

# Pseudo-3D Precambrian Basement Study of the Northern Williston Basin

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## Abstract

This study utilized 1900 km of seismic data forming a pseudo-3D grid over the northern portion of the Williston Basin. The interpreted region forms an approximate circular area with 90 km radius, centered on the Weyburn oil field. The focus of this investigation is the structural setting of the basin basement contact of this intracratonic depression.

The Saskatchewan segment of the Williston Basin can be divided into two distinct domains separated by the Elbow-Hummingbird monoclinial flexure and the coincidental NACP conductivity anomaly. To the west of these trends are the Archean Wyoming Craton, and the locally extensive Swift Current Platform. To the east is the Early Proterozoic Trans-Hudson Orogen, and within it, an Archean crustal fragment of the Dakota Block. This Archean block is bounded to the east by the Superior Craton.

Precambrian basement contours display a radial pattern with fold wavelength decreasing toward the centre of the basin. Folds east of the Elbow-Hummingbird monoclinial flexure are smaller than those to the west. The wavelength of the western folds is around 10 to 15 km. They extend 40 to 50 km in length, and plunge toward the basin centre. Superimposed on these major structures are smaller flexures derived by the long history of subsidence through most of the Phanerozoic. The development of these major ductile features on the western side of the basin is attributed to the documented systematic movements of the Swift Current Platform. The results also suggest an association between the larger folds and salt dissolution in the area. There are clear indications of characteristic fault patterns within the sedimentary fill resulting from removal of the Prairie Evaporite salt.

## References

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