

Lithium isotopic composition of the leachates acid-soluble in loess-paleosol sediments from Chinese Loess Plateau of Luochuan

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Lithium (Li) has two stable isotopes, ⁶Li (7.59%) and ⁷Li (92.41%). Their relatively large mass difference (~16%) and fluid mobility result in significant Li isotopic variations in nature. The lithium isotope system shows major fractionation during the weathering of continental silicate minerals. Thus, Li isotopes may provide new geochemical indicators for the Quaternary paleoenvironmental changes.

Numerous work have shown that loess-paleosol records are good archives for paleoclimate study and could be well compared with ice core and speleothom records. Hence, we studied Li isotopic composition from the classical Luochuan section on the central part of the Chinese Loess Plateau (CLP). The samples are leached using 0.5M acetic acid solution. The lithium content and isotopic compositions are analyzed using MC-ICP-MS. The Lithium contents varies within the range of 0.39 μg g⁻¹ to 1.97 μg g⁻¹ and δ⁷Li values varied from -6.55‰ to +12.88‰. The δ⁷Li value of paleosol were negative than those of loess. The results suggest that ⁶Li preferentially entered the solid phase during the weathered process. Therefore, we suggest that Lithium contents and isotope can reflect the weathering history on the CLP and can be regarded as an alternative proxy of paleomonsoon changes.