

Basement Features and the Paleozoic of Slave Plain, Southern Northwest Territories: Implications for Mineral and Hydrocarbon Exploration

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Several grids of industry seismic occupy a region that lies between Buffalo Lake (116°W) and the Cameron Hills (119°30'W) in the Northwest Territories immediately. The Base of the Phanerozoic has a gentle westerly dip across this region with depth to Basement of about 0.5 sec. of two-way travel time (TWT) between Buffalo Lake and Hay River increasing westward to 1.3 sec. TWT on the west side of Cameron Hills.

There is considerable structural disturbance and changes of seismic character within the Precambrian of the Great Bear magmatic belt across this region. On the east side of the area sub-Phanerozoic reflectors down to 3.0 sec. TWT exhibit rapid lateral changes in seismic facies from strongly layered to less distinctly stratified successions. Some of these lateral changes may have developed across faults that bound graben-like features of Proterozoic age. Several of these faults may have been reactivated as reverse faults from latest Proterozoic to Late Devonian time. Gas-bearing Slave Point reef mound complexes developed above buried erosional topography on the Base of Phanerozoic unconformity in the Cameron Hills area. These paleotopographic highs were the result of pre-Devonian movements on intrabasement faults.

Farther west, topography on the sub-Phanerozoic unconformity is subdued and the Precambrian is a gently west-dipping, more weakly layered succession with a low-contrast seismic character and no large structures. Numerous north-trending high angle reverse faults have offset the Slave Point. Undeformed Devonian carbonates, such as the Jean Marie Member overlying these faults points to an early Late Devonian time of compression.