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庐枞盆地浅表地壳速度成像与隐伏矿靶区预测

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Tomographic velocity structure of shallow crust and target prediction for concealed ore deposits in the Luzong basin

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摘要

利用反射地震初至波可以精确反演地壳速度结构和构造信息.对庐枞盆地采集的高分辨地震数据,运用初至波层析成像方法,反演得到了该区1200 m以上的浅表地壳速度结构信息.找矿信息总是同地球化学异常联系紧密,对采集于炮孔深处的岩屑、泥砂样品进行了地球化学分析,发现了多处显著的金属元素异常.对五条测线的速度成像结果及其映射的地下岩性结构和炮孔地球化学分析结果进行了相关性对比分析.结果显示,庐枞盆地的沉积岩、火山岩和侵入岩具有不同的速度范围,侵入岩具有高波速特征,地球化学信息高异常往往出现在高速侵入岩体的上方;精细的速度信息蕴含着丰富的浅表地壳结构变化特征,与庐枞矿集区已知的地质、岩体、构造和矿体分布存在着良好的对应关系.速度成像结果可以准确刻画地下隐伏侵入岩体的空间分布形态,结合地球化学分析异常和重磁探测等信息,预测隐伏矿床,提供深部找矿靶区.

关键词 庐枞盆地, 初至波层析成像, 速度结构, 地球化学, 隐伏矿, 预测

Abstract:

Crustal velocity structure and structural information can be inversed precisely by seismic tomography. The shallow crustal (1200 m above) velocity can be achieved by first arrival time tomography in a basin. Prospecting information is always closely linked with the geochemical anomalies. Many significant metal element anomalies have been found by geochemical analysis of the sediment samples from shot holes. Correlation analysis between velocity imaging of five lines and mapping rock properties, compared with geochemical anomaly, has finished. The results show that sedimentary rocks, volcanic rocks and intrusive rocks have different velocity ranges in the Luzong basin. Fine velocity analysis shows that shallow crustal structure varies, and has good correspondence to known geology, rock, structure and distribution of ore deposits in the district. Velocity imaging can accurately reveal the spatial distribution of buried intrusive rocks. Combining with geochemical analysis, information of gravity and magnetic anomalies, location of concealed deposits and targets at depth can be predicted for exploation.

Keywords Luzong basin, First arrival wave tomography, Velocity structure, Geochemistry, Concealed deposit, Prediction

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