6.35 m. Ech=echinoderm, Bch=brachiopod, Bry=bryozoan

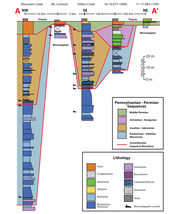


Figure 4. Cross section A-A' as indicated on Fig. 1. Correlations are based on ages obtained from conodonts, foraminifers and coral.

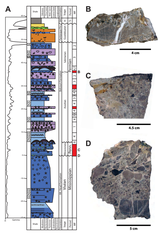


Figure 5. (a) Fellers Creek litholog indicating age based on conodont biostratigraphy, formations, conglomerates (red areas) and microfacies (MF) occurrence, modified from Zubin-Stathopoulos et al., 2011. Key to symbols and lithologies is shown in Fig. 6. (b) Conglomerate within the Sakmarian sequence containing reworked Pennsylvanian conodonts; 36.45 m. (c) 2.85 m. Second Belcourt Conglomerate. (d) Basal Belcourt conglomerate; 0 m.

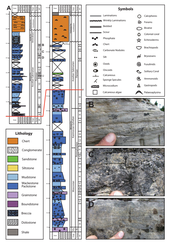


Figure 6. (a) Mountain Creek litholog indicating age based on conodont biostratigraphy, formations present and facies occurrence. The upper portion was re-measured at a slightly different location and logged as a separate section; the equivalent level is indicated by a red line. Field occurrences of (b) MF-11 (49.5 m), (c) MF-08 (43.7 m) and (d) MF-10 (41.0 m) are shown.

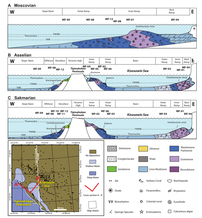
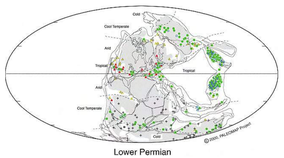
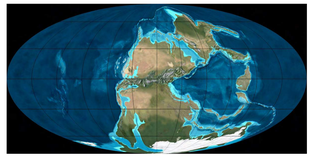


Figure 10. Deposition model of time slices roughly based on cross section of Fig. 4 as shown in inset map. FWWB=Fair weather wave base, SWB=Storm wave base. Facies locations are indicated by facies number. (a) Moscovian profile. The occurrence and distribution of shallow water deposits on the right side of the diagram are based on data from Wamsteeker (2007). K=Extensive supratidal to shallow subtidal dolostone succession (Ksituan Formation) occurs east of the back-ramp setting. (b) Asselian profile showing the Tipinahokan Peninsula and Kisosowin Sea. Known facies are shaded in solid colours (see legend) and interpreted location of facies are slightly transparent. (c) Sakmarian profile. Known facies are shaded in solid colours (see legend) and interpreted location of facies are slightly transparent.

EARLY PERMIAN PALEOGEOGRAPHY

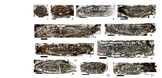


Lower Permian



Figures 11 and 12. Paleogeographic maps for Lower Permian (from Chris Scotese www.scotese.com on left and Ron Blakely cpgeosystems.com on right)

Fusulinaceans from Fellers Creek section. 1, *Schubertella* sp. Fel_37.5_6c, 0.1mm. 2, *Schubertella ex gr. kingi* Fel_39.5_1d, 0.1mm. 3, *Pseudofusulina attenuata* Skinner and Wilde Fel_37.5_1a, 1mm. 4, *Pseudofusulina attenuata* Skinner and Wilde Fel_37.5_2b, 1mm. 5, *Pseudofusulina attenuata* Skinner and Wilde Fel_37.5_8a, 1mm. 6, *Pseudofusulina attenuata* Skinner and Wilde Fel_37.5_1b, 1mm. 7, *Pseudofusulina attenuata* Skinner and Wilde Fel_39.5_1a, 1mm. 8, *Pseudofusulina attenuata* Skinner and Wilde Fel_37.5_5a, 1mm. 9, *Pseudofusulina acuta* Skinner and Wilde Fel_37.5_4a, 1mm. 10, *Pseudofusulina acuta* Skinner and Wilde Fel_37.5_1d, 1mm. 11, *Pseudofusulina acuta* Skinner and Wilde, Fel_37.5_5b, 1mm.



Fusulinids from east-central BC are similar to those in McCloud Lst of Klamath terrane and in central NV.

Sweetognathus behnkeni Found in Sugar Limestone, Bolivia and Nevada.

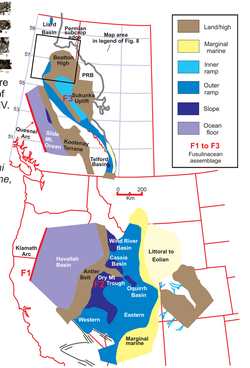


Figure 13.Asselian-Lower Sakmarian paleogeography and tectonic elements for British Columbia, Alberta and western United States, modified from Henderson et al. (2001). Configuration is based on the contouring function in ArcGIS and the predicted thickness distribution. This is a non-palinspastic reconstruction, so the Kisosowin Sea would be approximately 20 km wider than shown (Richards et al., 1994). The width of the Slide Mountain Ocean and Havallah Basin is speculative. F1 to F3 indicates the location of Fusulinacean assemblages discussed in the text.

Angular unconformity near Elko NV (Carlin Canyon) demonstrates tectonism associated with the C6 event.

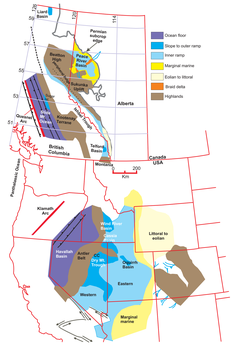


Fig. 14. Schematic paleogeographic map for western USA to NEBC for the Early Artinskian. Modified from Zubin-Stathopoulos et al. (2011). Dotted line in Beatton High area represents former position of late Asselian interior seaway. Dashed line in NEBC represents southernmost position of younger dextral Tintina strike-slip fault. The geotectonic history for the succession south of this position is markedly different from that to the north. The Yukon-Tanana terrane (see several papers in GAC Special Paper 45 including Nelson et al., 2006) may represent the western margin of the Slide Mountain Ocean that was later transported along strike-slip faults including possible transfer of strike-slip motion to Permian westerly facing subduction zone boundaries. The axis of the Devonian Peace River Arch and Carboniferous to Triassic Peace River Basin is perpendicular to this position as well. Position of tectonic elements is in part based on Gabrielse et al. (1991), Henderson et al. (1992), Nelson et al., 2006, and Wardlaw et al. (1995). Peace River Basin lithofacies from Dunn (2003). Tectonic nomenclature based on Snyder et al. (2002). CC=Carlin Canyon.

ACKNOWLEDGEMENTS

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