

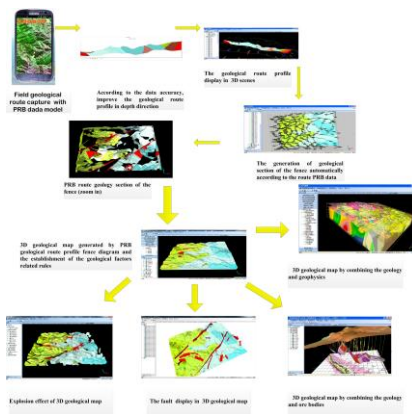
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PRB 3D geological map modelling technology

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This paper presents the dual PRB 3D modeling technology of geological mapping (PRB is short for geological Point, geological Route and geological Boundary in the field geological observation). It realizes the geological mapping process from 2D to 3D dynamic and quick modeling. The process is shown in figure 1. PRB is a kind of field data acquisition model in the geological mapping. It can meet the field geological route data acquisition of arbitrary scale geological mapping by applying the method of PRB syntax structure and mode. When the mapping precision of geological route within the work area reaches requirements, planar geological map can be dynamically modeled and formed according to the geological route (PRB) information in the horizontal direction (plane). On this basis, according to the



comprehensive study of planar geological map, it can be modeled to three-dimensions combined with the depth direction (profile) of PRB, and the 3D geological map can be generated dynamically. The method is called geological route (PRB) dual dynamic 3D modeling technology in the geological mapping.

PRB syntax structure and mode can use the expression description: semantic granularity = geological mapping framework rules (Syntax) + description precision content (semantics). Digital field geological survey PRB syntax structure is

mainly to solve the model of the geological route observation and recording process. The geological point, geological observation route and geological boundary are three key factors of the geological route. They have nothing to do with the scale. In the three core elements, through the definition of PRB data model, the basic process of PRB and PRB combination rules in the basic process, and the public mechanism of PRB process, solved the problem of semantics and described granularity associated with the mapping precision. The whole process consistency and inheritance of PRB data model can provide the computing conditions. So it can quickly form a plane geological map.

Three dimensional geological map modeling method based on the dual constraints of planar geological map and PRB depth direction (profile) is an efficient method。 Its key technologies are as follows: 1) The method of estimating the geological boundary attitudes under the attitude point influence region of geological semantic constraints; 2) Continuous tomographic algorithm of geological boundaries under the constraint of cross section and attitudes; 3) Dynamic fault reconstruction algorithm for 3D fault model based on curve fitting and surface cutting; 4) Topology consistency checking and seamless modeling technology of 3D model of whole area geological body. The demonstration application proves that the method is highly efficient and is dozens of times faster than the conventional modeling technology. Now it has been demonstrated in a number of countries.

References:

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