



Ca biogeochemical cycle at the beech tree - soil solution interface from the Strengbach CZO (NE France): a clue from stable Ca and radiogenic Sr isotopes

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Stable calcium and radiogenic Sr are analysed in several organs from two beech trees that were collected in June and September in the Strengbach CZO (NE France) and in corresponding soil solutions. The combination of these two isotopic systems shows that the isotopic signatures of roots are dominated by Ca fractionation mechanisms and Sr, and thus Ca, source variations. In contrast, translocation mechanisms are only governed by Ca fractionation processes. This study also confirms in the field that the Ca uptake mechanisms from nutritive solutions are controlled by adsorption processes in small roots because of physico-chemical mechanisms. Similarly, a study of surface soil solutions suggests that recent soil waters are less affected by vegetation uptake than in the past, probably because of a decline in the growth of the vegetation that is linked to climate warming, which causes drought episodes. Thus, soil solutions reflect the role of soil components in addition to nutrient uptake by vegetation. This isotopic Ca-Sr study also helps to identify one-time events that are caused by snow cover melting and/or dry episodes that release cations.