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INTERVIEW WITH PROFESSOR IRA SASOWSKY

KARSTOLOGY IS AN INTEGRAL PART OF GEOSCIENCES

cunducted by Janez MULEC

Prof Ira Sasowsky is Professor of Geosciences at the University of Akron, USA, who has made many outstanding scientific contributions to the karstological community in karst hydrogeology, geomorphology, geochemistry and dating. He completed his undergraduate studies in geology at the University of Delaware and defended his doctoral thesis at Pennsylvania State University. He is known by his colleagues and students for his broad knowledge and experience gained during his extensive field work early in his career in oil fields and later in various parts of the world (Brazil, Croatia, Italy, Slovenia, Spain, USA). His research focuses on groundwater flow in carbonate aquifers, sediment transport and palaeomagnetic dating of cave deposits. He has authored numerous scientific papers and book chapters, edited several scholarly volumes and mentored many undergraduate and graduate students. He has received many honours, to name just few of them: Outstanding Teacher Award (Eastern Section American Association of Petroleum Geologists), Science Award (National Speleological Society), Distinguished Service Award (Geological Society of America, Hydrogeology Division), Presidential Citation (Association of Environmental and Engineering Geologists), and Service Recognition Award (Karst Waters Institute). Prof Sasowsky is active in many geoscience professional organisations in the USA and abroad.

Professor Ira Sasowsky

- *Prof Sasowsky, can you tell our readers when and how you became interested in karst and caves? Was there a particular event, mentor or scientific discovery that particularly influenced your decision to do research in this field?*

My interest in caves began when I was a child. I grew up in New York City, but my family spent every summer in upstate New York in a town called Woodstock. On the drive from New York City to Woodstock we passed many billboards advertising a commercial cave, called Ice Caves Mountain, near the town of Ellenville. My brother and I repeatedly pestered my parents to take us there. The caves are formed in a sandstone unit at the southern end of the Shawangunk Mountains. They are what are commonly called tectonic caves, formed by movement of sandstone blocks, and they are cold traps so they retain ice through most of the year. I was fascinated by the wooden walkways that had been constructed throughout the various caves, and colored lights installed to illuminate the ice. Years later I became involved with the University of Delaware outing club and met a group of cavers one of whom was a geologist named Ed LaRock. I went on several cave trips to Pennsylvania and West Virginia, and enjoyed learning about the geology of the caves, along with the adventures we had. As with many cavers, my fascination with the underground environment is fed by a sense of discovery. After I completed my undergraduate geology degree, I wanted to continue to learn about caves. I spoke with professors at three different programs and ended up going to Penn State University for my MS and PhD degrees, where I worked with Professor Will White. He was, and still is, an excellent mentor to me, providing great insight, not only to solving scientific problems, but also emphasizing collaboration and the joy of discovery. I feel very lucky to have been able to pursue my passion to understand karst systems throughout my career.

In Cave CE-27, Pennsylvania, USA, October 2025. Photo by Lars Vogel.

- *Based on your professional experience, particularly through international collaborations and field research, what would you describe as your most significant scientific discovery or contribution to the field?*

There is a saying, among geologists that "the best geologist is the one who has seen the most rocks." I think there may be an analogous saying for karst scientists in that an advantage can be gained by seeing karst and caves in many different settings. I have had the benefit of working with many scientists from a variety of areas and gaining from their experience in these different settings. My main contribution I think is in the application of paleomagnetism to karst studies. This allows us to determine minimum ages for caves, in time frames going back millions of years. I did not invent this approach; it was pioneered by Victor Schmidt at University of Pittsburgh (another of my mentors). But I took and modified his methods, applying them with collaborators at many locations. My first international collaborations were at the Karst Research Institute in Postojna, with Stanka Šebela. Later I worked with Franci Gabrovšek and others. I have visited the Institute many times (including for a sabbatical) and I appreciate and admire the work being done, as well as the amazing hospitality of the people. I have also had great collaborations on projects with colleagues in Brazil, Croatia, Italy, and Spain.

- *Caves and karst landscapes provide important ecosystem services, but are also very vulnerable. What are the primary karst resources and to what extent should their utilisation and exploitation be limited to ensure sustainability?*

This is a very timely question, and also a very challenging one. I would say the primary resources are biological (including endemic species) and water extraction. I am currently working with a student, Lima Soto, who is pursuing a PhD through the karstology program at Nova Gorica University on the topic of multiple use management in karst terrains. Multiple use refers to the concept that the landscape serves many purposes for humans, for example forestry and recreation. It is hard to balance these multiple uses, because they may be at odds with each other. Utilization and exploitation should certainly be limited, as is the case with any natural resource. But, what form should that limitation take, realizing that society needs resources? Perhaps a goal is to reasonably minimize negative impacts to the environment. The challenge comes because different entities will have different definitions of what is reasonable. I would say that overall, the best approach in any of these situations is to first develop a thorough understanding of the resource through scientific studies. Only then can good and rational decisions be made about how to balance the competing needs of society. Ms. Soto's work involves cataloguing the various uses that people make of karst landscapes, identifying the stressors, and developing a model management plan which can be used by various agencies to develop their own specific guidance for the lands which they oversee.

- *Cave sediments preserve long-term records of past climates, landscapes and ecosystems. They also provide a context for human evolution, archaeological remains and the development of karst aquifers. What are the main limitations in dating cave sediments and their interpretation and how can we overcome them?*

Cave sediments are critical archives for all of the records you mention. These deposits fall into two classes: chemical (speleothems) and clastic (detrital) material. For the former, the greatest limitations are: a) Finding suitable deposits – typically stalagmites – that have low detrital thorium concentrations, and b) that are within the age range of the techniques (usually <500 ka with U-Th disequilibrium). In my experience with clastic deposits the greatest challenges lie with deciphering stratigraphic relations between the various deposits we find, so they can be placed in proper order. These deposits are typically fluvial materials (occasionally lacustrine) which have high variability. Additionally, caves may have many levels, so it can be unclear what the relations are between sediments in different levels. Finally, the deposits are fre-

quently dissected/eroded, and so we are only seeing part of the story. Nonetheless, with detailed observation we can in many instances construct a useful chronology. In that sense, the main way to overcome the limitations is by patience, and careful mapping and observation.

- *Prof Sasowsky, how do you think artificial intelligence (AI) will influence the geosciences in the near future? What are its main advantages and where do you see its limitations?*

The topic of AI covers a lot of ground. Presently, and I suspect for the near future, AI-aided searches are very useful as a research tool for exploring background work on specific subjects, but caution and human judgement must always be at the fore. I have several examples from classes that I teach where students injudiciously used AI for searches and the research that they turned in was nonsense. Generative AI, where a tool such as ChatGPT is used to compose text, or a full report, may have a role in the practice of geoscience. However, it is currently very problematic due to hallucinations and other problems. At best, extremely careful review of any generated material is required as a quality control step. And, unfortunately, the inappropriate use of such tools by students in completing assignments is leading to a loss of learning and intellectual capacity. Simply put, geoscientists still need to be able to read primary literature, synthesize it, and generate their own ideas.

Janez Mulec