## Geochemical evidence for tectonic setting of the Langjiexue Group in Langxian County, Tibet, China

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The research area is located in the southeast Tibet, which is the middle east region of Himalayan-Tethys orogenic belt. The Langjiexue Group in upper Triassic system is a flysch formation which can be divided into three formations: Songre formation, Jiangxiong formation and Zhangcun formation from bottom to top. The regional geological background and the geochemical composition of sandstones in Langjiexue Group are discussed in this paper. In diagrams of SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>-K<sub>2</sub>O/Na<sub>2</sub>O, K<sub>2</sub>O/(Na<sub>2</sub>O+CaO)-SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> and K<sub>2</sub>O/Na<sub>2</sub>O $w(SiO_2)$ , the data of rocks in Langjiexue Group are mostly plotted in the field of active epicontinental region. While the picture of La-Th-Sc, Th-Sc-Zr/10 and Th-Co-Zr/10 denote the rocks has tectonic background of continental island arc and active continental margin, and the characteristics of rare earth elements is close to the active epicontinental region.

The petrochemical and REE geochemical characteristics of the rock indicate that the Langjiexue Group might have been formed in the tectonic environment from the active epicontinental region to the continental island arc.

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## Analysis and evaluation of the available rock and soil mass in underground space in ChangChun,China

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Since 20th centry, as the industrialization and the urbanization developing rapidly, the demand of city geology resources is gradually increasing. At the same time, excessive exploiture made the geology entironment frail day by day, such as the city slope geology disaster, land subsidence, groudwater pollution and depletion, city waste meterial geology problem, and etc. How to use the city underground space reasonable, to assure the city's sustainable development is becoming a more and more important problem.

The ChangChun City site in the northeast area in China. The city is mainly confronted with landslip, debris flow, land subsidence, land fracture, groud destabilization and sand liquation because of earthquake, frost heave and thaw collapse on seasonally frozen ground, solid waste meterial's discharge problem, groundwater resource amount survey and the waterquality pollution problem, or other city environment geology problems.

The paper choosed more than 10000 representative bore datas, and used GMS to build a tridimensional visual underground space model for ChangChun City. Analysised above factor's influence, and evaluated the available rock and soil mass in underground space with the extension synthesis theory. The evaluation contains 0-3m, 3-15m, 15-30m rock and soil mass's ground availability. This result has the guiding sense for the ChangChun City's planning and construction, and has the model significance for other citys.

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