



David Domínguez Villar博士学术报告

David Domínguez Villar博士，独立研究人员，英国伯明翰大学荣誉研究员，2007年在西班牙马德里康普斯顿大学获得博士学位，分别在英国(2008-2010)、西班牙(2011-2012 and 2012-2015)、克罗地亚(2015-2016)有四次博士后科研经历。已在Geology、EPSL、QSR、GCA、Climate Dynamics等杂志发表研究论文40余篇。主要研究兴趣是利用洞穴堆积物重建古气候和洞穴过程检测。在准确的年代学 and 不同指标对比分析下建立高分辨率记录。在放射性定年技术的支持下，绝大部分洞穴堆积物的研究工作聚焦在年纹层和次年纹层分辨率的石笋上。结合洞穴系统监测和模拟，改进对代用指标的解释（特别是氧同位素记录），理解洞穴动力过程。

报告题目： Speleothem oxygen isotope records, What they really record?

报告内容： Oxygen isotope composition from speleothems is thought to be related to the oxygen isotope composition of the drip water at the time of their growth. Often, it is assumed that drip water oxygen isotope composition reflects the isotope composition of precipitation over the cave. So, speleothem oxygen isotope signals are interpreted as records of the variability of the oxygen isotope composition of precipitation over time. However, speleothem records often do not replicate each other, even if their chronologies are excellent and cave conditions indicate lack of kinetic fractionation of drip water in the cave system. I present a case study from Postojna Cave (Slovenia), where oxygen isotopes were measured in atmospheric precipitation, cave drip water and in a recent speleothem. An isotope model was developed to transfer the isotope composition of precipitation to the cave. The model was adjusted with the cave drip water data, and results provide residence time of the water in the aquifer, information on the period of infiltration to that aquifer and minimum estimates of transpiration of moisture over the cave. Despite the speleothem is laminated, the laminae are not annual in nature. Age control is based on ^{14}C dates that support that the sample was active during the last 50 years and U-Th dates that provide growth rate near the top of the sample. The excellent correlation between modelled drip water over the last decades and our speleothem oxygen isotope record provides an annually based chronology for the top of the speleothem. The study confirms that the speleothem records the long-term variability of oxygen isotopes in precipitation at this site, and that the signal is not biased towards any particular season, instead integrates the full annual signal of precipitation. This data is essential to perform detailed interpretations (e.g., decadal) of the oxygen stable isotope record from this speleothem in the future. Similar modelling studies performed in different locations may help to understand why records from the same region or even the same cave have detailed variability (decadal to centennial) that is often not replicated.

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