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Comparative study of the behaviour of radiostrontium and atmospheric common strontium in soils (Vosges mountains, France)

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The aim of the study is to trace the vertical distribution of atmospheric strontium by $^{87}Sr/^{86}Sr$ isotope ratios and by comparison with the ^{90}Sr distribution in soil. $^{87}Sr/^{86}Sr$ isotope ratios of soil leachates are correlated with ^{90}Sr activities. Samples from the uppermost part of a soil profile have low $^{87}Sr/^{86}Sr$ ratios and high ^{90}Sr activities. Samples from the deeper parts of the soil profile, however, have high $^{87}Sr/^{86}Sr$ but low ^{90}Sr activities. This points to mixing between an atmospheric and a geogenic component. Mixing calculations indicate that 50 to 80% of the Sr in the topsoil of a small catchment in the Vosges mountains is of atmospheric origin. Similarily $^{87}Sr/^{86}Sr$ and Sr concentrations of roots, sampled in one soil profile show strong mixing relationships between an atmospheric and geogenic component. $^{87}Sr/^{86}Sr$ ratios of soil leachates and corresponding roots are very similar indicating, that the roots integrate at each level of the soil profile the leachable Sr of the corresponding soil.