Workshop Report:

Fostering developing-developed country partnerships for the advancement of global volcano science

Inaugural Workshop of the

International Network for VOLcanology Collaboration (INVOLC)

4 – 7 June 2019

The University of the West Indies Seismic Research Centre, Saint Augustine, Trinidad & Tobago

THE UNIVERSITY OF THE WEST INDIES

SEISMIC RESEARCH CENTRE

IUGG

IAVCEI

International Association of Volcanology and Chemistry of the Earth's Interior

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Executive Summary

The University of the West Indies Seismic Research Centre (UWI-SRC) hosted the workshop *"Fostering developed-developing country partnerships for the advancement of global volcano science"* at the University of the West Indies St. Augustine Campus, 4-7 June 2019, with support of 7 different international organisations/institutions, including IAVCEI and IUGG. In total 25 participants from 20 different countries, primarily Lower-and-Middle-Income Countries (LMICs), came together to discuss challenges to undertake volcanology in a resource-limited context, as well as mechanisms to advance volcanology and inclusion of all volcano scientists into the international community. Prior to the workshop, an online survey was organised to seek input from the global volcanology community.

Primary challenges identified relate to

- limited financial resources in the form of funding for monitoring and/or research, conference participation, publication fees, etc.
- limited human resources, reflected in inadequate number of staff relative to workload as well as limited specialised knowledge at in-country institutes
- access to facilities or equipment, which often results in a reliance on external scientists
- international collaborations, which are widely recognised to be generally beneficial, are very often at the same time experienced in a manner which results in unequal treatment of in-country individuals or institutions, inhibiting their inclusion as a respected partner in the international community.

It was concluded that a professional network of scientists working in resource-limited contexts would be a suitable mechanism to strengthen collaborations in volcanology and promote professional and ethical conduct from all partners involved in international collaborations. The most appropriate host organisation of this network was considered to be IAVCEI, despite the fact that the majority of volcano scientists working in resource-limited contexts do not have active IAVCEI membership.

The proposed name for this network is the **International Network for VOLcanology Collaboration (INVOLC)**, with the overall aim defined as: "Fostering Cross-Country Partnerships to Overcome Challenges in Resource-Constrained Settings for the Advancement of Global Volcanology". This definition deliberately includes partnerships between *any* nations and reflects the specific ambition to foster inter-regional partnerships between scientists working in resource-constrained contexts.

INVOLC's **goals** are to 1) **ADVOCATE** for inclusion of volcano scientists working in resource-constrained contexts into the international community; 2) **DEVELOP** best-practice guidelines and engagement protocols for international collaboration; 3) **IDENTIFY and ADDRESS** knowledge gaps and needs; 4) **COLLECT and DISSEMINATE** information on available resources (financial, educational, infrastructural, etc.); 5) **FACILITATE and PROMOTE** the

exchange and sharing of knowledge and resources between countries; and 6) **IDENTIFY and HELP OBTAINING** funding resources facilitating the above-mentioned goals.

It is proposed that INVOLC function as a **network within IAVCEI**, and that it is steered by a **governing board of nine members**, one of whom will serve as a chair. Six of the board members will represent each of the following geographical regions: 1) Caribbean; 2) Mexico – Central America; 3) South America; 4) Africa – Middle East; 5) SE Asia (Indonesia – Philippines); 6) SW Pacific Islands. In addition to the six regional representatives, three additional board members are to be selected from any country. Another three advisory members will be invited from international organisations with a mission to promote the development of volcano science and/or risk mitigation in LMICs, and who have strong existing partnerships with several of these countries. After an initial transition period of two years during which a transitional board will launch the network and grow its activities, a new board will be elected every four years.

The governing board will oversee the functioning of thematic **Working Groups**: 1) Current Status; 2) Communication and Engagement; 3) Training; 4) Finance. Each working group will be in charge of organising a range of activities serving one or more goals of the INVOLC network. In the initial transition period, priority will be given to working group "Current Status", with a focus on benchmarking the existing status of volcanology in each relevant country. In addition, working group "Communication and Engagement" will work on establishing an efficient communication channel to enable recruitment of INVOLC members.

A second major task for Working Group "Communication and Engagement" is the development of best-practice guidelines for international collaboration. A draft of such guidelines is presented in the appendix to this report and will be further developed in agreement with the IAVCEI Executive Committee.

1. Introduction

The University of the West Indies Seismic Research Centre (UWI-SRC) and the IAVCEI – International Network for Volcanology Collaboration (INVOLC*) co-convened the workshop *"Fostering developed-developing country partnerships for the advancement of global volcano science"* at the University of the West Indies St. Augustine Campus, 4-7 June 2019. Financial support for this event was provided by 7 different organisations and institutions: the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), the International Union of Geodesy and Geophysics (IUGG), the United States Geological Survey Volcano Disaster Assistance Program (USGS – VDAP & USAID, United States), The University of the West Indies (UWI, Trinidad and Tobago), Vrije Universiteit Brussel (VUB, Belgium) and the Université Libre de Bruxelles (ULB, Belgium).

The purpose of the workshop was to bring together senior scientists representing countries working in a resource- or technology- constrained context to discuss the challenges to undertaking volcanology in this context and also opportunities for advancement of volcano science through the establishment of a network to support scientists primarily from Lower- to Middle- Income Countries (LMIC's). In total 25 scientists from 20 different countries, primarily LMICs, attended (a list of participants can be found in Appendix 1). This workshop and the associated survey (administered from 23 April until 17 May 2019) are combined into the consultation process for the establishment of the proposed network.

Specific intended outcomes of the workshop included: i) prioritised goals for the network and establishment of it's composition and function; ii) proposed future activities of the network; and iii) recommendations for best-practice engagement protocols targeted at international scientists working in developing countries. In preparation for the workshop, an online survey was developed and distributed as widely as possible to volcano scientists around the globe. Preliminary results of the survey were presented during the workshop to stimulate discussion and are also summarised in this report.

This report reflects the consensus view of all participants to the workshop, resulting from discussion in focused breakout groups and plenary form. All participants received the opportunity to provide confidential feedback and comments on an earlier draft version of this report.

**previously provisionally called IAVCEI – Developing Nations Network*

2. Workshop Overview – A detailed workshop schedule can be found in Appendix 2

Day 1 of the workshop focused on discussing the challenges and needs for volcanology in a resource-constrained context. Each country/region representative presented on the volcanological activities in their part of the world and the challenges they face (a list of presentations can be found in Appendix 3). This was followed by a presentation of the results from the accompanying survey that had been open for contributions from colleagues worldwide and group discussion to identify the key challenges that are common to all.

Day 2 centred around whether some of the challenges facing volcanologists in LMICs could be tackled through the establishment of a network. Following the presentation on the survey results pertaining to network definition, goals and activities there followed in-depth breakout discussions, during which the groups outlined the goals, functioning and composition of the network as well as producing a list of proposed activities for the network.

Day 3 started with an introduction to IAVCEI protocols and examples of existing guidelines for professional conduct e.g. during a crisis, and covered the survey results related to engagement. Participants all agreed that some sort of guidelines or recommendations for volcanologists working in LMICs would strengthen the professional relationships between foreign visitors working in-country. These discussions continued into **day 4** with the development of a draft set of 15 statements to make up the proposed guidelines for best-engagement protocols in international collaboration (found in Appendix 4).

During the last two days of the workshop the discussion of the focus and structure of the network was wrapped up by consensus on several important aspects related to the 1) network name, 2) network aim, 3) network goals, 4) network structure and board membership, 5) working groups and key activities including a list of specific action points to work on in the first six months of the network - detailed in the following sections.

On **Day 4** of the workshop participants were invited to visit The University of the West Indies Seismic Research Centre to view the operational facilities and meet staff in an informal setting. The final group activity was an evening tour of Port of Spain ending with dinner in the city to celebrate the successful achievements of the workshop. A selection of photographs from the workshop can be found in Appendix 5.

3. Key Challenges for Volcanology in LMIC's

A series of individual country presentations were given by participants, followed by a review of the relevant survey results and subsequent breakout group discussions focussed on the challenges for undertaking volcanology in a resource-constrained context. Several overarching themes were developed:

- ***Financial Resources:*** The most commonly reported challenge was that of limited funding. For some cases this means that prioritisation of funding to volcano science in general is low; for other cases it relates to the balance between funding for operational observatory functions versus research to underpin monitoring efforts, and so that prioritisation of funding to research is low. The majority of respondents to the survey also agreed that there is limited support available for conference attendance and journal publication. Conference attendance and publishing in peer-reviewed journals are activities that are of benefit to both our volcano understanding and for the scientific credibility of individual scientists.
- ***Human Resources:*** Whilst some regions have more personnel than others relative to the amount of volcanoes to study and/or monitor, the impact of limitations in numbers and capacity of personnel was experienced by all. There are difficulties attracting and retaining suitable personnel given the limited funding and the comparison of salaries with other employers. There can be a limitation in the available specialised knowledge, particularly when numbers of total personnel are low. The need for specialised training for personnel was also highlighted. However, the balance is difficult given that there can also be an issue that personnel that receive training can expect higher salaries and can also move to other employment.
- ***Facilities:*** Without appropriate equipment, laboratories or technology, it is difficult to improve on the knowledge of the volcanic geology and hazard. In-country scientists are often reliant on external groups to undertake analysis, which can be costly and can also mean that their work is steered by external researchers, and sometimes that in-country scientists cannot access the results. There was particular mention of the desire to have access and training on new techniques and also the ability to adapt and improve techniques to the reality of their context.
- ***Collaborations:*** Whilst it was broadly recognised and appreciated that external collaborations make it possible to obtain equipment and undertake work that is beyond the local resources, it was also noted that there are some distinct issues with the way many international collaborations are currently undertaken. In the broadest sense the definition of collaboration varies widely. There are instances where external researchers undertake work in a country without any prior consultation or collaboration at all, which can in fact be a breach of local regulations and collaboration ethics. Even when a "collaborative" project is actually established, the recognition of the contributions (assumed in-kind and use of already limited resources for instance) and needs of both sides is often not adequate and can mean that the collaboration is not really a partnership. In many instances external

researchers will only contact local scientists after the research proposal has been written or even funded. In those cases, the project is therefore imposed with no opportunity to be involved in the proposal writing stage to ensure that the project 1) is aligned with in-country priorities, 2) meets national rules and regulations, 3) has included the local knowledge of the volcanic system (which may be un-published) or complexities in social or cultural context for example, 4) includes an agreement on the mutual exchange of data and information. Local scientists would typically like to be involved in the proposal preparation and/or writing stage to ensure that there is indeed a two-way collaboration that involves some benefits to the local scientists such as training, or access to datasets that can be used to contribute to the understanding of the hazard and risk in-country. In many instances there is no opportunity or planned activity for discussion of the results or outcomes of the work, e.g. prior to their final presentation. Often local scientists may be included as co-authors on publications but are not given the opportunity to contribute their knowledge and be respected as equals in the process. The long-term impacts of such kinds of interaction is that it can affect the credibility of the local scientists in their own countries, making risk mitigation efforts harder. It was highlighted that long-term (continuous) partnerships, with mutual benefits, should be undertaken outside of crises activity to ensure that external scientists are familiar with the context and to facilitate collaboration during times of crises. Finally, it was noted that many countries or institutions do not have a data sharing policy, which can create conflicts or misunderstandings when results of a study are presented.

The above overarching themes and challenges were generally perceived to be applicable in all countries involved in the discussion. In addition, there was also discussion on challenges that subset or regional groups might experience, for instance language barriers to attending conferences or writing publications, or visa / immigration restrictions for travelling to conferences and workshops.

Throughout the discussions of challenges and opportunities, and in particular tackling these challenges, it was concluded that a professional network of scientists working in resource-limited contexts would be an suitable mechanism to strengthen collaborations in volcanology, and promote professional and ethical conduct from all partners involved in international collaborations.

4. Network Structure and Functioning

4.1 Network Name

Several options for a potential name for the new network were proposed during the pre-workshop survey, including "IAVCEI – Developing Nations Network" or "IAVCEI – Global Inclusion Network", the latter of which had the highest score in the survey. Based on the survey results and discussion among participants, it was decided that the network name should reflect the values and/or terminology of:

- *Internationality*: Whilst it is understood that the focus of the network is largely on the enhanced integration of volcano scientists working in resource-constrained contexts (typically LMI countries), the network does not wish to stipulate that members should be from specific countries. The network will be open to anyone who perceives themselves as working in a resource-constrained context that imposes challenges towards integration into the international volcanology community.
- *Volcanology:* As opposed to "volcano science", the latter of which might be perceived as academically focused research activities only. In other words, the network wishes to develop activities that are beneficial for those working in any aspect related to volcanology, including, but not limited to, volcano monitoring, risk mitigation, and applied and fundamental research.
- *Inclusion*: The network wants to stimulate collaborative partnerships fully based on equality, in which all partners are given the opportunity to work towards fully addressing their needs.

The final name was decided upon by a majority vote by show-of-hands:

International Network for VOLcanology Collaboration (INVOLC)

The overall **aim** of the new network was defined as follows:

"Fostering Cross-Country Partnerships to Overcome Challenges in Resource-Constrained Settings for the Advancement of Global Volcanology"

This definition deliberately includes partnerships between *any* nations and reflects the specific ambition to foster inter-regional partnerships between scientists working in resource-constrained contexts.

4.2 Network Goals

The **goals** of the network are to

1) **ADVOCATE** for inclusion of volcano scientists working in resource-constrained contexts into the international community
2) **DEVELOP** best-practice guidelines and engagement protocols for international collaboration
3) **IDENTIFY and ADDRESS** knowledge gaps and needs
4) **COLLECT and DISSEMINATE** information on available resources (financial, educational, infrastructural, etc.)
5) **FACILITATE and PROMOTE** the exchange and sharing of knowledge and resources between countries
6) **IDENTIFY and HELP OBTAINING** funding resources facilitating the above-mentioned goals

4.3 General Structure

The proposed structure of INVOLC is for it to function as a **Network** within IAVCEI with membership open to all **individuals and organisations who identify as working in a resource-limited context that is considered to impose barriers to their activities in volcanology and/or to inclusion within the international community**. In addition, individuals and organisations not based in LMICs but with significant affinity to and/or experience in working in such contexts will be welcomed to join the INVOLC network as well.

INVOLC will be headed by a governing board consisting of 9 members, one of whom shall take up the responsibility as **chair**. Board members will be newly elected by the INVOLC members every 4 years. The first board elections will be held after an initial transition period of 2 years starting in July 2019 (IUGG General Assembly), i.e. until July 2021 (or the IAVCEI General Assembly 2021) a transitional board will take up the responsibility of initiating activities and steadily growing the network. Election of new board members, and presentation of a final report by the outgoing transitional board, will take place during IAVCEI General Assembly 2021, and every four years thereafter.

At least 6 board members are to be representatives of geographic regions characterised by a large number of LMICs with active volcanoes (as identified by the Global Volcanism Program): 1) Caribbean; 2) Mexico – Central America; 3) South America; 4) Africa – Middle East; 5) SE Asia (Indonesia – Philippines); 6) SW Pacific Islands.

Where appropriate, the regional representatives are also considered as representatives for existing international regional networks: the Association of Latin American Volcanologists (ALVO), Indonesian or Philippine members of the Asian Collective for Volcanology (ACV), and the Melanesian Volcano Network and its extended partners in the SW Pacific region

(identified here as MVN+). It is clearly understood by all parties involved that INVOLC's mission will not in any way conflict with that of these respective regional networks, but rather function as a liaison body between these networks (Figure 1). It is expected that INVOLC will be able to facilitate the initiation of new regional networks where these are currently lacking, but where it is generally perceived highly beneficial to set up a future regional network (e.g. Africa – Middle East).

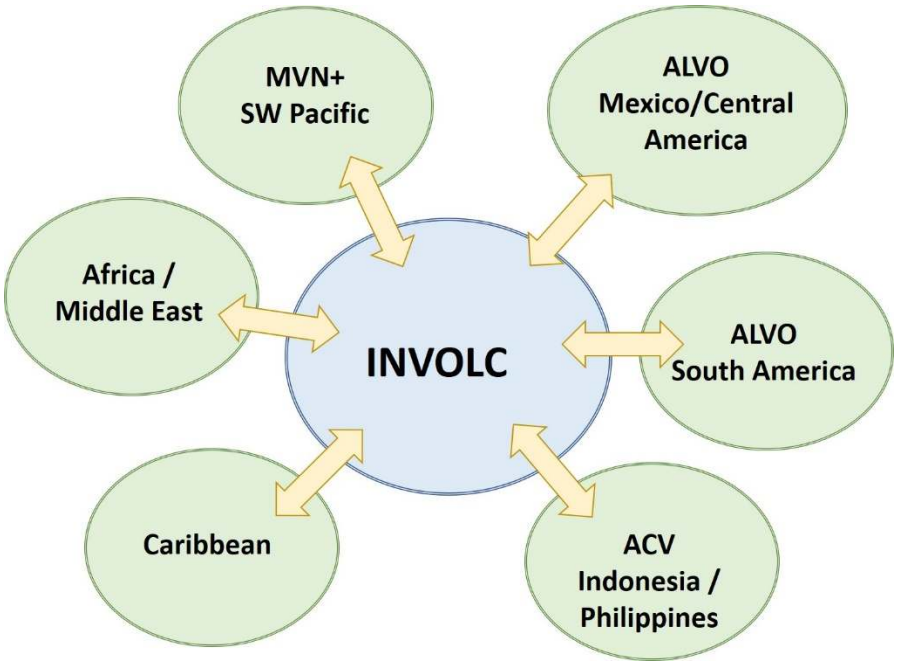


***Figure 1**: Proposed General Structure of INVOLC, acting as a liaison between six key regions with predominantly LMICs with active volcanoes*

In addition to the 6 regional representatives, a total of 3 additional members shall sit on the board. Two of these additional members can be from any country but shall have a significant track record of developing volcanology in LMICs and have a generally considered good reputation of professional and ethical behaviour, e.g. such as that reflected in existing IAVCEI guidelines. The third additional member shall be the outgoing chair of the board. It is considered ideal that the board members shall collectively represent a breadth of expertise in both volcano monitoring / risk reduction and fundamental / applied volcanology research with members including both academia and government institutions.

Finally, it was decided that 3 advisory (non-voting) board members are to be invited from organisations with a mission to promote the development of volcano science and/or risk mitigation in LMICs, and who have strong existing partnerships with several of these countries. Examples include USGS-VDAP (USA), GNS (New Zealand), GA (Australia), JICA (Japan), INGV (Italy) and BGS (UK). These organisations shall be formally invited to nominate advisory board members within 6 months of formal inauguration of INVOLC, with the ideal combination to balance across the regions.

Current IAVCEI guidelines state that IAVCEI commission members must all be members of IAVCEI. Given that ~70% of participants in our survey targeted at volcanologists in LMICs stated that they are not currently members of IAVCEI, it is proposed that INVOLC will keep the status of an IAVCEI network, for which there are no official restrictions. Amongst the participants at the workshop there was a similar representation of IAVCEI membership. For the purposes of the transitional board IAVCEI membership will not be a requirement to hold position. This policy will be reviewed in 2021 prior to the end of the outgoing transitional board's tenure.

During the workshop, the 6 regional representatives of the initial transitional board were appointed after mutual agreement by participants from each of the representative regions, and subsequent presentation of the candidates to the entire workshop group. Where it was not yet possible to appoint a representative, a volunteer facilitator was appointed to take up the responsibility of seeking a representative from their region at the latest within 6 months after the inauguration of the network. Two additional members of the transitional board were also appointed; a third one will also be sought within 6 months after inauguration. A sitting chair of the transitional board will be formally appointed as soon as all board members are identified. The transitional board members (or facilitators) are listed below:

Region	Representative / Facilitator	**Affiliation**
Caribbean	*Victoria Miller (facilitator)*	Montserrat Volcano Observatory (UWI-SRC)
Mexico – Central America (ALVO)	Raúl Salguero	INSIVUMEH, Guatemala
South America (ALVO)	José Luis Palma	University of Concepción, Chile
Africa – Middle East	Gezahegne Yirgu	Addis Ababa University, Ethiopia
SE Asia (ACV – Indonesia / Philippines)	Supriyati Andreastuti	CVGHM, Indonesia
SW Pacific (MVN+)	*Esline Garaebiti Bule (facilitator)*	VMGD, Vanuatu
Additional member 1	Victoria Miller *(past chair)*	Montserrat Volcano Observatory (UWI-SRC)
Additional member 2	Karen Fontijn	Université Libre de Bruxelles, Belgium
Additional member 3	*TBC*	

4.4 Working Groups

The governing board shall oversee 4 thematic **Working Groups** (Figure 2) that will each contain at least 1 current member of the board: 1) Current Status; 2) Communication and Engagement; 3) Training; 4) Finance – refer to detailed descriptions below. Each working group will be in charge of organising a range of activities serving one or more goals of the INVOLC network – within the limitations of available funding. As much as possible, funding sources will be sought to organise the activities. There will be some overlap in the objectives and activities of different working groups; therefore, regular communication between them, e.g. via the board members, will be crucial for success of the network. It is also anticipated that, as INVOLC grows, some working groups may become redundant, or may be redefined.

In addition to defining potential activities to be organised by each of the four working groups, we selected one working group to be prioritised in the first three years of inauguration. After a combined expression of preference nominated via both the regional groups and an individual vote, it was decided that priority should be given to working group (1) "Current Status," with a focus on benchmarking the existing status of volcanology in each relevant country. Four participants have volunteered to be part of this working group, two of whom are current board members: Raúl Salguero (Mexico - Central America representative), Gezahegn Yirgu (Africa – Middle East representative), Ramón Espinasa (Mexico) and Lloyd Lynch (Trinidad and Tobago). Additional "Current Status" working group members, as well as members for the other working groups, will be actively sought during the first two years of INVOLC's activities.

In addition to working group "Current Status," it is understood that certain specific tasks of working group (2) "Communication and Engagement" require absolute priority in order to start the network and allow it to recruit members and grow. Initial communication and call for membership will happen via social media, the IAVCEI website, VolcanoList, and participants' professional networks. This communication will be steered by the board members.

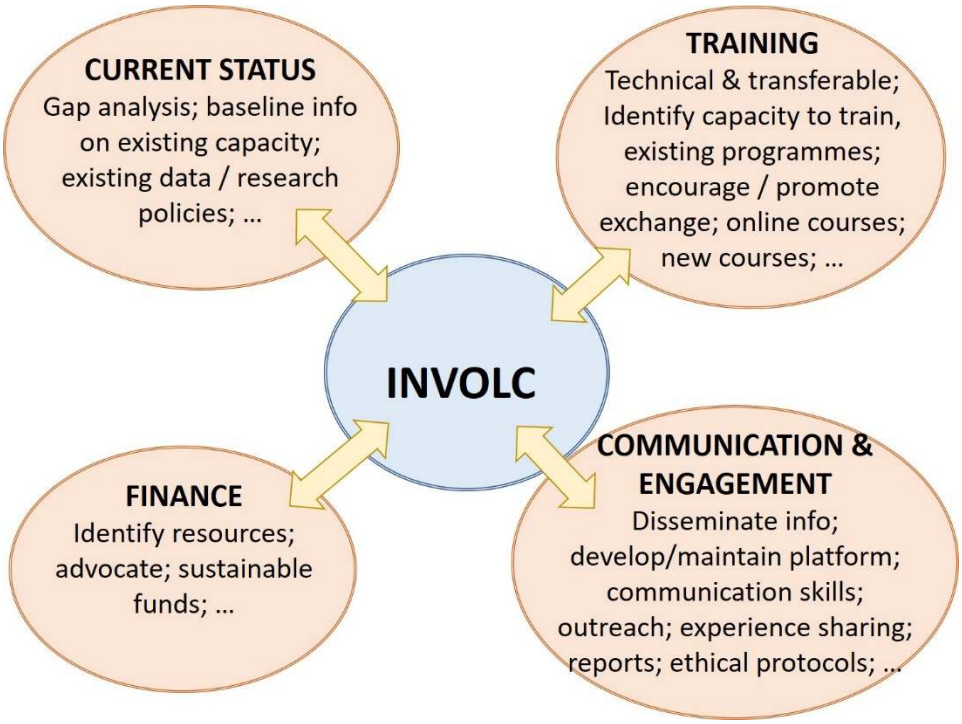


***Figure 2**: Proposed Thematic Working Groups Within INVOLC and their key contributions*

Working Group 1: CURRENT STATUS

This working group will be primarily concerned with identifying resources, needs and knowledge gaps related to volcano science in resource-constrained settings. Specific activities will include, but are not limited to:

- Develop or adapt an existing **framework** for assessing capacity in volcanology
- Collection of **baseline information** for each INVOLC-relevant country on existing capacity in volcanology – where this is deemed possible (e.g. observatories, universities, number of staff / students, volcanology (geology/geophysics) programmes, existing in-country expertise and facilities)
- Country-by-country **gap analysis** on the state of volcano monitoring and risk mitigation, largely following methods used by USGS-VDAP, and adjusted wherever this is deemed appropriate
- Inventory of existing national / institutional **data and research policies** in each relevant country; including national regulations related to international visitors conducting research in the country, and procedures to follow for obtaining research permits (where relevant)

Working Group 2: COMMUNICATION & ENGAGEMENT

This working group will be responsible for communication with members and external groups, ideally through an existing online platform (e.g. IAVCEI website, VHUB) as well as through newsletters, social media, etc. Because of the central role of communication, this working group will maintain strong connections with the INVOLC board, other working groups as well as regular members. Specific activities will include, but are not limited to:

- Develop and maintain an efficient **communication platform** for INVOLC members
- Developing **best-practice engagement protocols** for international collaboration
- Support to local institutions, especially in LMICs, to **increase their local credibility when explicitly requested**. Society in each INVOLC-relevant country must be aware about the existence of the network and the support to locals within the partnership (e.g. display institutional logos of the partnerships in web pages, etc.)
- Disseminate information on **existing resources** (e.g. funding calls, travel grants, training courses, lab facilities, etc.) – *some of this information will be collected from working group "Finance"*
- Share **outreach materials** used in various contexts; facilitate customization to local context
- In negotiation with **Bulletin of Volcanology** editorial board, develop a series of short-format papers, including
    - **"Volcanic Crisis"**, specifically targeted at volcano observatory staff to publish data and results soon after a volcanic crisis.
    - **"Observation Reports"**, specifically targeted at local groups to help publish their knowledge on the volcanic systems (e.g. volcanic geology, stratigraphy) in their country. It also serves as a means to promote wider access to published details of equipment/technology in use at a given volcano (facilitating the appropriate citation of monitoring data and allowing external researchers visibility of current status of volcano infrastructure).
- Encourage dissemination of research results, including through **open access** publication and **pre-prints** (e.g. EarthArXiv)
- Raise awareness of existing schemes for publication **fee waivers or grants** amongst network members and negotiate with additional journals
- Advocate for **appropriate citation of datasets** in journal publications e.g. making data citation a requirement of the journal review process

Working Group 3: TRAINING

This working group will be primarily concerned with training (both technical and transferable) needs for those performing volcano science in resource-constrained settings. Specific activities will include, but are not limited to:

- Identify **capacity to train** (technically) among existing institutions, including the possibility for individual **internships**
- Identify existing (technical) **training programs** and their entry conditions
- Identify and/or develop online **scientific writing courses**, either accessible at all times, and/or customized ones at specific timings
- Open a call for a one-on-one (unconditional) **mentorship** system
- Support / organize **short courses** hosted at local institutes
- Support / organize dedicated **field schools** in specific regions

Working Group 4: FINANCE

This working group will provide the backbone of many of INVOLC's planned activities. It is generally expected that INVOLC will be a low-budget organisation and most of its goals will be achieved by identifying and sharing existing resources. However, financial support will have to be sought from various sources in order to maintain the functioning of the network at a desired level. Specific activities will include, but are not limited to:

- Negotiate waived **IAVCEI membership** fees, and/or make membership more attractive
- Demand transparency and negotiate fair distribution of IAVCEI conference **travel grant allocations** – e.g. proportional by region
- Identify existing **financial resources** (e.g. funding calls, travel grants, etc.) and provide assistance with funding applications where this is requested
- Promote **virtual access** to conferences
- Identify and facilitate collaboration between LMICs institutions, with a strong focus on **sharing laboratory facilities**, enabling researchers to access (analytical) instruments that are not available in their own institutes but that are sometimes essential to the research becoming publishable.

5. Specific Action Points for First 6 Months of INVOLC (July – Dec 2019)

It was recognised that during the initial stages of the network it is important to employ efforts to i) grow the awareness and membership of INVOLC, whilst at the same time ii) commencing activities to provide benefit to existing members. Therefore a few key tasks have been identified for completion within the next 6 months, with a primary focus on initial setup in order create and maintain momentum. It is expected that additional activities as identified in the mandate of the four working groups, and any others that are considered appropriate as the network expands, will start to take place in the first few years after initial launch of INVOLC. Prioritised action points are:

- Draft report to be sent to workshop participants by 21st June 2019; feedback requested by 5th July 2019; report sent to IAVCEI by 12th July 2019
- Presentation of proposed INVOLC structure and functioning to IAVCEI Executive Committee during IUGG General Assembly, 15th July 2019 (TBC)
- Provide a draft of engagement protocols to IAVCEI Executive Committee and request feedback, July – September 2019
- Promotion of workshop outcomes via IAVCEI Newsletter, IAVCEI website, conference meetings etc. by 15th August 2019
- Set up of communication platform – e.g. IAVCEI website, VHub, IAVCEI Newsletter, VolcanoList, Twitter account, by 15th October 2019
- Specific regions (incl. Africa / Middle East, and possibly SW Pacific) to apply for UNESCO IGCP funding to launch regional volcanology related activities and set up a regional volcano network, by 15th October 2019
- Wider call for INVOLC members – after inauguration and initial tasks are complete
- Population of working groups (ongoing – with initial members for each working group by November 2019)
- Finalisation of transitional board composition within 6 months of IAVCEI inauguration (January 2020)

6. Workshop Recommendations

Below is a list of specific recommendations from the workshop participants to IAVCEI, in order to successfully launch the network and comply with its ambitions:

- A new support group be created to support colleagues working in LMICs; this support group should sit within the IAVCEI framework as a network
- Network aim to be "fostering cross-country partnerships to overcome challenges in resource-constrained settings for the advancement of global volcanology"
- Network name to be International Network for VOLcanology Collaboration (INVOLC)
- Network mission should not conflict with that of respective regional networks, but rather function as a liaison body between these networks and facilitate the initiation of new regional networks where these are currently lacking, but where it is generally perceived highly beneficial to set up a future regional network
- Network to be headed by a governing board consisting of 9 members
- Network will seek to promote the inclusion of volcanologists from LMICs into the IAVCEI framework by 1) communicating the benefits of IAVCEI membership to network members; and 2) providing recommendations on how to make IAVCEI membership more attractive, e.g. through advocating for fee-waivers for membership
- Network membership to be open to anyone who perceives themselves as working in a resource-constrained context that imposes challenges towards integration into the international volcanology community, and regardless of employment status or affiliation mandate, i.e. inclusive of both academia and government institutions
- Membership of the network will not require membership of IAVCEI
- Membership of the transitionary board will not require membership of IAVCEI
- Network to initiate four working groups: 1) Current Status; 2) Communication and Engagement; 3) Training; 4) Finance. Each working group will be in charge of organising a range of activities serving one or more goals of the INVOLC network
- The highest priority area for initial activities should be working group 1) Current Status; additional members for this working group as well as members for the other working groups should be actively sought during the first 2 years of network activities
- The goals of the network will be to:
    - **ADVOCATE** for inclusion of volcano scientists working in resource-constrained contexts into the international community
    - **DEVELOP** best-practice guidelines and engagement protocols for international collaboration
    - **IDENTIFY and ADDRESS** knowledge gaps and needs
    - **COLLECT and DISSEMINATE** information on available resources (financial, educational, infrastructural, etc.)
    - **FACILITATE and PROMOTE** the exchange and sharing of knowledge and resources between countries

  - **IDENTIFY and HELP OBTAINING** funding resources facilitating the above-mentioned goals

- The Draft Guidelines for Best-Engagement Protocols in International Collaboration should be presented to the IAVCEI executive for feedback, and, if received positively, should be further developed into a more detailed document by the network for future endorsement and promotion by IAVCEI
- After the initial 6 months, when all board and working group members are identified, a revised longer-term action plan will be put together and the list of action points (Section 5) will be updated.

Appendix 1: List of Participants

Name	Country	Organisation
South America		
José Luis Palma	Chile	University of Concepción
Mariano Agusto	Argentina	University of Buenos Aires / ALVO President
Francisco Vasconez	Ecuador	Instituto Geofísico, Escuela Politécnica Nacional (IG-EPN)
Cristian Lopez	Colombia	Servico Geológico Colombiano
North/Central America		
Javier Pacheco	Costa Rica	OVSICORI
Eduardo Gutierrez	El Salvador	MARN
José Saballos	Nicaragua	Instituto Nicaraguense de Estudios Territoriales-INETER
Raúl Salguero	Guatemala	INSIVUMEH
Ramon Espinasa	Mexico	CENAPRED
Jeffery Marso	United States	USGS - VDAP
Caribbean		
Victoria Miller	Montserrat	Montserrat Volcano Observatory
Richard Robertson	Trinidad & Tobago	The University of the West Indies Seismic Research Centre
Erouscilla Joseph	Trinidad & Tobago	The University of the West Indies Seismic Research Centre
Lloyd Lynch	Trinidad & Tobago	The University of the West Indies Seismic Research Centre
Michal Camejo	Trinidad & Tobago	The University of the West Indies Seismic Research Centre
Omari Graham	Trinidad & Tobago	The University of the West Indies Seismic Research Centre
SE Asia and SW Pacific		
Supriyati Andreastuti	Indonesia	CVGHM
Mikhail Herry	Papua New Guinea	Rabaul Volcano Observatory
Sandrine Cevuard	Vanuatu	Geohazards Division of the Vanuatu Meteorology and Geohazards Department
Solomon Possy	Solomon Islands	Geology Division, MMERE
Africa		
Gezahegne Yirgu	Ethiopia	Addis Ababa University
Elisante Mshiu	Tanzania	University of Dar es Salaam
Katcho Karume	Democratic Republic of Congo	Goma Volcano Observatory
Europe		
Karen Fontijn	Belgium	Université Libre de Bruxelles (ULB)
Matthieu Kervyn	Belgium	Vrije Universiteit Brussel (VUB)

Appendix 2: Workshop Schedule

	8:30 - 10:30 am	11:00 am – 13:00 pm		2:00 - 3:30 pm	4:00 - 6:00 pm	6:30 pm
3 June	Pre-workshop travel, arrival and check in to accommodations (optional tour of UWI-SRC @10 am for those who have arrived early)					
Day 1 **4 June** **Challenges and needs**	@9:30 am *Welcome & Housekeeping **Stacey Edwards, UWI-Seismic Research Centre** Official Opening **Richard Robertson, Director of UWI-Seismic Research Centre** Introduction to IAVCEI-DNN / Proposed Network **Victoria Miller, Network Chair** Ice-breaker activity **Jose Palma & Victoria Miller**	Regional / Country Presentations on volcanology activities and challenges **Victoria Miller** **Individual presenters**		Regional / Country Presentations on volcanology activities and challenges **Victoria Miller** **Continued individual presenters**	Presentation of survey results on challenges **Victoria Miller** Discussion of survey results and identification of key challenges **Victoria Miller** **Breakout groups** Group presentations on key challenges and needs **Victoria Miller** **Breakout group rep(s)**	Dinner and Networking
Day 2 **5 June** **Network definition, goals and activities**	Recap on Day 1 and introduction to Day 2 **Victoria Miller** Presentation of survey results on Network goals **Karen Fontijn** Discussion on what should be the goals of the Network **Karen Fontijn** **Breakout groups** Exercise to formulate / write the Network definition, goals, functioning, composition. **Karen Fontijn** **Entire Group** **GROUP PHOTO - ALL**	Introduction to IAVCEI-Network possible activities and support mechanisms identified by IAVCEI **Karen Fontijn** Discussion of proposed activities and how the network would like to be supported by IAVCEI **Karen Fontijn** **Breakout groups** Group presentations on activities **Karen Fontijn** **Breakout group rep(s)**		Exercise to collate, prioritise and allocate activities to short/long term timeframe. Including identification of possible leaders/groups to champion **Karen Fontijn & Victoria Miller** **Entire Group** Collective discussion of network needs from IAVCEI **Victoria Miller** **Entire Group**	Depart @3:45pm: Caroni Bird Sanctuary Tour **Entire Group**	
Day 3 **6 June** **IAVCEI protocols and engagement**	Recap on Day 2 and introduction to Day 3 **Karen Fontijn** Introduction to IAVCEI protocols, examples **Matthieu Kervyn** Presentation of survey results related to engagement **Matthieu Kervyn**	Discussion and itemisation of key aspects to be covered in the engagement protocols **Matthieu Kervyn** **Breakout groups** Round table of key aspects for engagement protocols (for afternoon) **Matthieu Kervyn** **Entire Group**		Break into groups to discuss aspects identified in morning discussion for inclusion in the protocols, one group per aspect **Breakout groups with designated note-taker**	Break into groups to discuss aspects identified in morn-ing discussion for inclusion in the protocols, one group per aspect contd. **Breakout groups with designated note-taker** Group presentations on engagement protocols **Breakout group rep(s)**	
Day 4 **7 June** **Wrap up and next steps**	Recap on Day 3 and introduction to Day 4 **Matthieu Kervyn** Groups draft section outline for engagement document and designate a 'lead' for writing up **Jose Palma** **Breakout groups with designated note-taker**	Develop strategy for dissemination of protocols and identify key reviewers in the community **Jose Palma** **Entire Group** Round table of existing opportunities for the network including possible region-focused events **Jose Palma** **Entire Group**		Wrap up and summary of next steps **Victoria Miller** **Karen Fontijn** Official Closing - Invitation to SRC for afternoon tea with staff @3 pm **Richard Robertson**	Afternoon tea / social at SRC **Entire Group** Depart @ 5pm: Driving Tour and Dinner @7:30pm in Port of Spain **Entire Group**	
8 June	Check out of accommodations, post-workshop travel					

Appendix 3: Regional / Country Presentations on Volcanology Activities and Challenges

Name	Country	Presentation Title
South America		
José Luis Palma	Chile	Volcanology in Chile: Volcanic activity, research, monitoring and the evaluation of volcanic hazards/risk
Mariano Agusto	Argentina	Latin American Association of Volcanology (ALVO): present and future perspectives
Francisco Vasconez	Ecuador	Challenges for volcano science in Ecuador
Cristian Lopez	Colombia	Monitoring and research volcanic in Colombia
North/Central America		
Javier Pacheco	Costa Rica	Observatorio Costa Rican seismic and volcano observatory (OVSICORI-UNA)
Eduardo Gutierrez	El Salvador	El Salvador volcanology state of art
José Saballos	Nicaragua	Volcano monitoring program of Nicaragua challenges & future perspective
Raúl Salguero	Guatemala	Volcano hazard monitoring in Guatemala
Ramon Espinasa	México	Volcanological activities and challenges in México
Caribbean		
Victoria Miller	Montserrat	Opportunities and Challenges for Volcanology in Montserrat
Richie Robertson	Trinidad & Tobago	The UWI Seismic Research Centre: Opportunities, Challenges & Strategies
SE Asia and SW Pacific		
Supriyati Andreastuti	Indonesia	Volcano disaster mitigation in Indonesia
Mikhail Herry	Papua New Guinea	Volcano monitoring and its challenges in Papua New Guinea
Sandrine Cevuard	Vanuatu	Vanuatu volcanoes activity and risk management system
Solomon Possy	Solomon Islands	Volcano activities in Solomon Islands
Africa		
Gezahegne Yirgu	Ethiopia	Volcanological studies and research in Ethiopia: efforts and challenges
Elisante Mshiu	Tanzania	Geothermal resource exploration in the Rungwe Volcanic: The current status
Katcho Karume	Democratic Republic of the Congo	Goma volcano observatory

Appendix 4: Draft Guidelines for Best-Engagement Protocols in International Collaboration

These guidelines comprise one specific activity of the working group "Communication and Engagement". During the workshop, a draft was agreed upon via group discussion. This draft is intended to be presented to IAVCEI Executive Committee for feedback, and, if received positively, will then be further developed into a more detailed document by working group "Communication and Engagement". The draft guidelines comprise the following 15 statements:

1. Research activities carried out by foreign teams in a country should be supported by (a) relevant local institution(s). This involves *at minimum* to inform the local institutions prior to research implementation as well as about research outcomes; but would preferably seek the involvement of the local institution in the research activity.

2. At the start of a partnership, the assessment of needs and knowledge gaps of the involved partners should be openly discussed. This assessment should be the basis for the definition of the objectives of the partnership and the selection of relevant partners.

3. Any partnership should consider the long-term mission of each of the partners and how the project will help fulfil these respective missions. This requires consideration of, for example:

- the exchange of knowledge and building of human capacities in local institutions
- the structural/sustainable development of infrastructures (including instrumentation)
- the inclusion of local partners within the international research community (participation to conferences, …)

4. During the design of a project, the responsibilities and role of each partner should be clearly defined, ideally as a component of a written partnership agreement. As much as possible, the project responsibilities should be shared between the foreign and local partner to favour equitable decision-making during the formulation and implementation of the project.

5. Prior to the establishment of a new partnership, a data sharing and use policy should be agreed upon, as one component of the partnership agreement. This policy should include the rights and limitations to use and share relevant existing and new data* collected during the project to third parties for the duration of the partnership and beyond. **Subject to the agreement between all parties, "data" may include any samples, results, analyses, code … collected.*

6. As part of the establishment of a new partnership, all partners should be aware of relevant national regulations related to scientific activities of foreign scientists in the host country. Compliance with these regulations is essential before starting the research activities.

7. The partnership agreement should clearly define the contributions from all parties, including financial and any other resources, e.g. human, existing infrastructure and equipment, …

8. The partnership agreement should cover the disposition of tangible assets, intellectual property, research output, etc. after the end of the partnership.

9. Duties and priorities of the local partners should be considered so that the partnership activities do not impose an excess burden on the available resources of the host institution.

10. Dissemination of the research output, e.g. through scientific publications, should properly acknowledge the contribution of all partners and all data sources.

11. All partners should be encouraged to contribute to the interpretation and publication of all research results from the partnership. Local partners should be encouraged and supported to lead publication of the results coming out of the partnership.

12. Foreign partners should be aware of and respect the established relationships and trust between the local partners and their stakeholders (e.g. communities, civil protection, authorities, …). As appropriate, the partnership should seek to contribute to the interactions with stakeholders, under the lead of the local partner.

13. Foreign partners should comply with the existing IAVCEI protocols regarding the professional conduct at times of crisis (IAVCEI Task Group on Crisis Protocols 2015; Newhall et al. 1999).

14. Foreign partners should consider and respect the cultural realities of the region involved in the partnership.

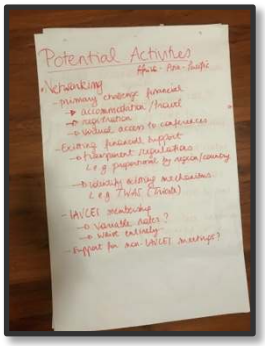
15. Communication strategies related to the partnership should be agreed upon among all project partners, including communication through social media, outreach activities, etc., and with specific attention to potentially sensitive information during crisis.

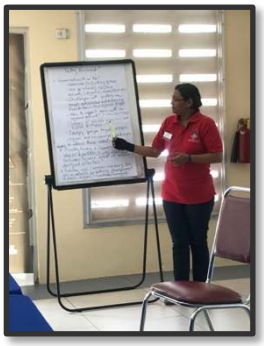
Appendix 5: Photo Compilation

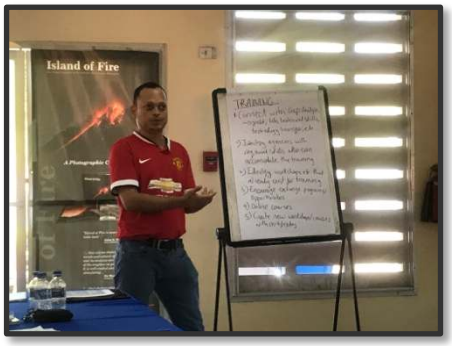
Workshop Opening & Icebreaker

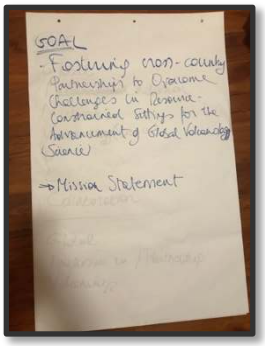
Country / Region "Challenges" Presentations

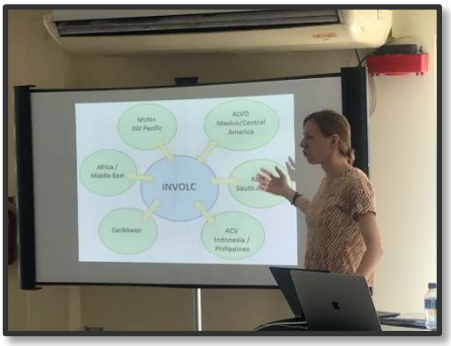
Topic Presentations, Breakout & Group Discussions

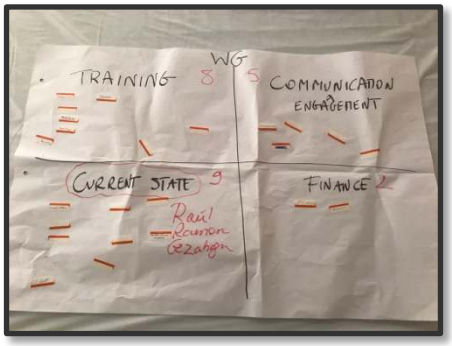












Group Photo

Group photo of the participants of the workshop - left to right: Eduardo Gutierrez (El Salvador), Cristian Lopez (Colombia), Victoria Miller (Montserrat), Mariano Agusto (Argentina), José Luis Palma (Chile), Sandrine Cevuard (Vanuatu), Elisante Mshiu (Tanzania), Matthieu Kervyn (Belgium), Supriyati Andreastuti (Indonesia), Gezahegne Yirgu (Ethiopia), Ramon Espinasa (Mexico), Katcho Karume (Democratic Republic of Congo), Francisco Vasconez (Ecuador), José Saballos (Nicaragua), Javier Pacheco (Costa Rica), Erouscilla Joseph (Trinidad & Tobago), Karen Fontijn (Belgium), Mikhail Herry (Papua New Guinea), Raúl Salguero (Guatemala), Solomon Possy (Solomon Islands), Lloyd Lynch (Trinidad & Tobago), Jeffery Marso (United States), Richard Robertson (Trinidad & Tobago)

Fostering Cross-Country Partnerships and UWI-SRC Tour