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We present calciumstable isotope and strontium radiogenic isotope datafor soils and sediments developed on volcanic and igneousrocks forming small catchments in the Massif Central (France).Measurements of $^{44/40}$Ca isotope ratios ($^{44/40}$Ca measured by the double spike method on TIMS and normalized to the value for seawaterCa in delta units) in rocks, sediments and soils from silicate catchments (e.g. granite and basalts) together with ^{87}Sr/^{86}Sr isotope ratios permit an examination ofthe relationships of these isotope systematics during weathering of silicate rocks. We have analysed the granite, weathered granite (arene) and saprolite, sediment and soil overlying the granite on one hand and the basanite, sediment and soiloverlying the basaniteon the other.

The main bedrock in the volcanic zone (e.g. Allanchecatchment) is 11 to 2.5 Mabasanite (nepheliniticto leucitic basalts) havingSiO_2between41-45 wt. %, Na_2O + K_2O <5%, modal or normative nepheline or leucite and a ground mass ofclinopyroxene and plagioclase.Surrounding rocks are feldspathic basaltshavingSiO_2between 46-49 wt. %, Na_2O + K_2O <5%, normative nepheline, hyperstene and olivine, with plagioclase as the main crystalline phase.The granite massif(e.g. Margeride, 332 ± 12Ma) consists of light and dark facies as a result of the fractional crystallisation of a crustal magma in a sub-horizontal laccolith, with leucogranites dated at 298±2 Ma intruding this granite. The average mineral composition is 37% quartz, 30% oligoclase, 23% K-feldspar and 10% biotite (light facies) and 31% quartz, 30% andesine, 20% K-feldspar and 19% biotite (dark facies).

Sr isotope ratios in the arene, sediment and soil diverge strongly fromthose in the granite bedrockand are positively correlated with Rb/Sr ratios. The ^{87}Sr/^{86}Sr and Rb/Sr ratios both increase fromthe whole rock tothe arene, reflecting the weathering of low ^{87}Sr/^{86}Sr, low-Rb/Sr minerals such as plagioclase and apatite. Sediments collected on ariver bank have^{87}Sr/^{86}Sr ratiosgreater than that of the arenewith values increasing in the sediment from the surface down to soil.The ^{87}Sr/^{86}Sr vs. Rb/Srvariation observedin the volcanic area likewise confirms the weathering of low ^{87}Sr/^{86}Sr, low Rb/Srphases in the bedrock, and there isalinear increase in ^{87}Sr/^{86}Sr and Rb/Sr ratios from thosein the sediment up to the values observed in the soils.

In the volcanic area, the basanite bedrock hasδ^{44}Ca = -0.94 ± 0.05‰(n = 7), while the soils and sediments have $^{44/40}$Ca of-0.75 to -1.13‰ and -0.79 to -1.01‰,respectively. These results suggest that Ca isotopes are not strongly fractionated during weathering of the basalt.The granite whole-rock has $^{44/40}$Ca of -1.29‰, while thesoil and sediments have$^{44/40}$Ca of -1.93to -2.07‰and -1.98 to -2.81‰,respectively, with values decreasing as the Ca content decreases.The $^{44/40}$Ca ratios of arene, soil and sediment are similar to or less than that of K- feldspar, reflecting complete loss of the relatively heavy Ca from plagioclase and apatite during weathering.Comparison of the $^{44/40}$Ca and ^{87}Sr/^{86}Sr ratios further revealed the roleof mineralogical assemblage in sediments and soils, particularly for the lesser$^{44/40}$Ca – greater^{87}Sr/^{86}Sr samples, when compared to the bedrock.