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Sr-isotopic systematics in soils (Sardinia, Italy)

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The Sr-isotope ratios of selected samples from the various horizons of representative soils in the southerneast corner of the island of Sardinia were determined. The autochthonous soils are developed on an acidic metavolcanic formation of the Lower Paleozoic.

The samples were dissolved using the sequential extraction technique, allowing to separate the labile strontium from that contained in the insoluble residue. Sr was then analyzed by mass spectrometry. The Sr-isotope ratios generally increase from the bottom to the top of the soils; increase being particularly significant in the insoluble residue fraction and, subordinately, in the HNO_3 -soluble fraction. However, the labile Sr exhibits a isotopic range (0.710916-0.711454) lower than the insoluble Sr (0.719142 - 0.749583), that is, in turn, lower than the average Sr-isotopic ratio of the parent rock (0.750756).

The results indicate that the bulk of the labile Sr is provided by a distinct source from the parent rock. Such a source is likely represented by the Sr contained in cyclic salts carried by rainwater ($^{87}Sr/^{86}Sr$ = 0.70918). Calculations show that the fraction of the labile strontium released by leaching of soil minerals vary from 6 to 18 % moving from the depth to the top of the soils.