Geophysical Research Abstracts,
Vol. 11, EGU2009-5913, 2009
EGU General Assembly 2009

Aerodynamics control of a cave with a high environmental stability by trace gases monitoring (Castañar de Íbor, Spain)

S. Sanchez-Moral (1), A. Fernandez-Cortes (2), S. Cuezva (1), JC. Canaveras (2), and R. Abella (3)

(2) Alicante, Lab Applied Petrology, Earth and Environmental Sciences, Spain (acortes@ua.es/+34 96 590 3727), (1) Dep. Geología, Museo Nacional de Ciencias Naturales (CSIC), c/José Gutierrez Abascal, 2, Madrid, 28006, Spain. ssmilk@mncn.csic.es, (3) Observatorio Geofísico Central (IGN), c/Alfonso XII, Madrid, 328014, Spain.

High-accuracy monitoring of a “low energy” cave (Castañar de Íbor, Spain) determined the temporal evolution of the aerodynamics processes and ventilation rate by tracking CO2 and 222Rn levels over a twelve-month period. Beside the general patterns of cave microclimate throughout an annual cycle, some particular microclimatic processes are described with regard to the gases exchange between cave and outer atmosphere. Special attention is paid to the key role of the isolation effect of host rock and soil on the confined cave atmosphere, determined by the water saturation state of this double-membrane. In this sense we focus on the complicate microclimatic functional relationship between the meteorological and cave microclimate conditions and the diffusion and flow of trace gases from the fractures and the pore system of soil and host rock to cave atmosphere. Finally, inferences are drawn about the physical mechanisms controlling the short-term fluctuations of trace gases levels on cave air, such as barometric fluxes and forced ventilation due to uncontrolled opening of cave entrance. The application of the knowledge regarding mass and energy fluxes involved in the subterranean environments is also discussed.