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^{14}C in speleothem drip water from Grotta di Ernesto, Italy

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The difference in ^{14}C activity of carbonate in speleothems or speleothem drip water compared to the atmospheric ^{14}C level is mainly controlled by processes in the unsaturated soil zone, i.e. production of CO_2 from soil organic matter and carbonate dissolution. The process of calcite dissolution depends on pCO_2 of the soil air and the mode of the dissolution, i.e. open, closed or intermediate system. We developed a model which calculates the concentrations of carbon species during limestone dissolution and the ^{14}C and ^{13}C isotopic composition of the solution, including not only the open and closed calcite dissolution system but also intermediate modes. In addition we monitored at the Grotta di Ernesto cave (NE Italy) important soil and cave parameters, e.g. stable isotopes of air and water, partial pressure of CO_2 (pCO_2) of soil and cave air, temperature of air, soil and water, precipitation, drip interval and pH of the drip water. Further we made ^{14}C measurements by **A**ccelerator **M**ass **S**pectrometry (**AMS**) on monthly collected drip water samples from November 2005 to October 2007. With the measured carbon isotopes of the water and the measurements of soil pCO_2 as well as the pH value of the drip water we were able to test the drip water model.