acid derived from oxidation of pyrite takes part in the rock weathering, which might counteract one part of CO_2 drawdown by silicate weathering. In this study, chemicals and carbon isotopic composition of waters were determined in the Beipan River, Guizhou. The $\delta^{13}C$ values of dissolved inorganic carbon in the province, Southwest China. The values of the samples range from -13.1‰ to -2.4‰, which show a good negative correlation with the equivalent ratio of $[HCO_3^-]/([Ca^{2+}+Mg^{2+}])$ and a good positive correlation with the equivalent ratio of $[SO_4^{2-}]/([Ca^{2+}+Mg^{2+}])$ and $[SO_4^{2-}]/[HCO_3^-]$. The relationships suggest that sulfuric acid took part in carbonate weathering. Acid rain is thus a significant source of sulfuric acid to the karstic rivers of Guizhou Province. Based on the mean Ca+Mg/Cl of Guiyang rain waters, there is about 2% and 5% of divalent cations in the waters are due to rain water input. This shows that the chemical weathering of carbonate dust by sulfuric acid in the atmosphere is not significantly compared to the weathering rates of bedrocks. The calculation of weathering budget and chemical mass balance shows that sulfuric acid derived from oxidation of pyrite might contribute about 1/5 to 1/3 of $[HCO_3^-]$ to the Beipan River and some main tributaries after correction of atmospheric sulfuric acid inputs. The result indicated that sulfuric acid derived from oxidation of sulfide minerals should be an important agent for weathering and should be considered to elaborate the global and regional carbon cycle model.

Key words carbonate weathering; sulfate; carbon isotope; pyrite; carbon cycle

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Water geochemistry and boron isotope in the Xijiang River, SW China

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During the last decade boron isotopic compositions have been successfully used as a geochemical tracer in oceanic paleo-pH reconstruction and paleo-climatologic studies. All the pH-proxy investigations were based on the assumption that the boron concentrations and $\delta^{11}B$ values of seawater keep unaltered over geological periods. But recent results obtained by some scientists have proved that the B isotopic composition of the ocean water was controlled the riverine discharge. Hence, it is necessary to investigate in detail the behavior of boron isotopes during erosion processes. Before this study, only one river catchment basin had been systematically documented. Using a method adapted for the isotopic analysis of low-boron-content samples, we measured the $\delta^{11}B$ values of river water samples from the Xijiang River Basin. The boron contents of the Xijiang River water vary from 0.7 to 22.7 μg/L, with an average value of 9.1±4.3 μg/L. The $\delta^{11}B$ values of the Xijiang River water vary from -11.2‰ to +17‰ with an average value of 4.4‰±5.0‰. The results revealed that the influence of anthropogenic contamination to the Xijiang River can not be neglected. About 10 percent of the total dissolved boron in river water was derived from the polluted sites located in the upper reaches of the Nanpanjiang River. *In-situ* riverine processes like adsorption on clay minerals and precipitation of $CaCO_3$ have no influence on the boron isotopic composition of Xijiang River water and the variation of $\delta^{11}B$ values of the Xijiang River water mainly reflects the change of the boron source. The variation of $\delta^{11}B$ values of the Xijiang River water is controlled by the boron isotopic composition of rain water and that of carbonates. The results are potential to indicate that the dissolution of carbonate rocks and the atmospheric inputs are the two major sources of dissolved boron in river water. Boron from these two sources accounts for 83% of that of the Xijiang River water. This is very different from the conclusions of Rose et al. (2000) and Lemarchand et al. (2002). This discrepancy can presumably be explained by the difference in bed rock composition between the Xijiang River and the other river basins. Carbonate is the dominant rock of the Xijiang River Basin. Therefore, the river water is characterized by high alkalinity, Ca^{2+} and Mg^{2+}, which is controlled by rock weathering, precipitation and acid deposition.

Key words boron isotope; river erosion; Xijiang River; China

Carbon and nitrogen isotope records in sediments of Lake Taihu, China, and their paleoenvironmental significance

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Lake sediments can provide important historical information on records of paleoenvironments and paleoclimates and their changes.

This study deals with the sedimentary history of the western Taihu Lake based on seven geochemical indices measured in an 89-cm long sediment core. The core, corresponding to a time period from 6870 a B.P. to the present, was analyzed for $\delta^{13}C_{org}$, $\delta^{15}N$, TOC, TN, TP, C/N ratio and radiocarbon dates. Comparison of these multiple geochemical tracers helps to improve interpretations of the paleoenvironmental changes. All of the geochemical proxies used in the study change regularly, and show four major time scales that suggest different environments. During 6870–6532 a B.P., the values of all parameters slightly varied. $\delta^{13}C_{org}$ values increased in a wave pattern from -25.9‰ to -20.7‰. Similarly, $\delta^{15}N$ values increased from 1.6‰ to 4.5‰. TOC, TN and TP concentrations remained around 0.8%, 0.1%–0.2% and 0.5%, respectively. C/N ratios varied from 20.6 to 6.6. At 6370 a B.P., the sediment record profile showed dramatic variations in all parameters. $\delta^{13}C_{org}$ and $\delta^{15}N$ values dropped to -26.9‰ and 1.3‰, respectively. On the contrary, TOC, TN, TP and C/N ratio reached their higher values of 3.9%, 0.4%, 0.6% and 10.8, respectively. After 5539 a B.P., all curves of the core got back close to the part before 6532 a B.P. After 2770 a B.P., $\delta^{13}C_{org}$ values dropped from -22.6‰ to -28.1‰. Whereas, $\delta^{15}N$ values fluctuated between 3.0‰ and 5.1‰. TOC, TN and TP progressively increased up to 2.3%, 0.4% and 1.1%, respectively, in the surface sediments. At this interval, C/N ratios remained around 6.0. Since 6870 a B.P., western Taihu Lake was characterized by a lacustrine environment. It is inferred that before 6532 a B.P., the climate should be cool, brackish water probably was undated in this area and that organic productivity increased slowly. At 6370 a B.P., there was an abrupt change in material source and a probable interruption of sedimentation. The geochemical record profile indicates a warmer moist climate and greater organic productivity than before. The higher biological productivity resulted most likely in heterotrophic carbon sources. After 5539 a B.P., the organic productivity and atmospheric temperature were lower than those in the last period, and Taihu Lake became a natural freshwater lake. In the following periods, the lake had its organic productivity obviously increased and became eutrophic gradually.

Key words carbon isotope; nitrogen isotope; paleoenvironment; Taihu Lake; lake sediment

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The erosion-weathering link: New insights from the sediment geochemistry of Himalayan small catchments?

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The causal links between physical erosion and chemical weathering remain poorly constrained, despite their importance for understanding landscape evolution, nutrient supply for ecosystem development, and the quantitative impact of tectonic uplift on the long-term carbon cycle and Earth's climate. This is partly because weathering processes are particularly complicated at high erosion rates, where there are a variety of controlling parameters. The Himalayas provide an ideal natural laboratory for studying weathering processes across an environmental gradient undergoing rapid erosion. We have previously used solute budgets to determine weathering rates in small catchments in the High Himalayas and Middle Hills of central Nepal. *In-situ* weathering rates are highest in the warmer Middle Hills, while the total riverine budgets suggest that much of the weathering of High Himalayan material must occur after erosion, during transport through the Ganges Plain (West et al., 2002). Here, we will present new data on the geochemistry of the solid phase (soils and sediments) from these small Himalayan catchments, including time constraints from U-series analysis. This will provide information about the residence time of material in the weathering environment, and its relation to weathering rates. This is a critical step towards developing a quantitative model for the impact of erosion on weathering fluxes.

Key words weathering; climate; erosion; carbon cycle; U-series

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Metal contamination of the Seine River: Zn and Cu isotopic composition measurement in fresh water and their uses as metal pollution tracers

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Recent developments in MC-ICP-MS afford suitable analytical technique for Zn and Cu isotope measurements, by coupling Zn and Cu instrumental mass discrimination corrections (Marechal. 1999; Zhu. 2000; Mason. 2004). Despite the potential pollution impact of these elements on aquatic environments, only few studies exist on Zn and Cu isotopic ratios in natural waters and none for rivers.