



Internacional Association of
Volcanology and Chemistry
Of the Earth's Interior (IAVCEI)

IAVCEI - WORKSHOP 2008
10th Gas Workshop, Mexico, 10th — 20th November 2008
México City — El Chichón — Popocatepetl- (Colima)

Second circular

Invitation

On behalf of the hosting geochemical community from the Institute of Geophysics, UNAM we are happy to invite the international geochemical scientific group working on volcanic fluids to participate in the 2008 Gas Workshop to be held in Mexico in November 2008.

The main topics of the workshop are the intercomparison of field data of both geochemical sampling and remote sensing methods, and discussions of the current problems of theory and practice associated with volcano degassing.

Scientific programme:

The programme will include a scientific meeting focused mainly on the geochemistry of volcanic gases.

Themes

Conference (11-12 November)

- New techniques, including sample collection, lab analysis and field spectroscopy, for the measurement of inorganic-organic gas and aerosol composition (including isotopes) of fumaroles, diffuse emissions and plumes.
- Modelling frameworks for the interpretation of volcanic (magmatic) fluid geochemistry
- Atmospheric chemistry of volcanic plumes; environmental and human health impacts of volcanic degassing.
- Measurement of volcanic plumes using space-based remote sensing

Field (13-20 November)

- .Plume Measurements –Popocatepetl volcano and optional Colima volcano
- .Direct Sampling –Crater of El Chichón volcano, boiling-point strong fumaroles, bubbling gas
- .Soil & Lake Degassing –Crater floor and crater lake of El Chichón volcano

Registration fee: not yet defined, coming soon

Included:

- Folder and materials (cap, T-shirt, program, papers about Popocatepetl, Chichón and Colima volcanoes, maps of Popo, Chichón and Colima, pen)
- One Ice breaker
- 2 coffee-breaks
- 2 buffet lunches
- Fieldtrip to Popo (transportation, hotel and 2 packed-lunches)

Further information on mode of payment and accommodation arrangements will be communicated in the third circular.

Preliminary programme:

Conference (11-12 November)

10 November:

Arrival of participants
19:00 Ice breaker

11 November:

08.00 Registration
09:30 Opening speech
Coffee Break 10.30 - 11:00
11:00-13:30 Oral Session
Buffet Lunch 13:30-15:00
15:00-18:00 Oral Session
18:00 Poster Session “the poster dimension is 80 cm (width) by 100 cm (height)”

12 November:

8:30-11:00 Oral Session
Coffee Break 10.30 - 11:00
11:00-13:30 Oral Session
Buffet Lunch 13:30-15:00
15:00 - 16:30 CCVG IAVCEI Assembly
1. Results of the 9th IAVCEI Gas Workshop 2005 -- Italy
2. Suggestions about the next IAVCEI Gas Workshop
3. Reports and elections of new officers.
4. Member fees
18:00 Transfer to Popo Park Hotel

Field (13-20 November)

1) Popocatepetl volcano, 5470 masl, 60 km E from Mexico City (13-14 November)

13 November:

08:00 For all participants, driving to Paso de Cortes and Cerro Tlamacas for all DOAS measurements, UV imagery, ground base spectroscopy and, if VERY lucky, MICROTOPS of Popocatepetl plume. Night in Popo park.

During this day, 1 or 2 vehicle will be available for traverses.

14 November:

08:00 Group1: driving to Paso de Cortes and Cerro Tlamacas for all DOAS measurements, UV imagery, ground base spectroscopy and, if VERY lucky, MICROTOPS of Popocatepetl's plume.

Group 2: direct sampling of springs and/or CO₂ flux measurement around Popocatepetl
Transfer to Mexico city.

During this day, 1 or 2 vehicle will be available for traverses.

Keep in mind that all plans are subject to changes according to the volcanic activity of Popocatepetl or the weather conditions.

Volcán Popocatepetl (19.023° N; 98.622° W; 5465 masl)

The name comes from the *Náhuatl* language and means “Smoking Mountain”. This volcano is located in central México at the southern edge of the Sierra Nevada and represents the current volcanic front of the active volcanic arc known as Trans-Mexican Volcanic Belt. Popo (volcano's nickname) is a dacitic, ice-capped, old and steep stratovolcano. The modern cone was constructed after the destruction of a previous one (El Fraile volcano) 20,000 years before present (BP). Popocatepetl is known to have produced a number of Plinian eruptions since the beginning of the Holocene, and experienced several episodes of violent-explosive activity, until about 1,200 years BP, after which the current, mildly explosive phase began. Frequent historical eruptions have been recorded since the beginning of the Spanish era. Most historical eruptions were apparently mild-to-moderate vulcanian steam and ash emissions, with larger explosive eruptions in 1518-1528 and 1663-1664. Activity in 1920-27 produced intermittent explosive eruptions and a small lava plug in the summit crater. The current eruption started in 1994 and was predominantly explosive (vulcanian) in nature during 1995, after 1996 there has been an alternation of effusive events that build dacitic lava domes that are destroyed afterwards by explosive events. One of the most remarkable issues of this eruption is the large amount of volcanic gases released during these years establishing several historic records in emission rates (up to 170,000 tons/day of SO₂).

Popocatepetl is located 55 kilometers east of Mexico City, Mexico, and 45 kilometers west of the Puebla metropolitan area. The volcano separates Mexico and Puebla Valleys, both with more than 20 million inhabitants. México City (population 18 million) and Puebla (population 2 million). More than 30 million people live within view of the volcano and hundreds of thousands of people would be endangered by hazards associated with a large explosive eruption of the volcano. A major eruption would have serious consequences for people living in communities on the flanks of the volcano, and ash from such an eruption could also endanger aircraft using Mexico City international airport.

2) **El Chichón volcano, 1100 masl in the state of Chiapas, 750 km to SE from Mexico City. (15-20 November)**

Fee: Not defined yet, coming soon

Important Note: El Chichon fieldtrip will be hard and under primitive conditions. Participants to this field trip are recommended to bring their tent, sleeping bag and helmet.

If you bring bottles of Giggenbach, we can fill them with 40 ml of 5 M NaOH solution at our laboratory.

15 November:

Transfer to Pichucalco
Operative meeting to organize groups
Night: Hotel “La Loma”

16 November:

07:00 Group 1 CO₂ flux measurements and direct sampling: climbing to El Chichon crater (around 2 hours and a half). Night in tents at the campsite.
Group 2 CO₂ flux measurements at the lower parts of the volcano. Night at Pichucalco hotel.

17 November:

07:00 Group 2 CO₂ flux measurements and direct sampling: climbing to El Chichon crater. Night in tents at the campsite.
Group 1 CO₂ flux measurements in the hike down, or on the higher parts of the volcano (Somma area e.g.). Night at Pichucalco hotel.

18 November:

6:00 Group 2 direct sampling of bubble gases and CO₂ measurements at Agua Caliente springs.
8:00 Group 1 visit at El Azufre, or extra measurements on the lower parts of the volcano.
Night at Pichucalco hotel

19 November:

8:00 Transfer to Mexico City

For further information please contact:

Dr. Dmitri Rouwet: dmitrirouwet@hotmail.com

El Chichón (17°21'40"N, 93°13'50"W, ~1000 masl)

El Chichón volcano (17°21'40"N, 93°13'50"W) is a small dome-pyroclastic edifice (1000 m asl and 600 m of the relative elevation) in the State of Chiapas, Mexico, the only active volcano in a short Chiapanecan Volcanic Chain located between Central America Volcanic Arc (CAVA) and Trans-Mexican Volcanic Belt TMVB). The volcanism here is also related to the subduction of the Cocos plate, but differs from a typical calc-alkaline volcanism of CAVA and TMVB due to a special geometry of the subducting slab. The eruption products of El Chichón are mostly andesitic to trachyandesitic pyroclastic deposits and its activity is characterized by catastrophic domedestroying explosions every 500 years.

The last eruption occurred in 1982. The central dome was completely destroyed and a 200 m-deep, 1 km-wide crater was formed which immediately was occupied by an acidic (pH-0.5), saline (Cl 25,000 ppm) and hot ($>50^{\circ}\text{C}$) lake. 25 years after the eruption there is still no a new dome growing in the crater as this was typical for volcanoes with similar type of eruptions.

El Chichón volcano has a well developed, powerful hydrothermal system. Fumarolic field on the later destroyed central dome and several groups of hot springs on slopes of the volcano, each one less than 3 km from the crater, have been discovered before the 1982 eruption. After the eruption the total discharge from these springs was estimated to be > 350 kg/s of water with temperature of 70°C and chloride content of 2000 ppm. The crater lake is slightly acidic (pH 2.3- 2.7), very shallow and variable in size and the water chemistry. Several groups of fumaroles on the crater floor and inner slopes discharge low-temperature steam with a low HCl and SO₂ content. The NE group is characterized by a moderate pressure of fumaroles and convenient for the sampling (see figure).

3) Volcán de Colima, 3860 masl in the state of Colima, 660 km from Mexico City – Optional

Volcán de Colima has shown variable degassing patterns during its recent history. SO₂ fluxes up to about 20,000 tons/day were measured during the effusive phase in 1998/9, however, the magma associated with the episode in 2004, which had a similar rate of effusion (up to $6\text{ m}^3\text{ s}^{-1}$), was extruded largely degassed. Fumarole temperatures have been measured up to 780°C ; however, it is usually too dangerous to access them on the crater rim. Gas monitoring is therefore currently limited to remote sensing. The University of Colima has been responsible for monitoring the volcano and records of SO₂ fluxes since 1998 using COSPEC and more recently Flyspec devices.

Since 2003, the continuous output of SO₂ has been very low, except during the effusion period of 2004. The volcano demonstrates a very efficient sealing system after each Vulcanian explosion. Currently (May 2008) a new dome is slowly growing in the summit crater, but little change in the degassing regime has been witnessed. Measuring fluxes during explosions has its challenges (variable ash-contents, variation in wind direction with altitude etc.). If any workshop participants wish to visit Volcán de Colima after the El Chichón part of the trip, field excursions for remote sensing of the plume will be organized. It will be carried out during 2 days with various locations occupied, depending upon the wind conditions. The field trips will be organized depending upon the specific requirement of the participants. We can record emissions from Nevado de Colima, the extinct part of the Colima Volcanic Complex about 6 km to the north or various other sites at a variety of distances from the summit. Since the activity of this volcano can change from one month to the next, we cannot be certain of the degassing characteristics until we are in the field.

Anyone interested in this extension of the workshop should email Nick Varley as soon as possible (nick@ucol.mx) with details of the measurements they would like to take. If there is sufficient interest, we can consider a publication, combining the data recorded. Transport from Mexico City to Colima could be arranged depending upon the demand; otherwise an overnight bus will get you there for about US\$55. Anyone wishing to visit purely to see the volcano is also more than welcome.

Volcán de Colima (19°30'44"N; 103°37'02"W; 3860 masl)

Volcán de Colima is a persistently active andesitic stratovolcano, located at the western extreme of the Trans Mexico Volcanic Belt. Its altitude is approximately 3860 m and currently with a summit crater with a diameter of 280 m and average depth of about 20 m. Historic activity has consisted of dome growth and collapse, lava flows and periods of explosive activity, mainly Vulcanian in nature but occasionally Plinian. An eruption in 1913 produced a Plinian column, pyroclastic flows to 15 km, and ash fall to 725 km. Previous to this, Plinian or sub-Plinian events occurred in 1576, 1606, 1690 and 1818, thus indicating a reoccurrence time of approximately 100 years for this type of eruption. In the past, large collapses produced debris avalanches that have reached distances greater up to 120 km. The most recent debris avalanche occurred 2,500 years ago.

Since 1998 the activity has shown an increasing trend and has included 4 effusive episodes with dome growth, lava flows and subsequent destruction of the dome by explosive activity. Previous to 1998, eruptive episodes, either effusive or explosive, were separated by quiet periods lasting several years, during which there was little sign of unrest. In contrast, since 2003 there has been continual low magnitude explosive activity with usually 3-4 events per day. In 2005 the largest magnitude explosions since 1913 were recorded, many producing pyroclastic flows up to 5.4 km from the volcano. There is evidence that activity during the period 1903-9 consisted of Vulcanian explosions of a magnitude similar to those observed since 2003. This cyclicity of large events combined with the enhanced activity has started to cause some worry amongst local volcanologists and is an important factor for the risk perception within the population.

General information

Mexico is located in North America between the Gulf of Mexico on the east and the Pacific Ocean on the west.


Located in Mexico's central region in a valley with a magnificent backdrop of two volcanoes: Popocatepetl and Iztaccíhuatl. The nation's capital has a pleasant climate with an average year round temperature of 22° C (72° F).

Mexico City

Known as the City of Palaces, the Federal District has three areas that were declared World Heritage sites by the UNESCO. The first one is the Historic Center, where you can admire beautiful religious and historic buildings like the Catedral Metropolitana and Palacio de Bellas Artes. The other site is Xochimilco Ecological Park, often referred to as the Venice of Mexico due to its beautiful canals. The third site is in fact, the IJNAM campus due to its architecture and cultural heritage as represented by the famous murals by Diego Rivera, Juan O'Gorman, José Clemente Orozco and David Alfaro Siqueiros.

Like most cosmopolitan cities, Mexico City offers a wide variety of cultural events, shopping areas, museums with amazing collections that depict the evolution of Mexico's art and history, from the pre-Hispanic era to present day. In the neighborhoods of Coyoacán and San Angel, near CU, you can enjoy a bohemian atmosphere.

Passport and visa

For specific information on entry requirements into Mexico, go to <http://www.sre.gob.mx/english/> (Services,  [Visas for foreigners \(INM\)](#))

Rq: To avoid problems when passing through customs at Mexico airport, please send us as soon as possible an e-mail with your name and the name and address of the University and which kind of equipment (including serial number) and/or special materials (ex: bottles of Giggenbach) you will bring. You will then receive a document which you can show in case of problem with Customs.

Letter of invitation

Requests for formal letters of invitation to attend the 10th Gas Workshop should be directed to the executive secretary (amazot@geofisica.unam.mx). This invitation is intended to assist participants in travel and visa arrangements. It implies no provision of any financial or other support.

Arrivals/departures

The principal international airport in Mexico is the international airport of Mexico City Benito Juarez. The airport is located 13 km to the east of Mexico City. Taxis are available from outside the terminal building, and pre-paid taxi tickets are available from Taxi "Autorizado" in the (Ground Terminal) "Transportacion Terrestre" both located in baggage reclaim. Passengers are advised to only use the authorized taxis, with and airport logo on them. (http://www.aicm.com.mx/home_en.php).

Organizing committee:

Hugo Delgado Granados, President
Dmitri Rouwet, El Chichón fieldwork
Nick Varley, Remote sensing
Julie Roberge, Logistics

Scientific Committee:

Yuri Taran, Mexico
Tobias Fischer, USA
Salvatore Inguaggiato, Italy
Giovanni Chiodini, Italy
Hiroshi Shinohara, Japan
Hugo Delgado, Mexico
Patrick Allard, France
Simon Carn, USA
Nicole Bobrowski, Italy

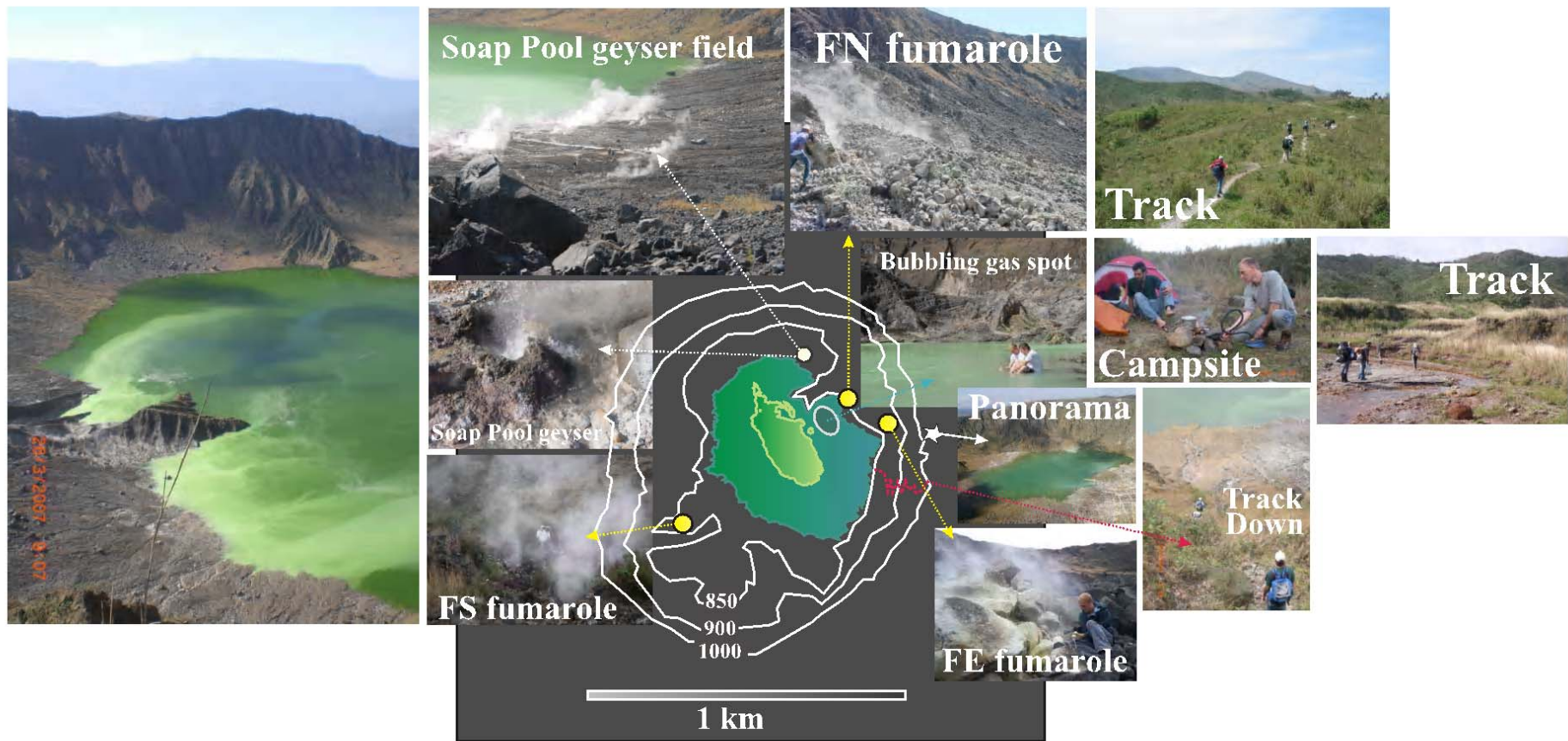
Executive Secretary:

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Schematic map of El Chichón crater and pictures (courtesy of M.A. Longpré, M. Jutzeler, S. Inguaggiato and D. Rouwet)