



Lateral variations in structural styles along the central Alberta Foothills of the Canadian Rockies

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The central Alberta Foothills lies along the eastern margin of the Rocky mountain fold-thrust belt, showing lateral variations in structural styles like other famous fold-thrust belts (e.g. Cordilleran fold-thrust belt of western U.S). A prominent structural feature in this area is the development of the triangle zones, mostly observed in seismic section, at the boundary between Foothills and Plains. Triangle zones are preserved at the northern and southern regions of the central Alberta area, while imbricate fan is preserved at the central region. We tried to figure out what factors make these differences, such as variations in stratigraphic thickness and/or mechanical stratigraphy of the alternating sedimentary layers etc. Structural interpretation is conducted based on the admissible cross-sections of three regions. The results indicate that, in northern region, backthrust forming triangle zone might be developed by stratigraphic pinch out of the shale layer toward the foreland. Backthrust is also developed in the southern region, where strength of strata is increased toward the foreland. In the central region, however, imbricate thrusts are developed along the weak continuous decollement layer. Detachment horizons are different in each regions because of the lateral variations in thickness of incompetent layers. These indicate that development of backthrusts are affected by stratigraphic thickness change of the detachment layer in the northern region and variations in strength along the transport direction in the southern region. They are not developed in the central region having continuous stratigraphy. These further suggest that variations in stratigraphic thickness and mechanical stratigraphy play a role in the development of lateral variations in structural styles along the central Alberta Foothills in Canada, and this, in turn, will further help for better understanding the structural evolution of fold-thrust belt in general.