

Ice Core Science at the three Poles

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International Partnerships in Ice Cores Science (IPICS) 3rd Open Science Conference & Ice Core Young Scientist (ICYS) meeting, Crans-Montana, Switzerland, 2-7 October 2022



The summer of 2022 will enter the climate change history books (again) as one of the hottest on historical record. In particular, southern Europe suffered from extreme drought and wildfires, and central European glaciers experienced the largest annual ice loss since glacier monitoring started. Even the highest areas in the European Alps, such as the Colle Gnifetti, a firn saddle in the Monte Rosa massif on the border between Italy and Switzerland at an altitude of 4500 masl, experienced snow surface temperatures at the melting point. While this news is, per se, already bad enough, it is even more devastating because the Colle Gnifetti site is also known as one of the most famous high-alpine ice-core drilling sites. At this site, Hans Oeschger – a famous climate scientist based in Bern, Switzerland, best known for reconstructing carbon dioxide concentrations using Antarctic ice cores – also initiated a high-alpine ice-core drilling project in the 1970s. The increasing temperatures and summer melt in high-altitude regions, such as the Colle Gnifetti, not only illustrate the anthropogenic warming, but also put an expiry date on the climate archive of high-alpine glaciers.

With this background, the international ice-core science community assembled for its third Open Science Conference (OSC) (pastglobalchanges.org/calendar/26967) in Crans-Montana, a ski resort above the Rhone Valley in Switzerland, only about 50 km from the Colle Gnifetti. The OSC brought together ice-core scientists from 20 countries working on the Greenland and Antarctic ice sheets as well as high-altitude glaciers; hence the theme of the conference was chosen to be "Ice Core Science at the three Poles." Also, a few intrepid specialists from other paleoclimate science areas attended the conference. The conference had been initially planned for 2020 but was postponed twice due to the COVID-19 pandemic. It could finally take place in fall 2022, allowing scientists from all regions of the globe to attend.

Of course, the authors of this report, who were also the conference chairs, are biased, but it was worth the wait! With 270 participants on site, and about 20 joining online, it was the largest IPICS OSC ever, and spirits were extremely high, showing that ice-core science is thriving and more important than ever. Latest proxy developments in ice-core science and from other areas of paleoclimate research, new ice-core drilling techniques, new high-resolution ice-core records, and reports from, and plans for new

ice-core projects (ranging from rescuing high-altitude glacier archives to securing the oldest ice on Earth) were presented in lectures from invited speakers, science talks and several poster sessions, with a high number of contributions. Moreover, the OSC was preceded by the traditional young scientist meeting organized by the ice-core early-career network ICYS, and attended by more than 130 early-career scientists. This meeting offered insights into additional aspects of research today, and instructed the attendees in various facets of science communication and research career development.

Certainly, the perfect organization by conference manager Doris Bühler from the Paul Scherrer Institute, the warm welcome and support by the conference center, Le Régent, and the typical Swiss hospitality, with both light and cheesy food, kept spirits and energy levels high for the entire week. Hands-on experience in glacier loss was provided by an excursion to the Great Aletsch Glacier on Wednesday afternoon, while a highlight was certainly the transdisciplinary theater production (initiated by Margit Schwikowski and author and theatre director Sabine Harbeke) called "Fleeting ice - news of tomorrow" (fluechtigeseis.ch) which took place on Tuesday evening. This theater performance illustrated the waning of ice due to climate change in sounds, enactment, and music, and was acknowledged by the IPICS scientists with standing ovations. A post-conference excursion to the Research Station Gornergrat at the foot of the Colle Gnifetti completed the program.

Of course, all this would not have been possible without a large number of sponsors (indico.psi.ch/event/6697/); PAGES was one of them, providing generous support for young researchers from low- to middle-income countries. Given the success of the conference and the outstanding contributions by many early-career scientists, ice-core science itself does not seem to be at risk (see also Fig. 1). We look forward to the next IPICS OSC to be held in 2026!

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REFERENCES

Osman M et al. (2022) A half century of partnerships in ice core sciences: evidence of progress and areas for improvement. 3rd IPICS Open Science Conference, Crans-Montana, Switzerland

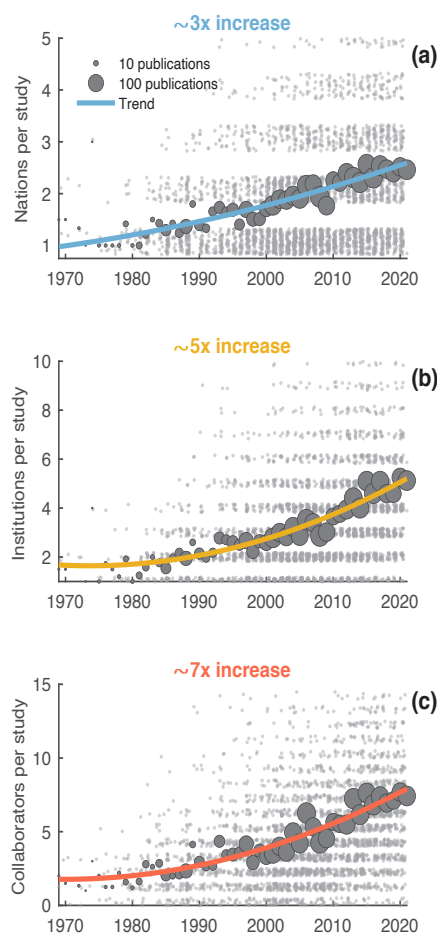


Figure 1: Results of a publication analysis (3423 papers included) on the evolution of ice-core science over the last five decades and the potential impact of the foundation of IPICS (after an NSF-funded workshop in Virginia in 2004) on international collaborations within the field of ice-core sciences (from Osman et al. 2022). Small gray dots refer to individual publications, larger dots to the annual average, where the size of the dots is scaled by the number of publications per year.