

Calculating of soil carbon storage of China based on multi-purpose geochemical survey

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Soil carbon storage is an important parameter for the study of carbon circling and global change. Accurate calculation of this parameter is limited by data sources for a long time. Multi-purpose geochemical survey (MPGS) in China, covering 1.6 million km² by 2008, using a scheme of grid sampling (one sample per km² and mixed analysis each 4km²) with double layers (surface 0-20cm and deep layer 150-180 cm), provides large quantities of data for soil carbon storage calculation.

We have been calculating organic carbon storage of China using data from MPGS. A concept of "Unit Soil Carbon Amount (USCA)", defining as the amount (weight) of carbon storage in the MPGS unit area (4km²), was put forward as the basic unit to be cumulated. On the basis of 414 soil profiles from 14 provinces, it was found that soil organic carbon (TOC), has a trend of exponential decreasing with depth. Thus, USCA_{TOC} was calculated for each MPGS unit area by integration of the exponential model that is determined by the surface and deep TOC contents:

$$USCA_{TOC} = \left\{ \frac{(TOC_1 - TOC_2) \cdot [(d_1 - d_3) + d_3 \cdot (\ln d_3 - \ln d_2)]}{\ln d_1 - \ln d_2} + TOC_2 \cdot d_3 \right\} \times \rho \times 4$$

where, TOC₁ and TOC₂ denote TOC in surface and deep layer respectively; d₁ and d₂ is the depth of the two layers; d₃ is the lower limit for integration and 1m was taken; ρ is the soil bulk density.

The results, calculated in the MPGS regions by 2008, showed that soil types and land use are the main factors that determine USCA_{TOC} or soil organic carbon density (SOCD). By soil types, meadow soil and chestnut soil have highest SOCD of 69879 t/km² and 34583 t/km² respectively, and coastal sand soil have lowest SOCD of 3906 t/km². By land use type, forestry and grass land have highest SOCD of 28323 t/km² and 27126 t/km² respectively, and residential area have lowest SOCD of 15558 t/km².

The rare earth element characteristics of the silicolite of Early Cambrian barite deposits in East Guizhou, China

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Geological Setting

The Lower Cambrian black shale sequence of the Niutitang Fm. in southeast Guizhou China hosts a barite layer. The ore-bearing rock series is composed of black silicolite, carbonaceous shale interbedded with phosphorite, barite and carbonaceous shale in ascending sequence. The stratified main ore bodies, are dominantly embodied in the silicolite and black shale of the lower section of the Niutitang Fm. of the early Cambrian.

Discussion of Results

Systematical silicolite samplings for the analysis of rare earth element by atomic emission spectrometry were taken in the Dahebian barite deposit in Tianzhu County of Guizhou Province China. Samples of silicolite were analyzed in the State Key Laboratory for Mineral Deposits Research.

Based on the analysis of rare earth element by atomic emission spectrometry, the characteristics was reported for the silicolite of barite deposits (Fig 1). The study provides evidence for the submarine hydrothermal exhalative genesis of Dahebian and Xinhuan barite deposits.

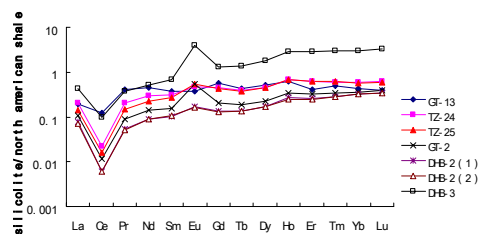


Figure 1: The NAAS-normalized rare earth element patterns for silicolite.

This research was jointly supported by the National natural Science Foundation of China (Grant No. 40872072), and the State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences (Grant No. GPMR0508).