

Are the Foothills Slipping?

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Abstract

The Foothills in Canada were created by a reverse faulting stress regime. This resulted in the folds and thrusts which today we associate with this tectonic belt.

It is often assumed that the present day stress field is too small to create active tectonism and that the Foothills trend is therefore a "fossil" thrust belt.

Image logs and other well data from the Central Alberta Foothills have been used to create geomechanical models of the present day stress field in the Foothills. The results show that the maximum and minimum stress directions are both horizontal creating a strike-slip stress regime in the area. The maximum horizontal stress is in a direction of 29 degrees East of North, oblique to the Foothills belt. The stress field magnitudes imply that the rocks are close to failure. Geomechanical analysis has also demonstrated local rotations of the principle stresses with depth, which is consistent with active faulting. These results suggest that the Foothills belt is still tectonically active, but this time as a strike-slip rather than a thrust regime.

3D seismic data from the area will be used to show the presence of a significant wrench feature. The possibility that this was created after the Foothills belt formed and indeed may be active today will be discussed. The interaction of the present day stress field and natural fracture orientations will be discussed; especially the impact on well orientation and fracture permeability.