The differences of fluid inclusions between ore minerals and gangue minerals of Huize lead-zinc deposit, Yunnan province, China

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The Huize surperlarge lead-zinc deposit is a typical deposit in the Sichuan-Yunnan-Guizhou Zn-Pb polymetallic mineralization zone, the main ore minerals and gangue minerals are sphalerite and calcite respectively. Research of fluid inclusions in sphalerite and calcite indicate that there are differences in homogenization teperature, salinity, density and composition of fluid inclusion. *a. homogenization teperature*. The homogenization temperature of fluid inclusions in sphalerite range from 100.2°C to 344.5°C, for the average homogenization temperature of 179.5°C, which have two change temperature sectors obviously, 150°C~200°C and 250°C~350°C. Whereas, homogenization temperature of fluid inclusions in calcite range from 160°C to 220°C, and few can reach to 250°C. *b. salinity*. Salinity of fluid inclusions in sphalerite is similar to homogenization temperature, which range form 1.05wt% $NaCl_{eq}$ to 18.04 $wt\%NaCl_{eq}$, for the average salinity of 11.56 $wt\%NaCl_{eq}$, and have two change sectors, 1~13 $wt\%NaCl_{eq}$ and 13~20 $wt\%NaCl_{eq}$. Fluid inclusions in calcite are of low salinity, with a range from 0.18 $wt\%NaCl_{eq}$ to 10.8 $wt\%NaCl_{eq}$, and the average sallinity of calcite is 7.29 $wt\%NaCl_{eq}$. *c. density of fluid inclusion*. The densities of fluid inclusions in sphalerite range from 0.8884$g\cdot cm^{-3}$ to 1.0507 $g\cdot cm^{-3}$, and the average densities is 0.9735 $g\cdot cm^{-3}$, but densities of fluid inclusions in calcite range from 0.8811 $g\cdot cm^{-3}$ to 0.9556$g\cdot cm^{-3}$, with a change sectors of 0.900~0.930 $g\cdot cm^{-3}$. *d. composition of fluid inclusions*. The composition of fluid inclusions in sphalerite and calcite is similar, but composition content of fluid inclusions in calcite is higher than sphalerite. Liquid components of fluid inclusions are mainly Ca^{2+}, Mg^{2+}, Na^{+}, Cl^{-}, with minor amounts of F^{-}, K^{+}, Li^{+}. Gas components of fluid inclusions are mainly H_2O and CO_2, CO and CH_4 are less abundant.

Spatial and seasonal variations of iron species in the Changjiang (Yangtze River) sediment

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The Changjiang River contributes huge amounts of dissolved and particulate matter to East Asian marginal seas. The complex provenance geology and source-to-sink pattern of terrigenous material into the sea complicate the fluvial flux and river chemistry. Geochemical cycle of key elements in the Changjiang, e.g. iron (Fe), has rarely been investigated. This study aims to investigate the spatial and seasonal variations of different chemical species of iron in the Changjiang sediment, and to reveal the low-temperature iron cycle in this large river.

The upper Changjiang sediment is higher in unreactive Fe (Fe_U) for its strong physical weathering and specific lithology, while the middle and lower reaches is relatively enriched highly reactive Fe (Fe_{HR}) because of hydrodynamic sorting and stronger chemical weathering. Seasonal variation of iron species in the lower mainstream is in consistent with variability of monsoon induced precipitation, with more significant supply from the upper reaches during flood season. Anthropogenic impact, such as the Three Gorge Dam, plays a key role in controlling sediment input, especially in dry season. Environmental magnetic study also suggests complicated and variable compositions of iron-bearing minerals within the river system. Thus, spatial and seasonal variations at different scales should be taken into account in the further study on elemental cycle and estimation of river flux.

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