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INTERNATIONAL ASSOCIATION
OF VOLCANOLOGY AND CHEMISTRY
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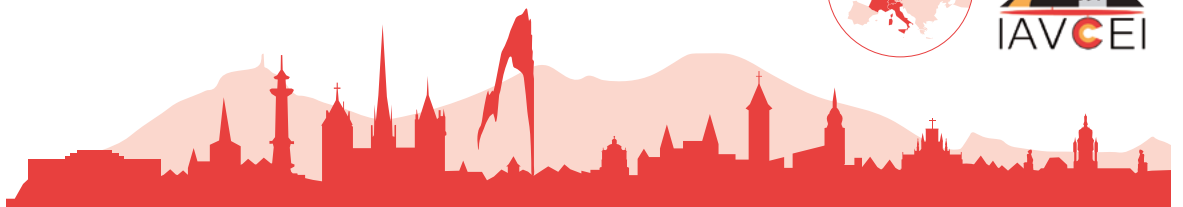


This Newsletter is intended to keep IAVCEI Members and individual scientists informed about the activities of the Association and its bodies, and the actions of the IAVCEI Executive Committee. Past issues are posted on the IAVCEI website. Your comments are welcome. The IAVCEI Newsletter may be forwarded to non-members who may benefit from the information.

Hans-Ulrich Schmincke: A scientific legacy



IAVCEI 2025
Scientific Assembly
June 29 - July 4, Geneva, Switzerland
sa2025.iavceivolcano.org



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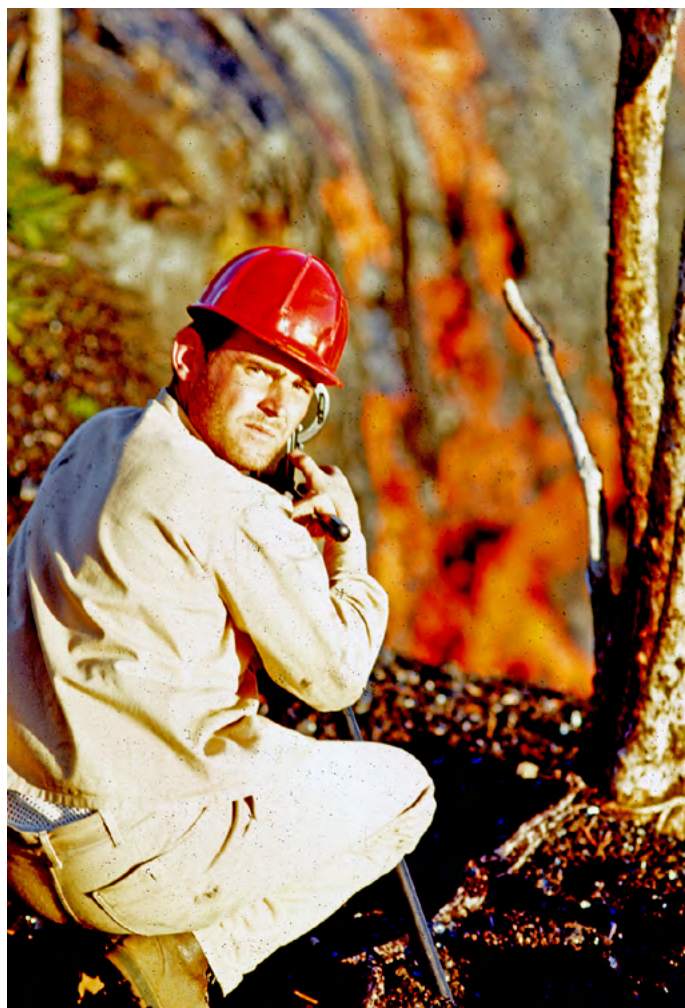
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REMEMBERING HANS-ULRICH SCHMINCKE

Hans-Ulrich Schmincke: A scientific legacy passed away on August 24, 2024

Hans-Ulrich Schmincke was born October 21, 1937, in Germany and grew up with the terrors of war and the destruction it left. But he successfully concluded high school. He was interested in art history, literature, and psychology, but he finally chose to study geology “for balance”. His wide interests, however, always showed themselves in his esthetic field photos and his many references to history and humanities. In 1960 he received a Fulbright stipend and went to the Johns Hopkins University in Baltimore, where he obtained his master (1962) and PhD (1964) degrees. The Chair of the department was Ernst Cloos, a fellow German who guided Hans-Ulrich through the cultural transition to American life. Together with other respected scientists such as JG Moore, RS Fiske, Don Swanson, and others, he was fortunate to study with Aaron C. Waters, a demanding professor who required his students to emphasize field studies. Hans-Ulrich chose to investigate volcanoclastic sediments interbedded with the Columbia River flood basalt, which required two trans-continental trips by car with Swanson that opened Hans-Ulrich’s eyes to the wide-open spaces of the American West. In his far-ranging dissertation, he developed the concept of invasive flows, in which the basalt flows sank into loose sediment (Schmincke, 1967). He completed his dissertation at the University of California at Santa Barbara, where Waters had moved in 1963 to establish a PhD program in the revitalized geology department; Hans-Ulrich and Don Swanson were the first graduate students in the program, though their degrees came from Hopkins. At Santa Barbara, he met faculty member Richard (Dick) Fisher who, as a member of the military, had witnessed the base surges emitted by the underwater nuclear bomb tests at Bikini atoll in the 1950’s. Fisher and Waters began a study of maar deposits, which they interpreted as emplaced by base surges triggered by magma-water interaction in their seminal 1970 paper. Hans-Ulrich accompanied this study and a short time later the three of them published their revolutionary findings on the Upper Laacher See Tephra in the Eifel, Germany (Schmincke, Fisher, Waters 1973).



Hans looking pensive in graduate school at Johns Hopkins 1961–62; Hans in the Goat Rocks Wilderness, Washington, in 1963; and Hans at Alo’i crater during the Mauna Ulu eruption on Kilauea in December 1969 (Photo Credits: Don Swanson)

Beginning in 1965, Hans-Ulrich Schmincke worked on Gran Canaria and other Canary Islands, initially focusing on the Miocene peralkaline ignimbrite succession and formation of the Tejeda caldera (Schmincke 1967b, 1969; Schmincke and Swanson 1967). Just like his work in the Eifel, he considered his work on Gran Canaria a life-long task. He was not interested in picking out one or two geological highlights; instead he wanted to investigate and understand it all! His long-term studies in these regions yielded milestone achievements in understanding intraplate volcanism, ocean island evolution, ignimbrites, and phreatomagmatic eruptions as well as magma evolution from source to eruption and into the atmosphere. He

wrote his habilitation thesis (a grade required for a professorship in Germany) on Gran Canaria in 1969 and became professor at the Ruhr-University Bochum. This provided him with the opportunity to involve graduate and PhD students in his work. Many of the more than 40 students he supervised during his career, such as Hubert Staudigel, Gerhard Wörner, Armin Freundt, and Thomas Walter, to name just a few, became respected scientists on their own. They would certainly all agree that they became strongly influenced by Hans-Ulrich's way of doing science and teaching, always starting with detailed observations in the field as well as under the microscope as the basis of interpretations, and to combine many approaches (field work and stratigraphy, petrology, geochemistry) in order to obtain a holistic idea about the processes that work in the entire volcano-magma system.



The two photos of Hans from field work during the 1978 Iceland Drilling project. Photo documentation was one of Hans' exceptional skills. On the second photo, Hans takes pictures from boxes of drill cores, using a self-made wooden device to keep the camera in its exact position (Photo Credits: Gerhard Wörner)

This included involving new methods and analytical tools. In fact, he foresightedly and cautiously directed his PhD students and frequent postdocs into specific research directions and using novel analytical methods that he had identified to promise significant advance. A further particular quality of his teaching and mentoring was to never let his students get stuck in established or untested ideas. He would often ask back: "are you sure, how do you know, can you think of alternative interpretations"? Frequent get-togethers, preferentially when famous colleagues of his made their stops in Bochum or Kiel, often enriched by home-grown food from his garden, barbecues and wines furthered networking of his students. His immense and rich knowledge in the field and experience from visiting numerous volcanoes and volcanic deposits around the globe was inspiring. But sometimes also challenging to his students: When we thought of having made some interesting and new observations. .. he would have seen it all before. On the other hand, this also was a great stimulus to make our own experiences, and so we did. In this way work and teaching on Gran Canaria and the Eifel made progress, with a culmination in the presentations given during the 1990 IAVCEI International Volcanological Congress. The modern approaches Hans-Ulrich demonstrated during this congress and on the excursions to the Eifel and Gran Canaria, influenced many scientists worldwide, and particularly in Europe.



Hans explaining the esthetic and geologic majesty of Gran Canaria during the IAVCEI 1990 excursion (Photo Credit: Armin Freundt)

Hans-Ulrich also engaged himself in the Deep-Sea Drilling Projects of Legs 46 (1976) and 65 (1979) with the Glomar Challenger, and realizing that ocean crust could relatively easily be drilled on land, he became co-chief scientist of international drilling projects into plateau basalts on Iceland (1977–79)

and into the Troodos ophiolite on Cyprus (1980–83), which also led to his study of Carboniferous marine volcanism in the German Variscan mountains. He still found the time to write “Pyroclastic rocks” (1984) together with Richard Fisher, the first comprehensive book on that subject that was not simply a review but introduced many new aspects and concepts.

When he moved from Bochum to the recently founded GEOMAR in Kiel in 1990, he created the new department of volcanology and petrology and co-initiated a graduate school on the “Dynamics of global cycles within the system Earth” (1992–2002). As an important complement of his decade-long work on land, Hans-Ulrich initiated ODP Leg 157 (VICAP project) where the JOIDES Resolution drilled into the volcanoclastic apron around Gran Canaria (September 1994). The wealth of data and observations and the resulting numerous publications provided new and improved insights into a wide variety of topics such as emergent ocean island volcanism, submarine emplacement of tephra including pyroclastic flows that entered the sea, submarine clastic transport systems or composition of the ocean crust (e.g., Schmincke and Sumita 1998a, b, Schmincke et al.

1998). Additional marine cruises provided further insights into the formation of submarine canyons and landslides (e.g., Krastel et al. 2001, Krastel and Schmincke 2002). Hans-Ulrich and Mari Sumita documented the advances of their studies in the Canary Islands in a book in 2010 (Schmincke and Sumita 2010). In the 1990’s, he initiated a project to investigate the influence of volcanism on climate together with climatologist Hans Graf, then at the Max Planck Institute for Meteorology Hamburg (e.g., Halmer, Schmincke, Graf 2002). Of course, he also continued work in the Eifel with a new focus on the aftermath of the Laacher See eruption (Schmincke et al. 1999, Park and Schmincke 2020). Hans-Ulrich co-initiated the collaborative research center SFB 574 on “Volatiles and fluids in subduction zones” (2002–2011) which fostered multi-disciplinary studies on the Central American and Chilean subduction systems. Apart from the volcanological studies in Central America (e.g., Rausch and Schmincke 2010, Kutterolf et al. 2008) he used his skills of keen observation to analyze the ancient footprints at the Acahualinca archeological site in Nicaragua, another demonstration of his universal approach to scientific investigation (Schmincke et al. 2009, 2010).



Hans on the Meteor M43-1 cruise around the Canary Islands in 1998, where also JOIDES Resolution (leg 157) drilled into the volcanoclastic apron around Gran Canaria in 1994 (Photo Credits: Mari Sumita)

After his retirement in 2004 he participated with a volcanological project in the ICDP drilling project at Lake Van in Turkey (PALEOVAN project). The newly established regional tephrostratigraphy (Sumita and Schmincke 2013) and the discovery of a large-volume hyaloclastite deposit emplaced by a highly-explosive basaltic eruption (Schmincke et al. 2018) provided essential contributions to the Lake Van sediment archive. More recently, he re-investigated maar deposits in the West-Eifel volcanic field and became convinced that CO₂ degassing played the major role in the eruption of some of these, next to phreatomagmatic processes near surface. Hans-Ulrich has just written up first results (paper in revision) but, unfortunately, he can no longer contribute to this work which is further pursued by Mari Sumita with German and Japanese colleagues.



Hans doing what he advocated the most highly: making detailed observations of field deposits at a quarry of the Bishop tuff in Chalfant Valley during the pre-conference field trip of the IAVCEI General Assembly in 2017 (Photo Credit: Szabolcs Harangi)

Hans-Ulrich was not only a scientist. He also fervently engaged himself for the scientific community. As general secretary of the IAVCEI (1983–1991) and chief-editor of *Bulletin of Volcanology* (1985–1995) he helped both bodies transition into the modern scientific organizations which they now are. His book “*Volcanism*” (2004) has appeared in German, English, and Japanese and became a standard textbook. These and other publications document his skills in presenting research results to students and scholars alike. Due to his almost life-long volcanological studies in the Eifel he felt a responsibility to convey the significance of geoscience to the public. In 1987 he initiated the foundation of the German Volcanological Society (DVG) in Mendig, Eifel, of which he was a founding member and later honorary chairman, and he advocated the establishment of a Geopark and the building of the “Lava Dom”, a volcanological educative museum. Together with Mari Sumita he also published a book for children: *Entdecke die Vulkane* (Discover the volcanoes).



Hans with Wes Hildreth and Judy Fierstein during Hans' award of Honorary Membership of IAVCEI at Pucon (Chile) in 2004, and receiving his “Medal of Merit from the Prime Minister of the State of Rheinland-Pfalz” in 2023 (Photo Credits: Mari Sumita)

His achievements in science and beyond have been honored by many awards both nationally and internationally. He received the Thorarinsson Medal in 1993, Honorary Membership of IAVCEI in 2004, and of IUGG in 2012, the Leibniz award of the German Research Foundation (DFG) in 1991, the Hans-Stille-Medal of the German Geological Society in 2001 (Geologische Gesellschaft) and the Steinmann Medal from the German Geological Union (Geologische Vereinigung) in 2012, and most recently the Medal of Merit from the Prime Minister of the State of Rheinland-Pfalz (2023) for his long-term efforts to communicate volcanology to the public.



Hans on his last field trip to the Eifel (December, 2023). An excursion during the ICDP workshop to the famous Wingertsbergwand outcrop, where one could see the beautiful sedimentary structures of the Laacher See tephra (Photo Credit: Mari Sumita)



A photo by Mari of Hans on his last field work in the Eifel at Pulvermaar in July 2023

Hans-Urich Schmincke has been a towering figure in volcanology for the past 60 years. He had a key-role in the development of modern volcanology. His wide interests made him a Man for all Seasons. On his passing, he can be truly recognized to have had a life well lived.

Don Swanson, Wes Hildreth, Gerhard Wörner, Armin Freundt and Mari Sumita



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(many more to be found at <https://oceanrep.geomar.de/>)

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SECTION 1. IAVCEI – WHO WE ARE AND WHAT WE DO

1.1 IAVCEI Commissions and Network Updates

Commission on Explosive Volcanism (CEV): upcoming changes

<https://cev.iavceivolcano.org/welcome-to-commission-on-explosive-volcanism/>

(Note: website to be reactivated as a priority by new committee)



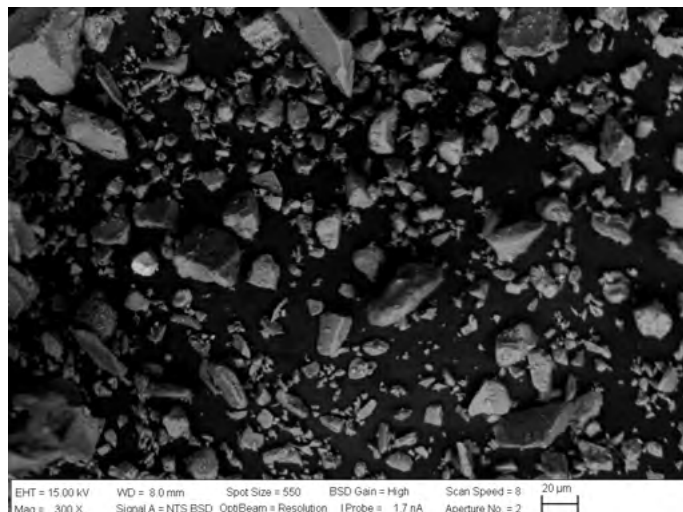
Explosive eruptive activity from Tajogaite volcano (La Palma, Spain) on 10 November 2021. Photo by Jorge E. Romero

IAVCEI's Commission on Explosive Volcanism (CEV) is devoted to research on explosive eruption processes, volcano evolution, and magmatic influences on eruption dynamics. CEV aims to:

- Foster modern, process-oriented studies of pyroclastic rocks,
- Encourage communication between scientists from the various branches of research directed to such studies,
- Provide input into other areas, such as volcanic hazards and atmospheric impacts, and
- Promote interest in explosive volcanism and its products.

New elections are on-going, with a vote scheduled for this month (October). Positions advertised in August include the roles of co-leader, secretary, social media & website officer, event coordinator, and ECR officer. Candidates are being encouraged to prepare proposals and measures with the aim of making CEV distinct from the rest of IAVCEI's commissions and expanding its scope into unexplored fields, as driven by the needs and ideas of early career research scientists. However, a central point to this new evolution of CEV is strengthening relationships between the CEV and other IAVCEI commissions with areas of common interest.

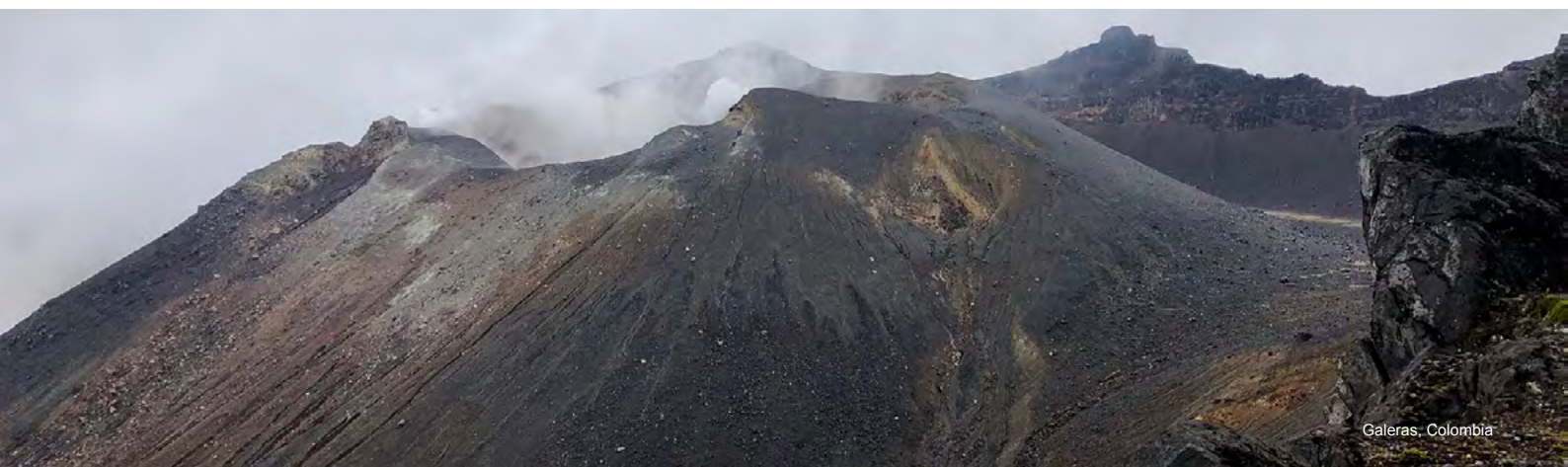
The new leadership will commit to an active online presence, with a focus on physical engagement. The intention is to place CEV in a position suitable for growth and influence. We will be proactive in reaching out via social media, reviving our website, and holding regular seminars, while also taking the lead in convening sessions at IAVCEI conferences, as well as organizing workshops, and field activities. This approach is aimed at not only increasing our membership, but also establishing the CEV as a reference for all scientists active in the field of explosive volcanism. *The future of the CEV is bright, and we invite you to be a part of it.*



Micron-sized ash particles of the Puyehue-Cordón Caulle 2011 eruption in Chile

The elections will take place via an online ballot on the IAVCEI website. This online voting process is a significant step in ensuring inclusivity and transparency in our elections. We will soon launch this process and announce key dates through IAVCEI's official communication channels and social media.

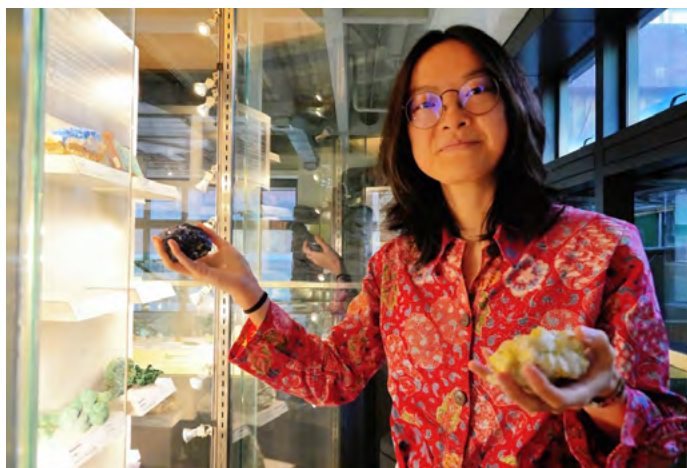
Jorge E. Romero



1.2 The Voice of IAVCEI Early Career Researchers

ECR profile: **Weiran Li (University of Hong Kong)**

Hello! My name is Weiran (aka “Alex”) Li. I am a petrologist-volcanologist from China, currently working as an assistant professor at the University of Hong Kong and the curator of the Stephen Hui Geological Museum. Just like many readers of the IAVCEI newsletter, I am curious about how volcanoes work.



Dr. Weiran (aka “Alex”) Li (University of Hong Kong)

I knew little about “volcanology” when I was an undergraduate student majoring in Geochemistry at Peking University. In fact, in my sophomore year (2009), I became more enthusiastic about arts and took a double major in Art history, picturing myself working in an art gallery or museum someday. Before completely changing direction, I participated in a research project on the geochronology of the Leiqiong volcanic field in southern China (under the supervision of Prof. Jianqing Ji) and suddenly discovered the fun of research that was not revealed to me before then. I decided to spend a little more time exploring this and enrolled into the master’s program at the same university. After one-year research into the geochronology of Changbaishan volcano, my interest in volcanology continues growing, and a life-changing trip occurred. In August 2013, I joined a five-day (super nicely organized) field trip to Etna and the Aeolian volcanoes after the Goldschmidt conference in Florence that year. A few hours’ hike in the evening took us to the summit of Stromboli, from where I watched, for the first time in my life, fragments of glowing magma thrown out of the crater, into the dark night. That was magnificent. After returning to Beijing, I started looking for PhD programs in volcanology, wrapped up all courses, laboratory work and my thesis, and graduated one year in advance from PKU. In the summer of 2014, I moved to Singapore for a PhD at Nanyang Technological University.

The first year of my PhD was tough because most technical terms I learned were in Chinese and (believe it or not) they have a very weak correlation with the expressions in English (especially when it comes to mineral and rock names). Therefore, reading the literature was a big challenge at the beginning. What is still vivid to me is the day when my PhD supervisor (Prof. Fidel Costa) showed me a few X-ray maps he had obtained for apatite from Merapi volcano and said that these zoned crystals could be very interesting to study for revealing time scales. I would not

have known at the time that most of my research thereafter was to be established on this phosphate mineral containing so much information about the chemistry of magma while sometimes being too small to be identified or analyzed in situ.



Alex visiting rootless cones of Batur volcano in Bali, Indonesia (March 2024) and at the summit of Changbaishan Tianchi volcano in Jilin, China (August 2024)

After spending a couple of years investigating eruptions of contrasting styles at one of Indonesia’s most active volcanoes – Merapi and attempting to develop an apatite-based melt hygrometer (that luckily worked out later), I received a local

research fund with my proposal on apatite diffusion and flew with two big suitcases to Germany in May 2017 to conduct experiments at the Ruhr University Bochum (under the supervision of Prof. Sumit Chakraborty). The experiments went surprisingly well thanks to the professional support from the technicians at the laboratories and workshop at RUB. The samples were later brought to several different laboratories for microscale-nanoscale analysis and eventually helped us to develop a volatile-in-apatite diffusion chronometer, for investigating time scales of magma ascent/degassing within hours to months. Applications of this method have revealed differences in magma ascent rates between effusive and explosive eruptions at several volcanoes (Merapi, Kelud and Rabaul) and could be extended to more systems in the future.

After completing my PhD (on the eruption styles of subduction-zone volcanoes) in late 2019, I explored broader topics (as a postdoctoral researcher) on the partitioning of rare earths between apatite-melt at NTU, and the temperature and lithological variability in the mantle beneath ocean islands at University of Cambridge.



Alex being interviewed by the University of Hong Kong media team as the curator of the Stephen Hui Geological Museum (April 2024)

In the autumn of 2022, I joined the University of Hong Kong as an assistant professor and started to build up the first petrology-volcanology group in Hong Kong, with a research focus on the eruption mechanisms of volcanoes in China and Southeast Asia. One of our group's visions is to promote scientific collaboration and communications among volcanologists worldwide (and particularly in Asia) so as to advance our understanding of volcanism and its influence on human societies. We welcome excellent researchers and postgraduate students to join us in Hong Kong!

Weiran Li



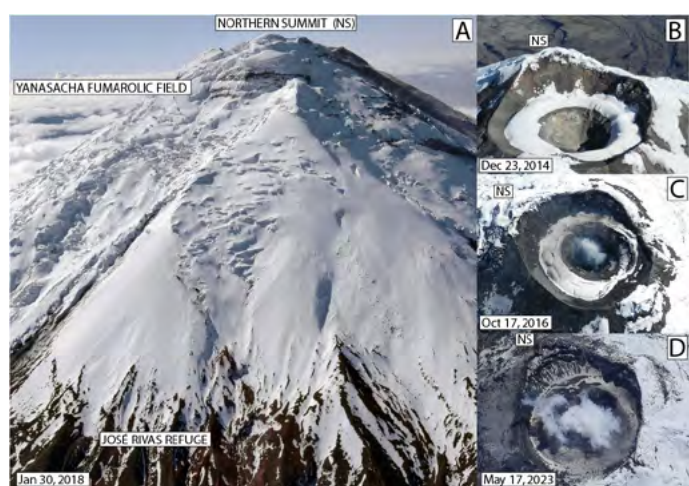
1.3 Insider Perspective: What's my job?

High Mountain Guides and the Geophysical Institute: Keeping Watch Over the Ecuadorian Andes

Mountain climbing is an adventure sport focused on exploring and reaching the summits of high elevation. In Ecuador, many of our mountains are either active or dormant volcanoes that dominate the Andean landscape. To safely pursue this thrilling activity, thousands of tourists from around the world rely on certified mountain guides with extensive training. These experts help climbers achieve their dream of ascending some of Ecuador's highest and most iconic volcanoes, such as Chimborazo ($6,267 \pm 5$ m asl), Cotopaxi ($5,892 \pm 15$ m asl), and Cayambe ($5,794 \pm 15$ m asl) (refer to height calculation details in Merizalde-Mora et al., 2018).

Cotopaxi is one of the highest and most hazardous glaciated volcanoes in the Ecuadorian volcanic arc. It is the most lucrative mountains in Ecuador, owing to its proximity to Quito (just a two-hour drive to the José Rivas Refuge at 4,864 m asl) and the allure of its dangerous beauty draws in the most adventurous tourists. However, with over 70 eruptions recorded since the 16th century, it is also one of the most active volcanoes in South America. One of its most catastrophic eruptions occurred on June 26, 1877, claiming dozens of lives and causing widespread destruction across the country. The volcano's last two eruptive phases, classified as "small", took place in 2015 and 2022.

The 2015 eruption was preceded by several months of unrest (Hidalgo et al., 2018), with the crater observed as a closed funnel. Seven years later, in 2022, Cotopaxi erupted again, this time with a sudden ash emission that occurred without any precursors (Informe Volcánico Especial – Cotopaxi – 2022 – N° 001; <https://www.igeppn.edu.ec/servicios/busqueda-informes>).



Photographs of Cotopaxi Volcano: A) View from the northwest, with the José Rivas Refuge visible in the lower left. B) View of the crater in 2014, showing its funnel shape and the circular glacier in good condition. C) View of the crater in 2016 (post-2015 eruption), showing the open conduit and the partially affected glacier. D) View of the crater in 2023 (post-2022 eruption), showing the open conduit, a significantly affected glacier, and a gas emission column. (Photos by Marco Almeida – IGEPPN)

Cristian Rivera and Francisco Arroba are expert mountain climbing guides, trained and certified according to international standards. During several years, they have dedicated their lives to mountain climbing in Ecuador and are active members of the Ecuadorian Association of Mountain Guides (ASEGUIM). ASEGUIM is the leading organization for the training and certification of specialized guides in adventure and high-altitude terrains in Ecuador. The ASEGUIM training school is accredited by the International Union of Mountain Guide Associations (UIAGM), established in 1965 as the global representative body for thousands of professional mountain guides.

Meanwhile, the Geophysical Institute (Instituto Geofísico de la Escuela Politécnica Nacional – IGEPPN) is the authority responsible for monitoring volcanic and seismic activity in Ecuador. Founded by Dr. Minard (Pete) Hall in 1983, IGEPPN has worked closely with communities impacted by volcanic hazards. Among these communities are mountain guides, whose primary livelihood takes place in the most hazardous zones of volcanoes – around the summit, fumaroles, and craters. We here share the experiences of the interaction between mountain guides and the IGEPPN during the last two eruptions of Cotopaxi volcano.

Cristian Rivera

The Ecuadorian Andes have been a significant part of my life since childhood, giving me over 30 years of experience with Cotopaxi and mountaineering. Currently, I serve on the ASEGUIM committee, where I oversee the collaboration with the IGEPPN. Throughout the years, volcanologists have often recommended my services to guide their friends and colleagues and have personally hired me to accompany them on climbs. My connection to IGEPPN extends to my family as well. My wife, who works near the Cotopaxi National Park, has also interacted with IGEPPN professionals and received training on the challenges of working near an active volcano. In many ways, our lives have been closely intertwined with this institution.

Francisco Arroba

Before embarking on my career as a mountain guide, I studied biology and specialized in remote sensing and geographic information systems. However, my passion for the mountains ultimately led me to make them my livelihood. I also served as the president of ASEGUIM, where I coordinated efforts with IGEPPN during Cotopaxi's second eruptive phase from 2022 to 2023. Earlier in my journey to becoming a certified mountain guide, I witnessed one of the most intense periods of activity at Cotopaxi in 2015. This event prompted the administration of the Cotopaxi National Park to suspend high-altitude activities on the volcano for at least two years. It was during this time that mountain guides began forging a close relationship with IGEPPN scientists.



Photograph of Cristian Rivera (left) and Francisco Arroba (right) while ascending the ice-capped volcanoes of Ecuador

Cristian and Francisco

The initial discussions about volcanic hazards at Cotopaxi, presented by IGEPN, were challenging for us to accept. At the time, we approached the information with skepticism and fear, primarily because climbing Cotopaxi was our livelihood, and we were concerned about the impact on our work.

As we climbed to Cotopaxi's summit daily, we could observe subtle changes in the landscape. Our experience allowed us to assess morphological changes in the glacier, gauge the intensity of gas emissions, and determine whether they seemed normal or unusual.

Our observations were crucial in alerting IGEPN scientists to early signs of volcanic activity. The 2015 eruption was preceded by the formation of a lake at the base of the crater just weeks before the eruption began. The first explosions occurred at dawn on August 15th. Fortunately, they happened early in the morning when no one was at the summit. This event served as a reminder that we needed to exercise greater caution with the volcano. The first closure of the summit route due to the 2015 eruption brought economic losses, but it also initiated a learning process in which we participated by providing our observations and suggestions on how to improve and make ascents to the volcano safer.

The mountain was reopened in 2017, but the gas emissions from the volcano could be so intense that reaching the summit felt like entering "*Dante's Inferno*", where the suffocating and foul smell of sulfur made it impossible to enjoy the peak or the magnificent panoramic views from the top. Seven years passed until October 2022, when the second eruptive phase began. In contrast with the 2015 eruption, the 2022 eruption seemed to have emitted a small amount of ash a few days earlier, leaving a thin gray layer on the summit that we reported—this subtle change had gone unnoticed by IGEPN instruments and satellites.

On October 21st, 2022, during the night, IGEPN contacted me (Francisco) directly, asking me to inform my colleagues (including Cristian) at the Rivas Refuge on Cotopaxi that volcanic activity had increased. They recommended that people at the refuge should consider moving to a safer location if activity levels continued to rise. Fortunately, the volcano's mildness and prompt communication ensured that there were no casualties.

These experiences have deepened our relationship with IGEPN scientists, leading to close collaboration in data collection, including gas measurements at the crater, ash sampling, and other critical observations. As a result of our camaraderie with IGEPN staff, we created space for discussion and proposed the development of protocols for authorities in charge of safety and decision-making to adopt, thereby increasing the safety of those who choose to engage in high-altitude activities on Cotopaxi. Given our contact with some members of the IGEPN volcanology team, we thought it would be best to report these changes and receive feedback. This led to the establishment of a strong communication dynamic with IGEPN.

Finally, the lessons learned by Mountain Guides are that we must always stay alert to official information channels, report significant and even minimal changes in the volcano on time, and maintain direct contact with the IGEPN. Trust and knowledge have allowed us to be more perceptive and apply the safety measures they suggest. Nowadays, we always carry a gas mask with protection against acidic gases to the summit of Cotopaxi because we know it is alive, and it is better to minimize the impact of certain dangers near its crater.

This is how we added an extra point to our profession, and we trust that the knowledge we have acquired will help us act to appropriately if the mountain decides to awaken while we are on it. Since its eruption in 2015, the volcano has become much more unpredictable, making it harder to understand what it will do next. Thus, it is our responsibility to continually train and fully commit to working closely with those in charge of volcano monitoring, ensuring that the next eruption, like the last two, does not result in any casualties.

Marco Almeida (IGEPN), Francisco Arroba (Mountain Guide) and Cristian Rivera (Mountain Guide)

Selected References:

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1.4 Observatory News

New Headquarters for the Volcano Research Promotion, Japan

On April 1, 2024, the Japanese government established the new headquarters for the Volcano Research Promotion. This headquarters conducts both volcano observation and research as a national project, combining relevant ministries and agencies, research and development corporations, universities, etc. This new framework is to achieve effective countermeasures to volcanic disasters. We here report the history of the volcano observation and disaster administrative system in Japan, and our future direction in volcano research.

In Japan, the basic framework for volcanic activity evaluation is based on the Meteorological Services Act (original in 1952, last version in 2007). The Japan Meteorological Agency (JMA) is responsible for forecasts and warnings suitable for public use concerning natural hazards. That is, JMA is the only organization which can issue official information necessary for disaster mitigation and emergency response measures. But the monitoring system of JMA is not enough for all natural disasters. Therefore, other organizations including national and local research institutes and universities provide monitoring data to JMA.

Modern volcano monitoring and research in Japan was first organized in 1974, when the Coordinating Committee for the prediction of Volcanic Eruptions (CCPVE) was established as a private advisory body to the JMA director. CCPVE is composed of researchers from universities and national institutes, plus representatives from

relevant organizations. CCPVE had the functions of performing observations, evaluating volcanic activity and recommending the volcano observation system. CCPVE also enhanced volcanic observations in the academic field at universities.

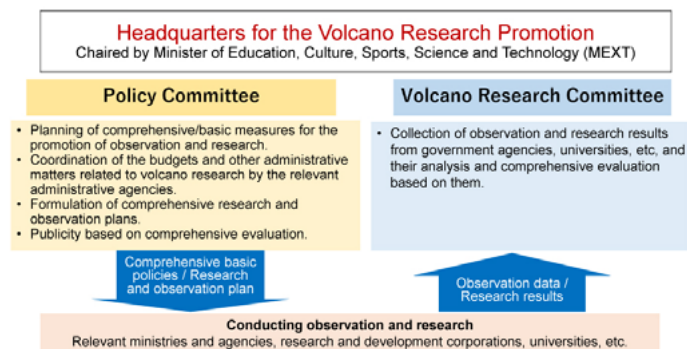


Active volcanoes in Japan

Classification	Abbreviated Term	Target area	Volcanic Alert Levels & Keywords		Explanation			
					Expected volcanic activity	Action to be taken by residents	Action to be taken by climbers	
Emergency Warning	Volcanic Warning (Residential area) (a.k.a. Residential area Warning)	Residential areas and non-residential areas nearer the crater	Level 5	Evacuation		Eruption or imminent eruption that may cause serious damage in residential areas and non-residential areas near the crater.	Evacuation from residential areas at risk is necessary.	
			Level 4	Evacuation of the elderly, etc.		Possibility or increasing possibility of eruption that may cause serious damage in residential areas and non-residential areas near the crater.	Evacuation of the elderly and other persons requiring special care, and preparation for evacuation of residents in residential areas at risk is necessary.	
Warning	Volcanic Warning (Near the crater) (a.k.a. Near-crater Warning)	Non-residential areas near the crater	Level 3	Restriction on proximity to the volcano		Eruption or possibility of eruption that may severely affect places near residential areas (possible threat to life in such areas).	Stand by and pay attention to changes in volcanic activity. Preparation for the evacuation of the elderly and other persons requiring special care, depending on the situation.	Restrictions on entry to areas at risk, such as prohibition of climbing and restrictions on mountain entry.
		Around the crater	Level 2	Restriction on proximity to the crater		Eruption or possibility of eruption that may affect areas near the crater (possible threat to life in such areas).	No action required.	Restrictions on entry to areas near and around the crater.
Forecast	Forecast	Inside the crater	Level 1	Potential for increased activity		Calm: Possibility of volcanic ash emissions or other related phenomena may occur in the crater (possible threat to life in the crater)	No action required.	No restrictions. Restrictions on entry to the crater, depending on the situation.

Note: The target areas subject to evacuation and restrictions varies depending on local conditions and volcanic activity

There are 111 active volcanoes in Japan, 50 of which are continuously monitored by JMA in 24/7 mode, all days of the year. JMA issues volcanic alert levels based on a five level categorization system. This alert level is used for evacuation judgement by the local government, and to which the mayor can refer. Thresholds between the levels are defined for each volcano, mainly based on observation experience. Thus, the system is effective only for volcanoes with sufficient eruptive activity, so we currently need more objective criteria, research and development to extend the alert system to all volcanoes.



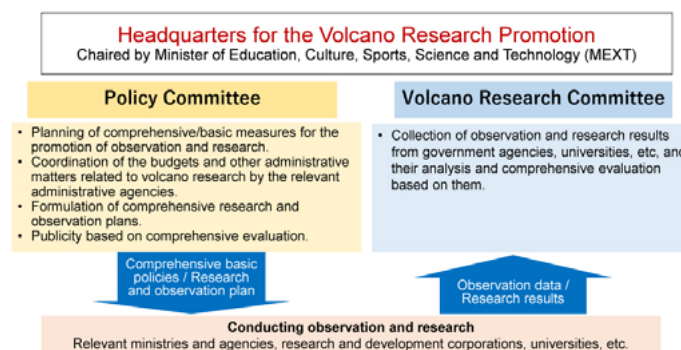
Volcanic Alert Levels defined by the Japan Meteorological Agency

We need to stress that our tragic experience of the phreatic eruption at Mt. Ontake in 2014, which killed 58 people and left five missing, triggered our recognition of a need to enhance volcano monitoring and research in Japan. The 1973 governmental act on Special Measures concerning Active Volcanoes in Japan was amended in 2015. As part of this amendment, a new national research project, named “*Integrated Program for Next Generation Volcano Research and Human Resources Development*” is now on-going. This project centralizes volcano observation data in Japan through the Japan Volcanological Data Network (JVND: <https://jvnd.bosai.go.jp/portal/en/>), as operated by the National Research Institute for Earth Science and Disaster Resilience (NIED: <https://www.bosai.go.jp/e/index.html>). The project also fosters early-career volcanologists, as a result of which JMA also has been strengthened the monitoring system and human resources. For example, 20 students mentored through the *Integrated Program for Next Generation Volcano Research and Human Resources Development* project were employed by JMA through 2024. One prefecture close to Mount Fuji has, also, employed early-career volcanologists as specialists for volcano disaster management. The Cabinet Office also started a working group on “*countermeasures for wide-area ash fall from major volcanic eruptions*”.

A Volcano Disaster Management Council (VDMC), involving the local governments based on each active volcano, was first established in 2011. This council has created volcano hazard maps and developed specific and practical evacuation plans. The VDMC was strengthened by the 2015 amendment to the governmental act “*Special Measures concerning Active Volcanoes*”, stating that the VDMC must draw up management plans for facilities to ensure the safety of climbers, and that the council must include volcano experts in addition to its existing members (which includes prefectural and municipal governments, the Japan Meteorological Agency, and the Erosion Control Department).

In 2023, VDMC members agreed to amend the law on the *Special Measures against Active Volcanoes*. This amendment includes the following topics:

1. Municipality mayoral support for the preparation of evacuations plans.
2. Considerations to facilitate the provision of information on volcano visit dates and routes.
3. Prompt and accurate communication of information.
4. Development and continuously secure human resources with expert knowledge or skills in volcanic phenomena
5. Establishment of a Headquarters for the Volcano Research Promotion (HVRP).
6. Establishment of a Volcanic Disaster Prevention Day (26 August of every year).
7. Discussion on how active volcanoes can impact Japanese communities.



Organigram for the headquarters for the Volcano Research Promotion

To support topic 5, the HVRP was created April 1, 2024. The HVRP is chaired by the ministry of Education, Culture, Sports, Science and Technology (MEXT), and involves a Policy Committee and a Volcano Research Committee. The Policy Committee conducts comprehensive and basic plans for volcano observation and research, including monitoring design, techniques and analyses, and coordinates the budget and manages administrative issues. In parallel, the Volcano Research Committee collects observation and research results from related organizations, and makes evaluations of volcanic activity.

More detailed strategies for volcano observation and research are currently under discussion, as a result of which we believe we are moving in an effective direction, both academically and institutionally.

Eisuke Fujita and Setsuya Nakada

SECTION 2. IAVCEI CONFERENCES, MEETINGS AND WORKSHOPS

2.1 The first international conference on Volcanic and Igneous Plumbing Systems, 18–20 June 2024 (MAGMA Lab, the University of Liverpool)



VIPS Conference 2024 in-person attendees, The Spine, Liverpool, UK

Between the 18–20th of June, the IAVCEI Commission on Volcanic and Igneous Plumbing Systems (VIPS) held their first international conference, hosted by the MAGMA Lab at the University of Liverpool (UK). This hybrid conference brought together 56 in-person attendees and a 44-person online audience from around the world to discuss the current understanding and challenges of volcanic and igneous plumbing systems. The full scientific programme and abstract book are available to view on the VIPS Commission website: <https://vipscommission.org/vips-conference-2024/workshops/>



Map showing the location of VIPS conference attendees across the world

Day 1 was dedicated to workshops on *real-time VIPS observations using analogue experiments* led Professor Janine Kavanagh

(Liverpool) and post-doctoral researcher Dr Caitlin Chalk (Liverpool), *exploring crystal histories* with Dr Katy Chamberlain (Liverpool) and Dr Geoff Kilgour (GNS Science, New Zealand) and *photogrammetry as a tool for studying active and fossil VIPS* with Professor Steffi Burchardt (Uppsala University, Sweden) and post-doctoral researcher Dr Stefano Urbani (Liverpool). The workshops were followed by the evening icebreaker at The Font, sponsored by Nature Geoscience.



Participants of the Analogue Experiments workshop making their own jelly volcanoes in the MAGMA Lab, University of Liverpool. This workshop was sponsored by LaVision and TA Instruments



Discussing advances in diffusion modelling at the crystal histories workshop



Pretty good drone flying conditions at the photogrammetry workshop

Days 2 and 3 of the conference were held in The Spine, Liverpool, in a hybrid format. The conference programme included 25 oral presentations including 6 keynote speakers:

- Professor Janine Kavanagh (University of Liverpool, and former President of the IAVCEI Commission on VIPS) – *“Modelling magma movement in dykes and sills: Insights from minerals, magnetism and mixing experiments”*
- Dr Geoff Kilgour (GNS Science, New Zealand) – *“Mantle to surface monitoring of an andesite magmatic-hydrothermal system”*
- Dr Prokop Závada (Czech Academy of Sciences) – *“The interplay of deformation and current volcanic activity on the Reykjanes Peninsula, Iceland – insights from analogue modelling”*
- Dr Antonio Costa (INGV-Sezione di Bologna) – *“Advancements in volcanic conduit modelling: A decade of development, applications, and future perspectives”*
- Dr Adelina Geyer (Scientific staff at CSIC, Barcelona) – *“Understanding the internal dynamics of magma reservoirs: A pending challenge”*
- Professor Steffi Burchardt (Uppsala University, and former president of the IAVCEI VIPS Commission) – *“Deformation related to magma transport in the Earth’s crust – not just in the host rock”*

In parallel, there were 26 posters presented at the dynamic Poster Session, including topics such as analogue experiments of dyke propagation, numerical modelling of volcanic plumbing systems, and petrographic studies into magma flow dynamics.



Key note speakers: Janine Kavanagh, Geoff Kilgour, Prokop Závada, Antonio Costa, Adelina Geyer and Steffi Burchardt



Lots of discussion at the VIPS poster session

On the final day, Professor Janine Kavanagh chaired three round table discussion sessions. Questions included 'what are some unresolved questions about volcanic plumbing systems?', 'what are the benefits of multidisciplinary projects?', and 'what are the most important questions the VIPS community should focus on answering in the next 5, 10 or 20 years?'. This provided the opportunity for fruitful discussion amongst attendees.

We would like to thank all attendees of the first international conference on volcanic and igneous plumbing systems. Many thanks to the sponsors for their support of the conference and travel bursaries for attendees. We also thank the local organising committee, the MAGMA Lab at the University of Liverpool!

This year also marks the 10-year anniversary of the MAGMA Lab (<https://www.liverpoolmagmalab.org/>)! You can find out more about their research or follow their social media for updates (Youtube, twitter, Instagram links).

The IAVCEI VIPS Commission (<https://vipscommission.org/>) are delighted to announce we will be hosting another conference in the future in Chile! Make sure to follow our social media channels for updates.

Jade Hrintchuk



Members of the MAGMA Lab and some of the local organising committee

2.2 The first international conference on Volcanic and Igneous Plumbing Systems: An ECR perspective

I am Lorenzo Mantiloni, a postdoctoral researcher at the University of Exeter, UK. I am currently working on numerical models of deformation and stress within and outside of magma-mush reservoirs under different conditions of magma supply, with the aim of studying the stability and failure of magma chambers. As a result, I recently won a bursary from the IAVCEI commission on Volcanic and Igneous Plumbing Systems (VIPS) to attend their first international conference in Liverpool held between June 18th and June 20th, 2024. As the title of the meeting ("*First international conference on Volcanic and Igneous Plumbing Systems*") suggests, it was the first conference of its kind organized by the VIPS commission, and I am sure that expectations were high among both the organizers and the attendees. From the experience that I had along with many colleagues, I can say that those expectations were fully met!



Lorenzo Mantiloni closing out his presentation "*The Role of Gravity in the State of Stress of Dynamic Magma Mush Reservoirs*" at the first international VIPS conference

The conference was hosted by the MAGMA Lab at the University of Liverpool, which opened its doors during the analogue modelling workshop on the first day. The rest of the conference was hosted at the top floors of The Spine complex: a modern and classy building offering – so I was told – the best view over the city of Liverpool.

The local organizing team did a fantastic job in both welcoming us and managing the event. Communication with the attendees, organization and timing were spotless. The daily schedule allowed plenty of talks and activities, without being too tight or drawn-out and leaving time to unwind and socialize in the evenings. The direction of the talk sessions was flawless. A floor-level display was arranged in front of the podium so that speakers could keep an eye on their slides and the timer without ever turning away from the audience: something that, as one of those speakers, I very much appreciated. The poster session was equally well-

managed. Finally, we were treated with some amazing food at the lunch breaks. All these, however, are relatively minor points. What really made this conference stand out were three highlights.

The first, as I already mentioned, was the analogue modelling workshop on the first day: that is, gelatine-based experiments of fluid-filled crack propagation in elastic media, something in which the MAGMA Lab team and its director, Prof. Janine Kavanagh, are world-leading experts. Janine and her team were brilliant at illustrating the meaning, techniques and applications of gelatine models. Most importantly, they gave us the opportunity to get our hands on some gelatine setups, where we injected different fluids into gelatine moulds and observed how they propagated. I had some experience with similar setups during my PhD, and it was nice to play with them once more. I was also aware of how challenging and time-consuming preparing those gelatine moulds can be: hence my kudos to all the people involved. Thanks also to the team of LaVision, who gave us a demonstration of their amazing particle tracking velocimetry. It was a fun and instructive experience, and I could learn a lot on the newest developments and potential of analogue modelling.



Carrying out gelatine-based experiments of fluid-filled crack propagation in elastic media during the analogue modelling workshop on the first day

The second highlight, and the most important one for me, was the relaxed and welcoming atmosphere that we all breathed throughout the event. The conference was indeed very international, with researchers from all backgrounds and career stages. While sharing a common research topic, we all brought in very different approaches and skill sets, which made it the perfect opportunity to compare and share our knowledge. More than that, the differences in age and career stage never put any distance between attendees: on the contrary, I felt it extremely easy to meet and talk to world-established researchers



Demonstrations in the Magma Lab. Based in the University of Liverpool's Jane Herdman Building, the facility is designed for analogue modelling experiments, namely particle image velocimetry and digital image correlation relating to fluid dynamics, magma flow, and volcanic plumbing systems (<https://www.liverpoolmagmalab.org/facilities>)

as well as students at the very beginning of their PhD, and many colleagues of my age and younger shared the same impression. This resulted, I believe, in an extremely stimulating exchange of ideas and experience, from which I am sure everyone, and especially the younger among us, benefited a lot.

The third highlight, which best showcased my previous point, was the round (well, square) tables session on the last day. I had experienced such a format only once in a previous conference, and I find it an excellent activity to bring junior and senior researchers together and make them learn from one another. The way tables were formed ensured the right proportion between different career stages and expertise, and we all came out of it with some new knowledge or perspectives on what we do as a community. The organizers asked us a series of questions, which each group had to discuss over a given time, before the group's representative wrapped up the resulting points. The most notable question to me was what the direction, goals and achievements of the VIPS community should be over the next five, ten and twenty years. With that scope in mind, it was hard to come up with well-thought out answers in such a short time, though a two-hour discussion would have probably not been enough, either. However, it made me realise how much our age, research and academic background can shape our perspectives on what is lacking and what is worth prioritizing in

our community. I could tell people about the current limitations of numerical models and why overcoming them is important, but then somebody would open my eyes on how models cannot go far without better constraints from observation, be it from the field or the lab. The inverse also happened. From the role of machine learning to cutting the costs and risks of fieldwork, to enabling fast and free access to data and promoting engagements with local populations in volcanic areas, it was nice to be drawn out of my expertise bubble and reminded me that research is a multi-faceted organism, and works at its best when all its parts keep up with each other.

To sum up, the first VIPS international conference was a success, and I am very grateful to have been part of it. All the people involved, including the staff at The Spine, deserve the greatest compliments. I wish to thank IAVCEI and the VIPS Commission for the travel bursary they awarded me: I could not have made it there without it. It was a beautiful opportunity to meet some old friends, make new ones and, most importantly, share our research in a relaxed environment, no matter our age, status or nationality. I will remember those days with fondness, while looking forward to the next edition. See you in Chile in two years!

Lorenzo Mantiloni

SECTION 3. IAVCEI – DOWN TO BUSINESS

3.1 IAVCEI Scientific Assembly, Geneva (June 29 – July 4, 2025)

<https://sa2025.iavceivolcano.org/>

The next IAVCEI scientific assembly will take place from 29 June to 4 July 2025 in Geneva, Switzerland (see: “IAVCEI Scientific Assembly”, IAVCEI Newsletter No. 1, March 2024¹). Registration is now open at <https://sa2025.iavceivolcano.org/registration/>, where Early Bird Registration is available until 31 March 2025, and costs 550 CHF for IAVCEI members, and 300 CHF for Early Career Researchers. Thereafter registration fees will be 700 and 400 CHF, respectively (see: “IAVCEI Scientific Assembly”, IAVCEI Newsletter No. 2, June 2024²). **Details of all sessions and workshops that will be held can now be found here:**

<https://sa2025.iavceivolcano.org/call-for-sessions/>
<https://sa2025.iavceivolcano.org/call-for-workshops/>

**APPLY FOR YOUR
VISA NOW!**

IAVCEI can provide an invitation letter
(contact secretary@iavceivolcano.org)

Travel grants and/or free registration will be available for IAVCEI members lacking support, both for ECRs and senior scientists from low-to-middle income countries (<https://sa2025.iavceivolcano.org/travel-grants/>). Requests will be assessed on a case-by-case basis. Note that, **grant application is open**

until 15 November 2024. Grant recipients will be announced on 20 December 2024.

**ABSTRACT SUBMISSION
IS NOW OPEN**

<https://on-line-form.eu/iavcei2025sa/abstracts/>
(Submission open until 20 December 2024)

The registration fees will include:

- Access to all sessions, plus IAVCEI opening and closing ceremonies
- Icebreaker, all coffee breaks and lunch boxes
- **FREE USE OF ALL PUBLIC TRANSPORT**

The public transport system can be used for free by all participants. This covers the entire Geneva canton, which includes the airport.

For low cost travel and accommodation options please see:

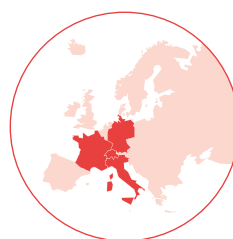
<https://sa2025.iavceivolcano.org/geneva-on-a-budget/>

There will be six volcanic field trips organised in the week prior to the Scientific Assembly, and three plutonic trips afterwards, where full field trip details are now available here:

<https://sa2025.iavceivolcano.org/field-trips/>



IAVCEI 2025
Scientific Assembly
June 29 - July 4, Geneva, Switzerland
sa2025.iavceivolcano.org



¹https://www.iavceivolcano.org/content/uploads/2024/04/iavcei_newsno1_march2024_final.pdf

²https://www.iavceivolcano.org/content/uploads/2024/07/iavcei_newsno2_july2024.pdf

3.2 Events and meetings: 2024–2026

IAVCEI events 2024

Cities on Volcanoes 12

February 11–16, 2024

Antigua, Guatemala

[commission Cities and Volcanoes]

<https://citiesonvolcanoes.wordpress.com/>

<https://congress.iavceivolcano.org>

Volcandpark 2024

May 20–24, 2024

Jičín, Czech Republic

[supported by commission on Volcanic Geoheritage and Protected Landscapes]

www.volcandpark2024.geocon.eu

1st international workshop on volcanic and igneous plumbing systems

June 18–20, 2024

Liverpool, UK

[commission Volcanic and Igneous Plumbing System]

<https://vipscommission.org/>

<https://vipscommission.org/event/1st-international-conference/>

2nd edition of the Carpathian Fluid Geochemistry Summer School

July 15–21, 2024

Eastern Carpathians, Romania

[commissions Chemistry of Volcanic Gases; Volcanic Lakes]

<https://ccvg.iavceivolcano.org/>

<https://iavcei-cvl.org/>

<https://forms.gle/PzSQxAQyDMnf5biYA>

10th International Conference on Tephra Studies

September 8–15, 2024

Catania, Italy

[commissions Tephrochronology; Tephra Hazard Modelling]

<https://cot.iavceivolcano.org/>

<https://thm.iavceivolcano.org/>

IASPEI/IAVCEI Commission on Volcano Seismology and Acoustic annual meeting

September 16–21, 2024

El Paso (Canary Islands)

[IASPEI/IAVCEI Commission]

<https://www.ign.es/web/ign/portal/vlc-congreso-la-palma-2024>

6th Conference Alfred Rittmann

September 18–20, 2024

Catania, Italy

[IAVCEI-sponsored]

<https://www.conferenzarittmann.it>

9th school on Convective and Volcanic Clouds (CVC) detecting, monitoring and modelling

October 5–13, 2024

Nicolosi, Italy

[IAVCEI-sponsored]

<http://www.cvctrainingschool.org/school/>

EMSEV 2024: Workshop on electromagnetic studies of earthquakes and volcanoes

October 6–9, 2024

Chania, Crete, Greece

[IUGG Inter-Association IAGA-IASPEI-IAVCEI]

<https://www.emsev2024.org>

Upcoming events 2024

1st International Monogenetic Conference

November 4–8, 2024

San Pedro de Atacama, Chile

[commission Monogenetic Volcanism]

<https://cmv.iavceivolcano.org/>

<https://cmv.iavceivolcano.org/international-monogenetic-conference-2024/>

IAVCEI events 2025

7th Volcano Geology workshop

January 11–17, 2025

Colombia

[Volcano Geology commission]

<https://volcanogeology.iavceivolcano.org>

Field Workshop in Iceland (in planning)

May 18–24, 2025

[Volcano-Ice Interactions Commission]

IAVCEI Scientific Assembly

June 29 – July 4, 2025

Geneva, Switzerland

[Scientific Assembly]

<https://sa2025.iavceivolcano.org/>

Workshop of the 'Tephra Hazard Modelling' commission (in planning)

Before or after the 2025 IAVCEI Scientific Assembly

Catania, Sicily, Italy

[commission Tephra Hazard Modelling]

LASI VII workshop on "The physical geology of subvolcanic systems: laccoliths, sills & dykes"

September 9–11, 2025

Hveragerði, Iceland

[supported by Volcanic and Igneous Plumbing Systems Commission]

<https://lasi7.hi.is/>

IAVCEI events 2026

12th Workshop on Volcanic Lakes

March 9–17, 2026

Luzon, Philippines

[commission on Volcanic Lakes]:

<https://iavcei-cvl.org/>

3.3 Bulletin of Volcanology: Executive Editor's Column

The Bulletin of Volcanology is the official journal of IAVCEI and we encourage all of the IAVCEI community to consider submitting their work to the journal. *We are pleased that the 2-year Impact Factor (IF) for the journal has now risen to 3.6 and our rise in the Geosciences journal rankings means we are now a Q1 journal.* We have a number of special issues now open, including on the Mauna Loa 2021 eruption, the Icelandic eruptions, lessons from historical eruptions and on basaltic paroxysms (<https://link.springer.com/journal/445/updates/18557382>). We would also very much welcome suggestions from the IAVCEI community on topical review papers.

We would like to remind authors of the option for open access publication in the Bulletin of Volcanology. Transformative agreements with Springer to cover the article processing charge (APC) exist now for many countries and institutions globally; corresponding authors (articles may have more than one corresponding author) may qualify for open access on that basis, so do check among your authors. If you are in any doubt about whether agreements exist for your co-authors check the website <https://www.springernature.com/gp/open-research/oa-agreements>.

Open access fees may also be sponsored by a third party; details can be provided after acceptance of the paper.

New for this year: IAVCEI will cover one open access fee for a first author ECR who is planning to submit a paper for which none of the authors come from a country or institution with a transformative agreement with Springer.

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Please do contact me (marie.edmonds@esc.cam.ac.uk)!

Marie Edmonds (Executive Editor, Bulletin of Volcanology)

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