Dating two young laminated stalagmites by the $^{210}Pb_{excess}$ method.

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Stalagmites are considered as a reliable continental archive for paleo-climatic and paleo-environmental reconstructions based on analyses of their stable isotopes ^{18}O and ^{13}C and trace element contents. Dating very young stalagmites offers the possibility to validate such reconstructions through the comparison with historical and instrumental data. The worldwide distribution and the ability of dating stalagmites by U-series dating makes them a preferred choice, compared to other proxies for such reconstructions. However, establishing chronologies for very young stalagmites (century timescale) may still have some associated difficulties. For example ^{14}C cannot be used in a straightforward manner due to uncertainties on multiple sources of CO_2. The application of U-series dating of very young speleothems is not obvious when they are poor in uranium and have some detrital fractions, which require age corrections that result in high uncertainties. We present here the potential of the ^{210}Pb excess method as a dating tool for very young stalagmites. For instance, two laminated stalagmites from the Han-sur-Lesse karstic complex (Belgium) were analysed for their ^{210}Pb activities. The results in both stalagmites show a very clear and well-defined decreasing exponential curve from the top to the bottom, allowing therefore the calculation of ^{210}Pb ages for different depths and thus growth rates of the stalagmites. By comparing these ages with those obtained by laminae counting, we can validate ^{210}Pb ages. Our results indicate a good agreement between the ages and highlight the potential of using the ^{210}Pb method for dating very young, and not laminated stalagmites.