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Analysis And Implementation Of Kirchhoff And F-K Migration To Focus Ground Penetrating Radar Images

Ground penetrating radar (GPR) is widely used in detecting subsurface objects such as buried landmines. Depending on the application, different scanning schemes, namely, A-scan, B-scan, and C-scan, are being employed. In the B-scan measurement situation, a downward looking GPR antenna is moved along a straight path on the top of the surface while the GPR sensor is collecting and recording the scattered field at different spatial positions. This static measured data collected at single point is called an A-scan. Data collection in GPR can be done through CMP (common mid-point) gathering and then applying the signal traces for NMO (Normal move out) correction and stacking it. CMP gathering is one of the techniques of collecting the data showcasing the subsurface of the earth through the GPR system. The Fig. 1 shows how the data is captured using CMP gathering technique.

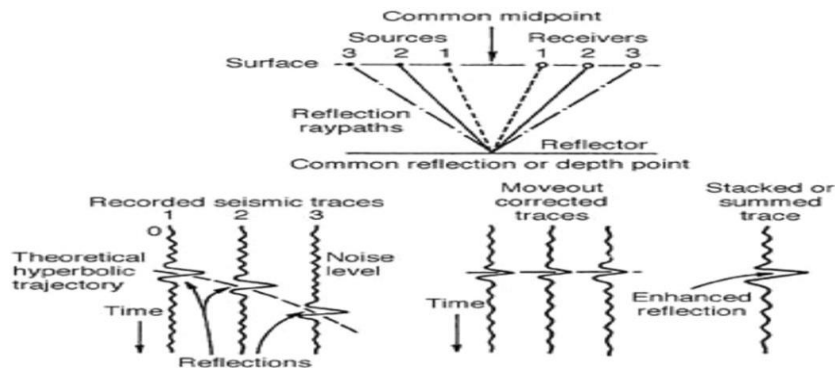


Fig 1: CMP gathering, NMO correction and stacking

Migration is the process that moves the reflection energies from the apparent locations to the true locations. Kirchhoff migration is a non-recursive method. It uses integral form of wave equation and based on Huygens principle, according to which, the seismic reflector is viewed as if it is composed of closely placed point diffractions. F-K method uses FFT algorithm.