Application of the field seismic data in the security assessment of coal mining in Cuijiazhai Area

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Introduction

The Cuijiazhai area is located in Hebei Province in north China, where plenty of coal resources are mined. In recent years, a large amount of seismic exploration work with the aim at coal recources has been done in the area successively. Based on the foundation of seismic exploration data, this study focuses on the structure of sedimentary basin and the security assessment of coal mining in the Cuijiazhai area.

Experiment and Results

A crisscross seismic exploration lines had been measured. the exploration lines are little longer than the field survey profile to cover all the possible coal resources area. Seismic data processing can be summarized concisely into the following steps [1]: (1) carefully checked the positions of field shot-receiver pairs to obtain accurate localities; (2) calculated the static corrections in details; (3) eliminated bad shots, bad courses and abnormal amplitudes; (4) selected appropriate deconvolution parameters; (5) made accurate velocity analysis and got residual static corrections through stacking; (6) carried out the post stack processing and precise migration.

The result indicates that there is a buried reverse fault structure in the region, suggesting long-term tectonic push influenced Cuijiazhai area since Jurassic. This crustal deformation was accompanied with rock cracking in both coal sills and their wall rocks, which could lead to the security difficulty and potential danger to the deep exploitation for coal mines.

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Nd isotopic compositions of adakites from Dabieshan: Implications for the subducted mafic lower crust of the South China Block

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A thick mafic lower crust (MLC) is necessary for the South China Block (SCB) to promote Triassic deep subduction, indicated by the exposed UHP rocks [1]. A systematic Sm-Nd isotopic study of early Cretaceous adakites from Dabieshan except those from the North Huaiyang zone provides constraints on the subducted MLC. T_{DM} ages of adakites (from 1.56 to 2.56 Ga) can be divided into two main groups: ~1.7 to ~1.9 Ga and ~2.2 Ga (Fig. 1), significantly older than the main Neoproterozoic crustal growth event uniformly recorded in exposed UHP rocks [2,3]. With respect to T_{DM} ages, adakites exhibit a clearly spatial zonation. Samples from South Dabie and one pluton adjacent to it have T_{DM} ages > 2.19 Ga, while others are < 2.15 Ga. T_{DM} ages of adakites imply that Paleoproterozoic (possibly some Archean) components are uniformly distributed in the subducted MLC of SCB. This agrees with U-Pb data of zircons mainly from the upper and the felsic lower crust [4]. These old components participated in the formation of the MLC of SCB either by being incorporated into later underplating magmas (e.g., Neoproterozoic) or as relics of ancient basements. The T_{DM} ages and the spatial heterogeneity imply a multi-stage growth history for the MLC of SCB.

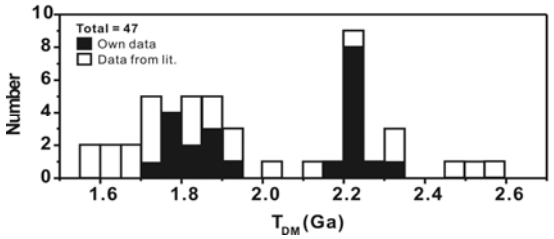

Figure 1 Spectrum of T_{DM} ages of adakites from Dabieshan

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