

THE USE OF FWI IN COAL EXPLORATION

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3D reflection seismic is routinely used for a precise structural mapping of coal seams in Australia. Seismic images are used to analyze and predict underground hazards such as faults and folds, weak strata, gassy zone, etc. Structural analysis of 3D seismic images is then utilized to help plan underground mining operations. While time seismic images are of a high quality; issues with depth conversion, fault through estimate, coal quality, presence of fractured and gassy zones, weak strata, etc. are still to be fully resolved from seismic images. A step change in solving these issues could be by incorporating Full Waveform Inversion (FWI) into seismic borehole and surface imaging flows. The seismic data quality in Bowen and Sydney basins is such that FWI could be applied over a wide frequency band to produce high resolution P-wave and more importantly density images, particularly from VSP data that can be used for both depth imaging and directly for coal characterization. We evaluate the potential of FWI for coal exploration in Australia by conducting comprehensive, log-derived simulation studies.