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INTERNATIONAL ASSOCIATION OF VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

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.

FROM THE PRESIDENT

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Dear colleagues,

Upon issue of this first IAVCEI Newsletter in 2021 the Covid-19 pandemic still continues to severely impact most of the world. We all hope that the ongoing vaccination campaigns will progressively permit to protect larger and larger fractions of the global population and hence to reduce the virus propagation and its impact. Of course we know that this will take time and not progress at the same speed in every country or continent.

These difficult circumstances continue to force us to adapt our working habits and, for the IAVCEI, our plans of international meetings.

As regards the **11th Conference of Cities on Volcanoes (COV11) in Crete**, previously re-scheduled for next June, the IAVCEI Exec, CaV leaders and the Greek LOC and POC unanimously agreed to further postpone it by one year. This decision was officially announced on March 8. The new dates for COV11 in Crete will be June 20–25, 2022. At that time, thanks to overall vaccination progress, we do hope being able to hold the first in-person IAVCEI major meeting since July 2019 (our General Assembly in Montreal)! We are convinced that such an opportunity could motivate the enthusiastic attendance of many more participants than initially expected. Updated information on the scientific programme, field excursions, and new schedules for abstract submission and registration will be provided later on (see the IAVCEI website and https://pcoconvin.eventsair.com/volcanoes11/).

We also had to adapt the plans for the **IAVCEI Scientific Assembly in New Zealand (Rotorua)**. The NZ LOC early alerted us of extreme difficulties in warranting the organization of this Assembly in January 2022. After intense discussions, it was finally agreed to further postpone our SA in Rotorua from 2022 to 2023 (January 30–February 3). We regret this new postponement but trust your understanding.

These forced changes in our meeting plans raise unprecedented difficulties. Indeed, the IAVCEI now faces the difficult issue of being obliged to hold its two major meetings – its SA and GA – within 6 months of the same year (instead of 2 years apart as in standard times)! Our next General Assembly is indeed scheduled in July 2023 during the 28th IUGG GA in Berlin. Such a situation thus raises conflicting issues in terms of meeting attendance, IAVCEI award delivery programme, etc. and may also affect the financial budget of the Association. We'll need to adapt ourselves and find the most appropriate solutions. Your comments and suggestions will be welcome.

Otherwise, among the good news I'd like to highlight the activation, on February 2, of **our new IAVCEI website**, built up with the technical assistance of our private partner Guarant. As previously warned, and as you probably realized, various sub-pages of this new website still need to be completed and updated. This work is under progress and will continue under the coordination of E. Nicotra. An official call was launched on February 17 to find a few trained volonteers willing to make part of the Communication Team that will be in charge of routine update of the IAVCEI website and our social media accounts. This team will be finalized quite soon and its composition communicated.

Finally, this Newsletter includes two reports on online volcanological conferences that were successfully hold in the past weeks or months:

- An International conference on "*Strategies for the prevention and mitigation of volcanic risk in Peru*", organized in November 2020 by the Institute of Geophysics in Peru (IGP) and supported by ALVO, IAVCEI, VDAP-USGS and IRD.
- An international workshop on "*volcano monitoring infrastructure on the ground and in space*", held on Februray 18–23, that has been dedicated to (i) improve the understanding of the current capabilities and limits of volcano monitoring from the ground and space and (ii) contribute to the development of a **Global Volcano Monitoring Infrastructure Database** (GVMID) by WOVOdat (Matt Pritchard).

Stay tuned and keep safe!

Best regards,

Patrick Allard
March 28, 2021

CONFERENCE

International conference: strategies for the prevention and mitigation of volcanic risk in Peru

How to face the hazards generated by volcanic eruptions with resilience and responsibility on the part of the authorities and the population is one of the constant challenges in the volcanic community. This situation is a challenge in all areas of the planet where people live with active volcanoes.

For this reason, scientific institutions and volcanic observatories promote activities and events in which preventive actions against volcanic danger are discussed for the benefit of vulnerable populations. These activities involve not only the commitment of scientists to research and disseminate knowledge about volcanoes and their activity, but also the will of the authorities to design volcanic risk mitigation strategies and the willingness of the population to comply with these measures.

In South America, this concern is active. About it, volcanological observatories and scientific institutions work in order to convince decision makers and the population that volcanic risk management must be based on scientific knowledge. In Peru, the Geophysical Institute of Peru (IGP), an institution attached to the Ministry of the Environment that is responsible for monitoring volcanic activity in the country, has been making a great effort to achieve the synergy of capacities of scientists, authorities and the population.

It is precisely in this sense that, in November 2020, with the knowledge and approval of the IAVCEI, the IGP, with the Latin American Volcanology Association (ALVO), the Volcano Disaster Assistance Program (VDAP-USGS), and the Research Institute for the Development of France (IRD), organized the international conference "Volcanic eruptions: strategies for the prevention and mitigation of volcanic risk". This event took place virtually between November 4 and 6, 2020 and brought together 19 experts in volcanology from countries such as Peru, Ecuador, Colombia, Argentina, Chile, Mexico, the United States, Spain and France. The conference was divided into three sessions, which are described below.

Session 1: Scientific investigations in volcanology

The objective of this session was to show recent research in volcanology and to highlight that multidisciplinary studies allow knowing the type of past behavior of a volcano, the degree of recurrence of eruptions, the configuration of magmatic systems, as well as other useful aspects to determine the nature and characteristics of future eruptions that may generate disasters.

This session was held on November 4 and involved the presentation of studies related to the internal structure of Sabancaya volcano (Roger Machacca-IGP); magmatic processes and pre-eruptive conditions of the recent magmas of Ubinas volcano (Pablo Samaniego-IRD from France); history of explosive eruptions of Misti volcano during the last 20,000 years (Christopher Harpel-VDAP); volcano-tectonic interactions in Sabancaya volcano: eruptions, magmatic inflation, moderate earthquakes and aseismic landslide (Patricia MacQueen-University of Cornell); precursors volcanic eruptions (Társilo Girona-University of Alaska Fairbanks) and, finally, a new database and a volcanic hazard maps website (Heather Wright-VDAP).

The first session of this conference reached a total of 28 029 people on Facebook.

Figure 1: Participants in the session "Scientific research in volcanology", the first of the international conference "Volcanic eruptions: strategies for the prevention and mitigation of volcanic risk".

Session 2: Volcanic Monitoring and Forecasting

The purpose of this session was to highlight the contribution of volcano monitoring to the forecast of eruptions. This session showed the latest progress in the implementation of volcano monitoring networks, the collection and processing of data, and the subsequent generation of information.

This second session of the conference was held on November 5 and included the following topics: geophysical monitoring and eruptive pattern of the eruption of Sabancaya volcano (2016–2020) (José Del Carpio-IGP); linking satellite and terrain surveillance data to understand the last two decades of eruptive activity from the isolated Sangay volcano (Francisco Vasconez-IGEPN); hydrothermal fluids and seismicity in quiescent volcanoes (Luca D'Auria-INVOLCAN); detection and surveillance of lava domes from space using the Mounts system (Sébastien Valade-UNAM México); multiparametric monitoring of the eruptive cycle of Nevados de Chillán volcanic complex, Ñuble, Chile (Cristian Mardones-OVDAS); geophysical observations of Ubinas volcano in the period of the Iquique earthquake, MW8.2, on April 1, 2014 (Adolfo Inza-IGP); degassing in open-conduit andesitic-dacitic volcanoes: the Popocatepetl volcano and its Latin American brothers (Robin Campion-UNAM México).

The transmission of this second session, through the Facebook of the IGP, ALVO, IRD and INVOLCAN, reached a total of 31 074 people.

Figure 2: IGP volcanologists carry out geophysical tests as part of the monitoring of volcanic activity in Sabancaya (Peru).

Session 3: Volcanic Risk Management

This important session closed the international conference. The presentations were aimed at showing how the application of background knowledge in volcanology to volcanic risk management actions can benefit to vulnerable populations. In particular, it was demonstrated how successful risk management by the authorities relies on validated scientific information and clear and accurate volcano monitoring data.

The topics that were discussed in this session were the following ones: attention to recent volcanic emergencies in Peru implemented by the Geophysical Institute of Peru (Luisa Macedo-IGP); lessons learned after the 1985 eruption of Nevado del Ruiz volcano (Marta Calvache-SGC); multidisciplinary strategies for the evaluation of impacts produced by volcanic ash (Pablo Forte-IDEAN); bicentennial project of the new hazard map of Misti volcano, a tool for risk management in Arequipa (Jersy Mariño-INGEMMET); volcanic risk assessment in Ubinas (Juvenal Medina-CENEPRED); monitoring and forecasting of ash dispersion for air safety: the case of Sabancaya volcano (Germán Russián-VAAC Buenos Aires).

The transmission of this session through Facebook reached a total of 24 700 people.

Figure 3: Advice and technical assistance to authorities for proper decision-making in the eruptive crisis of the Ubinas volcano (Peru) in 2019.

The conference had an overall duration of approximately 9 hours. Without any doubt, it represented one of the most prominent action in the field of volcanology in South America in 2020 despite the COVID-19 pandemic that the world is experiencing. The effort and commitment of the researchers to properly present their work resulted in the publication of a book of abstracts that can be freely downloaded (Spanish version: https://repositorio.igp.gob.pe/handle/20.500.12816/4872). Likewise, each of the conferences can be seen through the IGP YouTube channel (https://www.youtube.com/playlist?list=PLZg3wUguk4TM-Zg2EQhnuPGILcmW3aFK7).

The international conference "Volcanic eruptions: strategies for the prevention and mitigation of volcanic risk" was a great opportunity to remember that we live on a dynamic planet, with natural phenomena such as volcanic eruptions that can affect the population, its economic activities and the environment that surround volcanoes. The organization of such events, allowing to disseminate the usefulness of volcanic research and monitoring, can bring scientists, authorities and the population closer to the common objective of effectively managing volcanic risk.

WORKSHOP

Workshop on volcano monitoring infrastructure on the ground and in space (Online February 18–23)

To improve the understanding of the current capabilities and limits of volcano monitoring from the ground and space, a group of twenty conveners had planned a two-day workshop to be held May 21–22, 2020, before the Cities on Volcanoes 11 (CoV11) workshop in Crete.

The goals of the workshop were to: 1) open more channels of communication among volcano observatories, space agencies, and the remote sensing/database community; 2) contribute to the development of a **Global Volcano Monitoring Infrastructure Database** (GVMID) by WOVOdat, and 3) develop a roadmap to improve the utility of satellite data by volcano observatories. The workshop builds upon a two-day workshop held before the 2017 IAVCEI meeting titled "Promoting the Use of Satellite Observations at Volcano Observatories" and attended by about 45 people.

Interest in the CoV11 workshop was also strong with about 50 registrants from around the world by March, 2020, with financial support provided by IAVCEI, the Earth Observatory of Singapore, the U.S. Geological Survey Volcano Disasters Assistance Program, and the United Kingdom National Environmental Research Council.

But the CoV11 workshop was postponed, and is now scheduled for June 2022. After many discussions among the convenors, it was decided to reschedule the original in-person two-day workshop as **a four half-day online workshop from February 18–23, 2021**. One benefit of the new format was that more people were able to attend: over **280 people registered and 90–160 individuals** participated each day, representing **30 countries and more than 20 volcano observatories**. All of the sessions were recorded and can be viewed here: https://wovodat.org/about/cov_timeline.php Presentation slides and a "cheat sheet" with links to various satellite resources for volcano monitoring will also be posted.

On the first day, we discussed the **motivations for the GVMID and the potential benefits of an infrastructure database for volcano observatories**. A database of current infrastructure will provide a snapshot/baseline view of what techniques/instrumentation are in place at other similar/analogous volcanoes, which can help justify expanded networks by volcano observatories. These data will allow identification of what gaps exist that can be targeted by remote sensing and/or targeted deployments. In addition, we discussed existing volcano-monitoring databases (e.g. EPOS, EuroVOLC, Japan Volcanological Data Network, and WOVOdat) and we show how those efforts are complementary. One point of discussion was the importance of having both discipline-specific or nation-specific compilations of monitoring information and datasets, as well as global and multidisciplinary databases.

On the second and third days, we discussed **the roles played by satellite systems in augmenting ground-based networks**. We focused on four primary observables: Interferometric Synthetic Aperture Radar (InSAR) and gas emissions (day 2); thermal emissions and optical and SAR high-resolution measurements of surface and topographic change (day 3). Remote sensing experts discussed different satellite resources and case-studies of recent crises, with demonstrations of open-source web portals available to access data. We focused on the following questions: 1) What data are currently available from the constellation of over 50 satellites? 2) What is the value of satellite data for volcano observatories and how are the data currently being used? 3) What is required to improve data use? A long-term goal is to develop a global remote sensing observation strategy to ensure that the right satellites are collecting the right data at the right volcanoes. The recommendations will be communicated to the space agencies through *the Committee on Earth Observing Satellites (CEOS) volcano demonstrator project* (https://ceos.org/ourwork/workinggroups/disasters/volcanoes/).

Finally, on day four there were **presentations by volcano observatories from fifteen nations** around the world, as well as from IAVCEI about a renewed effort to strengthen the WOVO (World Organization of Volcano Observatories). Each observatory discussed the state of the art for their volcano monitoring infrastructure (ground-based and satellite/airborne remote sensing) -- what is presently available, what are the identified gaps, and what are the future plans. Each observatory also discussed their potential participation in GVMID, its potential benefits, and any concerns. It was heartening to see each observatory making use of satellite data in monitoring and interest in GVMID.

The workshop showed that there has been immense progress in recent years in the capabilities of satellites and ground sensors to monitor volcanoes and development of inter-disciplinary online tools and databases to access this information. Developments in sensor technology and artifical intelligence make this a fast developing field. We have a great

opportunity to improve the linkage between space- and ground-based observations, for mutual benefit through continued communication and collaboration. We received many positive comments after the workshop about the value of the online format, but also the desire to meet again in person. One person commented: "this workshop was really tremendous and what a great turn out which never could have been achieved with travel and a live event someplace. It would be great to do this more often so we all get to know each other better and to be reminded to keep the GVMID up-to-date. GVMID might really help to bring us all together more."

The work of this initative will be carried forward at a workshop planned to be held in conjunction with the 2022 IAVCEI meeting in New Zealand called "Remote Sensing for volcano monitoring – From Science to Operational activity" and organized by Gabor Kereszturi (Massey University) and others. We hope you will be able to attend!

Lead Conveners:

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Co-Conveners:

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Sarah Brown	University of Bristol, UK
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Hugo Delgado	UNAM, Mexico
Nico Fournier	WOVO and GNS, New Zealand
Eisuke Fujita	National Research Institute for Earth Science & Disaster Prevention, Japan
Julie Griswold	Cascades Volcano Observatory, US Geological Survey, USA
Gill Jolly	WOVO and GNS, New Zealand
Sue Loughlin	British Geological Survey, UK
Paul Lundgren	Jet Propulsion Laboratory, California Institute of Technology, USA
Chris Newhall	Mirisbiris Garden and Nature Center, Philippines
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