

QUATERNARY BURIED VALLEY CHARACTERIZATION ON THE CANADIAN PRAIRIES USING A SHEAR LAND-STREAMER

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Recent near surface seismic reflection developments using a land-streamer have been commercialized in the Western Canadian Prairies making use of Oil and Gas exploration seismic equipment. A 72 channel 3C land-streamer in conjunction with an IVI Envirovibe modified with a transverse shear-pack has been constructed and tested over a known 70m Quaternary buried valley system SE of Calgary, Alberta. Shear-shear reflection, P-wave reflection and multichannel analysis of surface wave (MASW) data are acquired concurrently using this cost-effective system. Processed data depicts a vastly different lithology than prior geology based on sparse water wells drilled and analyzed in the 1980's. Real-time GPS to sub-meter accuracy, 24-bit distributed recording, advanced vibrator electronics and feedback using 3C analogue geophones with expandable remote acquisition digital recording by a single observer while operating the Vibroseis machine is a novel approach for engineering applications. This equipment and methodology demonstrates a cost-effective approach to soil investigations for near surface shear velocities, soil characterization, and lithologic interpretation of quaternary valleys within the Canadian Prairies to in-fill known drill locations.