

Azimuthal Seismic Velocities and Field Fracture Mapping, Southern Moose Mountain

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Abstract/Excerpt

This study investigated the variation of near-surface velocities derived by the inversion of first arrival data from a 3D seismic survey. A refraction interpretation method was used to analyze the refracted P-wave from shot-receiver pairs confined to different azimuthal sectors. Azimuthal velocity variations were interpreted in terms of the orientation of fracture systems in the Moose Mountain structure in the southern Canadian Rocky Mountains. Field mapping was undertaken to integrate the seismic interpretation with the dominant fracture pattern measured in carbonate rocks outcropping in southern Moose Mountain. Refraction velocity analysis revealed the existence of azimuthal anisotropy of (9%) in P-wave velocities with the fast velocity subparallel to structural strike. Field mapping of fracture data confirmed that the dominant fracture pattern is (type-2) fold-associated fracture pattern in which the fractures are oriented in a direction parallel to the structural strike.