Geophysical Research Abstracts, Vol. 7, 08767, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08767

Results of 1 Year of Cave Monitoring in Cueva de las Lechuzas, Peruvian Amazonia

M.R. van Breukelen, H.B. Vonhof and D. Kroon

Faculty of Earth and Life Sciences, Vrije Universiteit, Amsterdam, The Netherlands.
(martin.van.breukelen@falw.vu.nl)

From September 2003 to November 2004 a monitoring project was carried out in the Peruvian cave 'Cueva de las Lechuzas'. This cave located at the Eastern flank of the Andes at 700 meter altitude (S09˚19'44.4", W76˚01'37.5") close to the town Tingo Maria, was selected for its potential for Amazonian paleoclimate reconstruction. This area in the foothills of the Andes is one of the wettest of the Amazon basin with up to 3800mm rain annually. The migration of the InterTropical Convergence Zone (ITCZ) results in a strong seasonal contrast, with maximum rainfall in March and minimum rainfall in August. Average isotope composition of rain water differs significantly between wet and dry season

This monitoring experiment was designed to find out to what extent the seasonal precipitation variability was noticeable inside the cave. We automatically monitored the temperature, humidity and driprate over one year, and watersamples were taken throughout the year.

On our main monitoring location we recorded a very stable drip rate, providing evidence for a large groundwater reservoir, which buffers seasonal variations in precipitation. At this site, seasonal stable isotope variation of drip water lies in a narrow range. However, caution is needed because at some sites in the cave with relatively high drip rates, clear seasonal variation in water supply was observed, suggesting these drips were fed by a much smaller reservoir. These same sites often deviated in isotope composition of the drip water.

The total set of rain and dripwater analysed for this project fits very well on the Global Meteoric Water Line. Calculated cave temperatures based on oxygen isotope values of drip water and sub-recent speleothem $CaCO_3$ come very close to actual temperatures, suggesting that speleothems grew in isotopic equilibrium.

In conclusion: the combined monitoring data support the great potential for paleoclimate reconstruction of the Western Amazon Basin, based on stalagmite stable isotope records from Cueva de las Lechuzas.