Influence of dust deposits to the budget of U-series nuclides in mount Cameroon basaltic soils

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The timescale of soil formation can be inferred from U-series disequilibria. This requires a complete comprehension of sources and fractionation of U-series nuclides during soil formation processes [1]. Usually, aeolian inputs are not considered to be an important source of U-series nuclides in soils. We therefore propose to evaluate the impact of dust deposition on U-series nuclides in soils, by working on present and paleo-soils from the mount Cameroon volcano. Sr-Nd-Pb isotopic data for these samples have documented significant inputs of Saharan dusts in these soils [2]. Comparison of ^{238}U-^{234}U-^{230}Th isotopic data with Sr-Nd-Pb isotopic ratios indicates a significant impact of the dust inputs onto U-Th budget of the soils, with a mean value of 15% dust contribution for both U and Th. The dust pool estimate for both U-Th concentrations and U-Th isotope ratios is compatible with data obtained on Saharan dusts collected in Barbados [3]. However, according to U/Th elemental ratios, a secondary uranium migration associated with chemical weathering has affected both soils and paleo-soils. The quantification of this small U mobile pool (~10%) highlights that in this context the effect of dust accretion onto U-Th budget in soils can be as important as chemical weathering effect. This conclusion means that atmospheric dust cannot be systematically neglected in chemical weathering studies using U-series nuclides. Nevertheless, in basaltic terrains of mount Cameroon large dust inputs from continental crust of Sahara with high U-Th content contaminate soils with low U-Th contents. In other contexts where dust inputs are lower, or the soils more concentrated in U and Th, the dust contribution might not significantly influence U-series chronometry.

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Organic geochemistry of mudstones in the Upper Permian Linxi Formation, NE China: Implications for hydrocarbon-forming potential in the Late Paleozoic strata

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It has been a hotly discussed issue whether the Late Paleozoic strata in the Xing-Meng orogenic belt (NE China) have hydrocarbon-forming potential or not. However, organic geochemical data of the mudstones from the Upper Permian Linxi Formation in northeastern Inner Mongolia provide insights for that. The Upper Permian Linxi Formation consists mainly of dark mudstone, shale, siltstone, fine sandstone. The thickness of the mudstones in the Formation is about 276 m in Solon. Organic geochemical analytical results for 30 mudstone samples indicate that their residual organic carbon contents range from 0.45~3.55% (average 1.09%). TOC values for about 87% samples are over threshold of the organic matter abundance (0.5%), and TOC values for about 73% samples are more than 0.6%, suggesting that the source rocks are of the midium-good hydrocarbon-forming potential. The organic matter includes sapropelinite and vitrinite, with a typical kerogen type of II_1-II_2. The Ro values range from 1.57% to 2.71%, and the maximum pyrolysis temperature is 475~507°C (average 488°C). Taken together, it is suggested that the source rocks are high maturity. Combined with the high-evolutionary hydrocarbon source rocks from the Tarim and Sichuan basins, we consider that the Upper Permian Linxi Formation could have the gas-forming potential, and that the marine source rocks from the Late Paleozoic strata in NE China could be of a good hydrocarbon -forming prospects.

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