Structural Changes in the La Biche Range, Yukon and Northwest Territories

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The La Biche structure, located in the southern Franklin Mountains, involves Devonian and Mississippian strata at the surface and displays a marked change in trend and geometry of folds and related faults along strike. Douglas and Norris (1959) documented north-south oriented structures with terminations and marked changes in strike at “lines” of deflection. The structural interpretation incorporates surface, seismic, gravity and magnetic data, delineated two distinctly different fault propagation folds meeting at approximately 60°40’N latitude. South of 60°40’N, the range is characterized as a southwest-verging, northwest trending fault-propagation fold that dies out northward. North of 60°40’N, the vergence of structures is eastward and the trend is north-south. The change in structural character is a result of a high in the Proterozoic strata deepening and flattening northward. In the southern portion of the study area, a high in the Proterozoic indirectly controls the trend and vergence of structures. Where the high deepens and flattens northward, structures were free to propagate, without basement influence, toward the foreland. Based on this interpretation, the La Biche Anticline does not “deflect” at 60°40’N, but is a result of two fault-propagation folds with different vergence directions meeting. The regional implication is that crustal-scale wrench faulting (as proposed by Morrow and Miles, 2000) is not necessary in order to explain the change in trend and character of structures at 60°40’N, but can be explained by undulation of the top Proterozoic surface.