Rare earth elements in river waters draining karst terrain, Guizhou, SW China

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Introduction

To study geochemistry of the rare earth elements (REEs) in ground waters is of importance for us to understand continent-ocean recycling of elements and transportation mechanism of heavy metals that often cause environmental problems at the earth's surface. River waters draining karst terrain of Guizhou Province in SW China have been measured for their concentrations of rare earth element and major ions for a better understanding of factors controlling distribution and transportation of the REEs in ground water.

Results and Discussion

Concentrations of the REEs in the river waters range from 3.0×10^{-9}g/l to 40×10^{-9}g/l for La and from 0.4×10^{-9}g/l to 3.0×10^{-9}g/l, lower than those of most of the world large rivers. The low concentration of the REEs in the river waters draining karst terrain is most likely attributed to high pH values, low contents of suspended matters and HCO_3^--Ca^{2+}-dominated water chemistry.

The Shale (NASC)-normalized REE patterns for the dissolved loads are shaped with from light REE-enriched to heavy REE-enriched features. The rivers in the upper reach of Wujiang river generally show light REE-enriched patterns, while the river waters in the lower reach have heavy REE-enriched patterns, with $(La/Yb)_N$ varying from 0.2 to 2.3. The waters of Wuyang River draining dolomite-dominated terrain have the REE patterns showing heavy REE-enriched signature. The fractionation between heavy and light REEs in the river waters can be ascribed to several factors, such as source, water chemistry and water/particle interaction, among which the water/particle interaction might have played an important role.

A number of river waters show the shale-normalized REE patterns with negative Eu anomaly, especially the waters from Wuyang River. The existence of negative Eu anomaly in the river waters shows most likely a lithology dependence, among other controlling factors. The negative Eu anomaly, together with negative Ce anomaly, is probably one feature of the river water in karst terrain.

Preliminary study on geochemistry of Nanwenhe Later-Silurian granite, SE Yunnan, China

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Introduction

Nanwenhe Later-Silurian granites, had been recognized nearly in 1:50,000 regional geological mapping, is a new good object to probe geodynamic evolution of the Southern China.

Geology

The granites, one of main components in Laojunshan metamorphic core complex, enclose a lot of mianthites and Precambrian metamorphic rocks. The litho-structures are augen-like, streak and gneissoid. The major minerals are microcline, plagioclase, quartz, biotite and muscoveite, and the accessory minerals are magnetite, ilmenite and zircon.

Analysis methods

The major elements of 15 samples were measured with wet chemical analysis, the minor elements of 15 samples were measured on ICP-MS, Rb-Sr and Sm-Nd isotopic compositions of 5 samples were measured on TIMS.

Discussion of results

A/CNK=1.0-1.5, A/NK=1.1-2.0 and σ=1.2-2.9, suggested that the granites should be calc-alkalic rocks of sub-alkalic series. V-type REE pattern with δEu=0.15—0.30 have be recognized. Synthesized several diagrams for tectonic interpretation of granitoid units, Nanwenhe granites should be continent-continent collision zone granites (CCG).

The Rb-Sr isochronal age, 427.5±40Ma, with I_{Sr}=0.7151±0.0022 have be gained. This age accorded to the Guangxi movement in middle-later Silurian, and maybe indicated later stage of the collision between Dian'gui-Northern Vietnam landmass and Yunkai landmass.

The average εSr(t)=138 and the average εNd(t)=-5.84, suggested that the source rocks should be middle-later Proterozoic metamorphic rocks.

Conclusions

1. Characteristics of geology, geochemistry of Major-minor elements and isotopes, indicated that Nanwenhe granites should be *in situ*-parautochthonous anatetic-metasomatic granites.

2.The Rb-Sr isochronal age, 425Ma, is consistent with Guangxi movement, responded to the collision event between Dian'gui-Northern Vitenam landmass and Daminshan landmass.

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References

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