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Geographic Information Systems For Seismic Line Optimization

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Summary

Ideal conventional seismic survey design creates regularly sampled source and receiver lines to produce high fold data with consistent offset distribution. A “text book” orthogonal seismic grid with evenly sampled perpendicular source and receiver lines, however, is impossible to achieve due to many physical and non-physical factors. In Alberta Canada, seismic design and acquisition is often adversely affected by geographic, ecologic, environmental, cultural and political concerns. Adjusting for these restrictions within traditional seismic design methods creates non-orthogonal sparsely sampled poorly offset distributed seismic data unsuitable for both acquisition and interpretation

However detailed use of Geographic Information Systems (GIS) for seismic line optimization combined with Independent Simultaneous Sweeping (ISS) can produce high fold, high trace count, offset rich seismic data even where adverse conditions exist. In this paper, we look at a survey acquired by Explor Geophysical in Northern Alberta where GIS methodology and ISS were successfully used to acquire record breaking seismic data in an extremely geographically complex area.