

Comparative Analysis Of Stratigraphic Influences On The Mechanics Of Foreland Deformation

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ABSTRACT

New maps from the recently completed Central Foreland NATMAP Project illustrate significant differences between the geometry of structures in the Liard-La Biche (NWT-Yukon) transect and that of the Trutch (British Columbia) transect.

Although the surface structures are detached on the Late Devonian Besa River Formation throughout the project area, structures in the north differ from those in the south. In the Liard area, wavelengths are 10-25 km, plunge reversals are characteristic, and fold trends reflect interference between NW and NE structures. In Trutch, structures have 1-3 km wavelengths, long linear trends and near-zero plunges, but folds terminate abruptly.

The correlation of characteristic wavelength and layer thickness in the mechanics of folded multilayers is well established in theory and experiment. The northern transect is underlain by a Carboniferous succession that attains a thickness of up to 1400 m of limestone and sandstone (Flett and Mattson formations) that is not present in the south. Structures become less continuous, and more linear as relief and exposure deteriorate. In contrast, the stratigraphy in the southern transect is not dominated by a single competent unit but consists of a succession of thinner units.

Also, subsurface data document the deformation of lower Paleozoic carbonates beneath the exposed foothills structures in the Liard, whereas the same stratigraphy is not deformed beneath the Trutch foothills. Thus two very thick competent successions are deformed in the north, compared to none in the south.