

多源資料整合於三維地質建模之有效方法

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摘要

現有的三維地質建模系統高度依賴大量的鑽孔與地質剖面資料。然而，眾所皆知，地質資料通常是稀疏且取樣不足的。本研究提出一種逐步細化方法，整合多源資料進行三維建模。無論地質資料是否充足，該方法皆可自然地模擬地質構造。透過對多種資料的逐步細化處理，可有效提高三維模型的精度。此外，該方法中所使用的資訊組織與操作機制，對地質學家的思維方式、地質資料的詮釋以及建模方法學同樣具有重要影響。應用該建模方法於淮北斷層褶皺帶的實例顯示，該方法可適用於廣泛且地質構造複雜的區域。

關鍵字：三維地質建模、多源資料、整合架構、逐步細化方法。



An effective method for 3D geological modeling with multi-source data integration

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Abstract

The existing 3D geological modeling systems rely heavily on large numbers of borehole and cross-section data. However, it is well known that the available geological data are generally sparse and undersampled. In this paper, we propose a stepwise refinement method for 3D modeling with multi-source data integration. The method can naturally simulate geological structures no matter whether the available geological data are sufficient or not. By stepwise refinement on multiple data, the method increases the accuracy of 3D models gradually and effectively. In addition, the mechanisms used in the method for organizing and manipulating information can have an equally important impact upon geologists' thought, the interpretation of geological data, and 3D modeling methodology. A concrete example of using the method to Huai Bei fault and fold belt shows that the method can be applied to broad and complex geological areas.

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Keywords: 3D geological modeling; Multi-source data; Integration architecture; Stepwise refinement method