



Isotopic (^{18}O) signature of $\text{CO}_2\text{-H}_2\text{O}$ vapor exchange in the vadose air of Nerja cave (Malaga, Spain)

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In caves, carbon dioxide contents and its $\delta^{13}\text{C}$ signature have been widely studied to provide information about the ventilation regime and the source of carbon dioxide. However, less has been researched about $\delta^{18}\text{O}$ signature in vadose air. We analysed cave-air samples for the CO_2 concentration and oxygen isotopic composition from a monthly sampling campaigns for two years within different halls in Nerja cave. In general terms, ventilation controls the variation of CO_2 content seasonally, showing two distinct modes with the highest values in summer. The $\delta^{18}\text{O}$ values range from -8.74 to $+0.47$ ‰ being maximum in January and minimum in September, coinciding with the lowest and highest humidity values within the cave respectively. We found that a gas exchange between $\delta^{18}\text{O}\text{-CO}_2$ and $\delta^{18}\text{O}\text{-H}_2\text{O}$ vapor is carried out and pattern is repeated every season, showing the importance that water has in karst environment.