

## **High Resolution Seismic Refraction Tomography of Glacial Deposits**

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Seismic refraction tomography is now widely used in the engineering and environmental industry. In this study seismic refraction data were collected over glacial sediments in northern Illinois to test the ability of refraction tomography to delineate structures in these deposits. At the site, located 10 km south-east of Rockford, IL, shallow fractured bedrock is overlain with sandy and gravelly regolith, possibly outwash, covered by glacial till (diamicton). Seismic refraction tomography was tested as a tool to identify buried sand and gravel channels, to examine horizontal and vertical velocity variations within these sediments associated with facies changes, and to image the bedrock surface. Locating possible contaminant pathways and estimating hydrogeological behavior of these sediments is especially useful as groundwater at the site is contaminated with heavy metals and organic compounds. The shallow sands and gravels may be in hydraulic connection with the underlying karstic dolostone bedrock.

Seismic refraction tomography was able to image the undulating surface of gravel layer at 3-5 m depth, beneath sandy clay, and was also able to recognize velocity changes in the sediment with a vertical and horizontal resolution of 0.5 m. A non-ideal collection geometry was used so data reliability is also carefully examined in this study.