Excess ^{226}Ra dating of young stalagmites: An example from Niue Island, South Pacific.

B. Ghaleb[1] & P. Aharon [2].

[1]GEOTOP, Université du Québec à Montréal, P. O. Box 8888, Succ. Centre-ville, Montréal, QC H3C 3P8, Canada.
[2]Dept. of Geological Sciences, Box 870338, University of Alabama, Tuscaloosa, AL 35487, U.S.A

In order to investigate the frequency and the variability of ENSO events in the **S**outh Pacific, a 160 mm long stalagmite from Niue Island was analyzed for its $\delta^{18}O$ and $\delta^{13}C$ content. Reliable chronology in such a study is a crucial parameter and usually obtained by combining ^{14}C and ^{230}Th-^{234}U-^{238}U analyses with counting annual laminae. However, in the case of stalagmite USM1 the low uranium concentration (44 to 100 ppb) and the limited amount of material available rendered the ^{230}Th-^{234}U-^{238}U disequilibrium method impractical considering the youth of the stalagmite. Furthermore, the presence of even a very small amount of detrital material in the calcium carbonate fractions becomes problematic because the usual method of correction assumes secular equilibrium of crustal material. However this assumption can't be applied because the soils of Niue Island show a highly anomalous radioactivity (Whitehead et al 1992)[1]. For the reasons mentioned above, we attempted to establish the chronology of this stalagmite based on ^{226}Ra activity in the $CaCO_3$ fractions. The results show that the radioactive decay of ^{226}Ra incorporated during the formation of the stalagmite is predominant whereas ^{226}Ra ingrowth from its parents can be neglected for this young and uranium poor stalagmite. Our results also show that normalising the ^{226}Ra value by the initial $^{226}Ra_{(0)}$ yield a well defined radioactive decay curve (Eikenberg et al 2001)[2] allowing the establishment of time constraints of the stalagmite formation. A comparison of $^{226}Ra/^{226}Ra_{(0)}$, $^{226}Ra/U$ and $^{226}Ra/Ba$ will be discussed.

[1] Whitehead et al,(1992), *Chem. Geol, Iso.Geo Sec* 94,247-260.
[2] Eikenberg et al, (2001), *QSR,* 20, 1935-1953.