

The 5th Summer School on Speleothem Science

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The 5th Summer School on Speleothem Science (S4), São Paulo, Brazil, 6-13 August 2023

About S4

Speleothem science is integral to reconstructing past climates and environmental and archaeological change. S4 is a student-organized training school taught by leading experts, that provides an informal space to share knowledge on traditional and state-of-the-art research and methods applied in the field. Participants share and discuss their own research with peers and get valuable feedback from experts. The event is particularly suited for MSc and PhD candidates whose research interests are closely related to speleothem science. After four successful summer schools held in European cities (Heidelberg 2013, Oxford 2015, Burgos 2017, and Cluj-Napoca 2019) the current organizing committee made it a priority to significantly increase S4's diversity and accessibility with a major geographical relocation of S4 2023 to Brazil.

The current school

The 5th S4 was hosted at the Institute of Geosciences, University of São Paulo (USP). This year's summer school program was full-size again, after a long COVID break of four years, during which we organized two small S4 events – S4 Online, and MiniS4 2022, Innsbruck, Austria. The organizing committee that was formed in 2019 after the summer school in Cluj-Napoca was strengthened by new members recruited during MiniS4.

A total of 59 students, including bachelor, masters, PhD and postdoctoral researchers, from 25 countries participated: 28% of the students came from South America, 24% from North America, 23% from Europe, 18% from Asia and 7% from Africa (Fig. 1). We are happy to share that the proportion of male and female participants was exactly 50%. The accessibility was greatly enhanced by support from several funding sources, including PAGES, that helped to lower the registration costs by 50%. Additionally, 19 partial or full travel grants and 17 registration fee waivers were awarded.

The scientific program consisted of two main parts. The first three days were dedicated to lectures and workshops at the Institute of Geosciences at USP. We started with an overview of speleothem-paleoclimate research in South America, followed by lectures on speleothem growth, radiogenic dating methods, and the use of proxies as stable isotopes and trace elements. The paleothermometry lecture discussed the use of fluid inclusions and clumped isotopes, as well as useful tips for their application. Substantial time was dedicated to speleothem petrography, with a lecture and workshop where participants

learned novel and time-efficient approaches for using petrography as a paleoclimate proxy. Among the less traditional methods, attendees enjoyed the speleothem paleomagnetism lecture, followed by a tour of the paleomag laboratory. Further, participants learned about speleothems and climate models, attended an interesting workshop on time-series analysis, and reviewed the multi-proxy approach in paleoclimatology. The summer school concluded with a lecture on the SISAL database, its history and use, and an invitation to join this great effort of the speleothem community! We sincerely thank all the experts who participated and gave fascinating lectures for the new generation of speleothem scientists.

Fieldtrip

Following the three-day lecture portion, we traveled to the Alto Ribeira Touristic State Park for a field trip to the beautiful and large caves of the Mata Atlântica rainforest. The participants visited six Precambrian limestones caves, and discussed their genesis, the formation of speleothems, and deposition of cave sediments and emphasized ethical and environmentally friendly sampling methods. In the evenings, we organized lectures on cave monitoring with practical examples, a lecture on diversity, equity and inclusion in speleothem science, a lecture on the geomorphology and genesis of caves, and a discussion on ethics in field research, focusing on the topic of scientific neocolonialism.

To provide participants with resources for later reference, we recorded all lectures; the recordings are available on our YouTube channel (youtube.com/@speleothemscience-summersch5335). Traditionally, after each S4 summer school, a new organizing committee is formed by the participants. News and information about the upcoming 6th Summer School on Speleothem Science can be found on the event webpage: speleothemschool.com.

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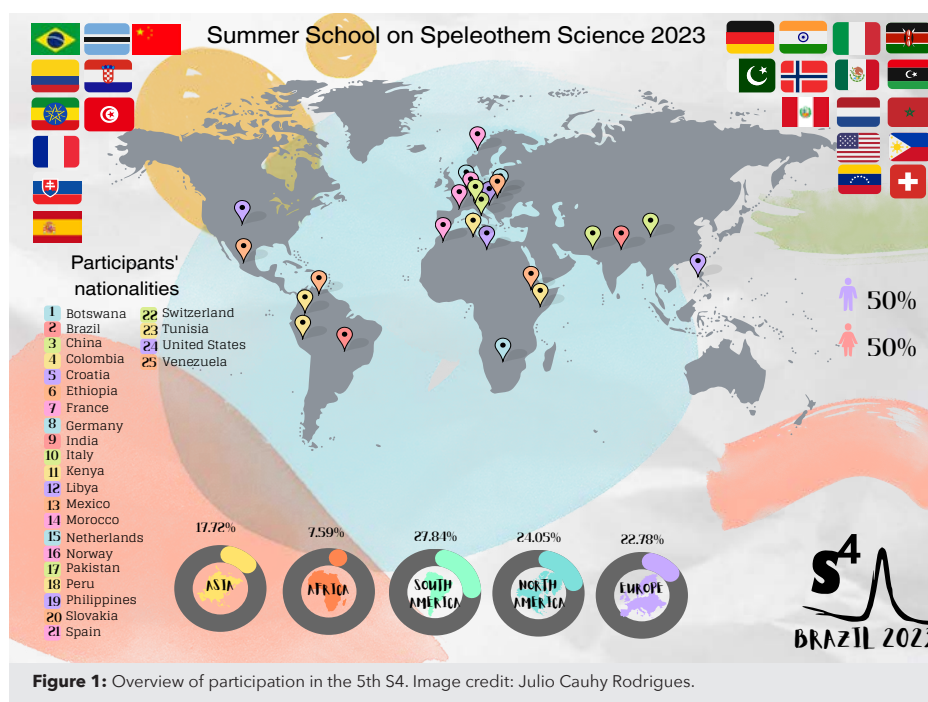


Figure 1: Overview of participation in the 5th S4. Image credit: Julio Cauhy Rodrigues.