

Imaging Extensional Fault Systems Along Foothill Trends

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The foothills region of the Canadian Rocky Mountains is considered to be a prospective hydrocarbon province. To date relatively few wells have been drilled, this is primarily because exploration costs are prohibitively expensive. In 2005 ARKeX Ltd was contracted by JEBCO Seismic (Canada) to acquire a multi-client BlueQube airborne geophysical survey over Muskwa-Kechika, British Columbia. The BlueQube survey, covering 3,000 sq km of the Rocky Mountain Foothills was completed in the winter of 2006/07 and the data acquired provides the explorationist with previously unattainable high resolution airborne gravity gradiometry imaging, magnetic gradiometry and LIDAR data. The recent commercialization of the previously classified defense technology gravity gradiometers has opened up a new and exciting genre of exploration in the oil, gas, and mining industries. The simultaneous acquisition of complementary data sets delivers a cost effective, multidisciplinary interpretation, of previously hard to reach areas. Gravity gradient imaging was used to map extensional faulting systems east and in front of the thrust front proper. A new methodology based on convolving end member inversion models was developed, which allowed the signal from rotated Triassic fault blocks (masked by overlying Cretaceous clastics) to be isolated from signals relating to deeper structures. This paper is a critic of the methodology used, the ability of gravity gradient imaging to identify targets of this nature and the success and failure of a blind inversion result to that of known producing / dry wells.