# POLARIZATION MIGRATION OF MULTI-COMPONENT SEISMIC DETECTION IN THE TUNNEL OF MOUNTAIN CITIES

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With the development of transportation in the west of China, tunnel construction in mountain cities is becoming very important and widespread. Tunneling safety in the tunnels is usually controlled by faults, and the advanced prediction of faults by seismic detection method has become a research hotspot in the field of engineering geophysics. Unlike seismic exploration on the ground, the sources and geophones are not properly arranged due to the limitation of the tunnel detection space, so as to cause migration artefacts problem in the process of advanced migration imaging. The problem results in inaccurate imaging of the faults. To solve the problem, this article proposed a polarization migration method. The method makes use of the polarization characteristic of three-component seismic signals. The principal polarization direction is calculated by Hilbert transform and complex covariance matrix analysis. A weighted function of the principal polarization direction factor is incorporated into the migration calculation. To verify the effectiveness of the polarization migration method, this article carried out numerical simulation and physical simulation. Test results demonstrate that the artefacts were eliminated by the polarization migration, and occurrence parameters of faults, such as dip and trend were calculated accurately. The field detection case shows that seismic advanced prediction which is based on polarization migration provided parameters of faults in the front of the tunnel face with 100m, and the distance error is less than 2m, and the dip error is less than 3°, which ensures efficient and safe construction of tunneling.