



13<sup>th</sup> Gas Workshop  
ECUADOR 2017

THIRD CIRCULAR

September 24<sup>th</sup>  
to October 3<sup>rd</sup>

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CCVG

COMMISSION ON THE CHEMISTRY OF VOLCANIC GASES

IAVCEI

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



## INVITATION

On behalf of the Instituto Geofísico de la Escuela Politécnica Nacional (IG-EPN), the Parque Nacional Galápagos, the Commission on the Chemistry of Volcanic Gases (CCVG) and the International Association of Volcanology and Chemistry of the Earth Interior, we are glad to invite you to the 13th Gas Field Workshop to be held in Ecuador, from September 24 to October 3, 2017.

The main objectives of the workshop are to discuss and share new and existing direct sampling, in situ sampling and remote sensing results, collect complementary volcanic gas measurements from local volcanoes, and to discuss the latest theories and observations related to volcanic degassing.

The workshop will include four days of conference meetings and presentations, five days of field measurement and sample collection at Tungurahua, Guagua Pichincha, Pululahua and Cotopaxi volcanoes and two optional four and five days field excursion to Reventador volcano and to the Galápagos Islands.





## Scientific Programme

The program will include a 4-day scientific meeting focused on geochemistry of magmatic gases and fluxes from volcanoes, followed by a 5-day field excursion to allow participants to acquire plume measurements, diffuse soil flux measurements and direct fumarole and water samples from local volcanoes. Details of the scientific program and field campaign are outlined below.

### Conference:

- 1. New developments in direct, in situ, remote, and diffuse volcanic gas and aerosol sampling/measurement techniques, including but not limited to advancements related to measurement accuracy and precision, acquisition, automation and analysis.*
- 2. Geochemical observations and interpretations of volcanic and hydrothermal systems.*
- 3. The effect of volcanic plumes on atmospheric chemistry, natural hazards and environmental and human health.*
- 4. Modeling of volcanic degassing processes.*
- 5. Integrating volcanic gas observations with complementary datasets to elucidate volcanic processes*

### Scientific Committee

Patrick Allard	Ryu Kazahaya
Santiago Arellano	Taryn Lopez
Nicole Bobrowski	Agnes Marzot
Mike Burton	Yuri Taran
Maarten de Moor	Franco Tassi
Tobias Fischer	Fatima Viveiros

### Field Campaign:

1. Remote plume measurements (Tungurahua and Cotopaxi).
2. Measurements of soil degassing (Pululahua).
3. Direct sampling of fluids emitted from thermal springs and fumaroles (Tungurahua and Pichincha)

**September 24**

09:00- 17:00	Registration of participants and handout Congress material Hotel Check In starts at 13:00
15:30-16:30	Ice Breaker- Welcome cocktail and invitation by Congress hosts.
17:00-18:30	Ecuadorian Party bus "Chiva" with music and drinks.
	<b>Free for Dinner (on your own)</b>
	Lodging Hotel Reina Isabel

**September 25**

	Breakfast
09:00- 12:00	Travel to Baños
13:00-14:00	Free time to check in or walk around town
14:00-15:30	Lunch at Hotel
15:30-18:30	Afternoon conference with Coffee break and snacks
19:00-20:30	Dinner at Hotel
	Evening Free & Lodging at Hotel Sangay

**September 26**

	Breakfast
09:00-12:00	Conference with Coffee break
12:30-14:00	Lunch at Hotel
14:30-18:30	Afternoon conference with Coffee break and snacks
19:00-20:30	Dinner at Hotel
	Evening Free & Lodging at Hotel Sangay

**September 27**

	Breakfast
09:00-12:00	Conference with Coffee break
12:30-14:00	Lunch at Hotel
14:30-18:30	Afternoon conference with Coffee break and snacks
19:00-20:30	Dinner at Hotel
	Evening Free & Lodging at Hotel Sangay

**September 28**

	Breakfast
Group 1 09:00- 16:30	Full Day DOAS and Tungurahua volcano observatory with Box Lunch
Group 2 09:00- 16:30	Full Day Sampling Thermal Springs Casa del Arbol with Box Lunch
17:00- 19:00	Free afternoon
	<b>Free for Dinner (on your own)</b>

**September 29**

	Breakfast
Group 1 09:00- 16:30	Full Day DOAS and Tungurahua volcano observatory with Box Lunch
Group 2 09:00- 16:30	Full Day Sampling Thermal Springs Casa del Arbol with Box Lunch
17:00- 19:00	Free afternoon
19:00-20:30	Dinner at Hotel

**September 30**

	Breakfast
10:00-13:00	Check Out and return to Quito
	Remainder of the day Free.
	<b>Free for Dinner (on your own)</b>
	Lodging Hotel Reina Isabel

**October 1**

	Breakfast
Group 1- <b>Guagua Pichincha</b>	
06:00-16:30	Full Day Guagua Pichincha Box Lunch
Group 2- <b>Pululahua</b>	
07:00-16:30	Full Day Pululahua with Box Lunch
	Remainder of the day Free.
	<b>Free for Dinner (on your own)</b>
	Lodging Hotel Reina Isabel

**October 2**

Group 1- <b>Pululahua</b>	
07:00-16:30	Full Day Pululahua with Box Lunch
Group 2- <b>Cotopaxi</b>	
07:00-16:30	Full Day Cotopaxi with Lunch at Tambopaxi
	Remainder of the day Free.
	<b>Free for Dinner (on your own)</b>
	Hotel Reina Isabel

**October 3**

09:00-13:00	Seminar #1 with Coffee break and snacks
09:00-13:00	Seminar #2 with Coffee break and snacks
09:00-13:00	Seminar #3 with Coffee break and snacks
	<b>Free for Lunch</b>
16:30-18:30	Final Conference Meeting with Coffee break
19:30-21:30	<b>Farewell Dinner</b>
	Lodging Hotel Reina Isabel

**October 4**

	All Day Transfers Hotel to the Airport
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September 20	leaving from Quito to Reventador: Sleeping at hotel
September 21	hiking to Reventador: measurements : camping
September 22	measurements all day : camping
September 23	Hiking back, visit of Jamanco thermal springs : back to Quito

Reventador experienced a highly explosive event, which was followed by emplacement of two lava flows in November–December 2002. Silica contents range from 62 to 58 wt.% SiO<sub>2</sub> for the November 3 pyroclastic deposits to 58–56 and 54–53 wt.% SiO<sub>2</sub> for the successive lava flows. In November 2004 eruptive activity resumed supplying four new lava flows (56–54 wt.% SiO<sub>2</sub>) between November 2004 and August 2005. Volatile content in matrix glass and glass inclusions from the November 3 pyroclastic deposits allow us to estimate the total amount of SO<sub>2</sub> and HCl released into the atmosphere during the paroxysmal phase (i.e. 80 kT of SO<sub>2</sub> and 280 kT of HCl). Pre-eruptive pressure-temperature conditions of the magmas range from 300 to 150 MPa and ~ 1000 °C with high water content (~ 5 wt.%). Samaniego et al., (2008) propose the existence of an andesitic magma body located at ~ 7–12 km depth that is frequently intruded by more primitive, hydrous magmas from a deeper source. The initial crystallization of amphibole from the hydrous primitive magma seems typical of El Reventador, as well as the historically recurrent and regular periods of eruptive activity lasting several years. This eruptive behaviour coupled with the fractionation and mixing processes inferred from the 2002 and 2004–05 petrologic data suggest that deep magmatic recharge at El Reventador is frequent, and is probably responsible for the high frequency of eruptions. Current activity is characterized by gas and ash plumes, pyroclastic flows and lava flows. Remote sensing can be performed from the caldera floor.

To get to Reventador there is a 5 hour drive from Quito and a 3 to 4 hour hike in the jungle. Heavy rain is typical of the place.

Only one flux measurement by mobile DOAS was possible in 2013 by helicopter traverse. We measured 500 t/day. No other gas measurements have been obtained.

**REVENTADOR VOLCANO**

Maximum 25 participants

**September 20 Depart Quito at 08:00 for the Reventador area**

- 12:00 Hike to the impressive San Rafael Waterfall, the highest in Ecuador. (1-2 hour hike R/T)
- 14:00 Lunch at Hostería El Reventador. After Lunch, free time to enjoy the serene area and the pool & waterslide.
- 17:00 Hike to see the colorful and rare Cocks of the Rock. Almost guaranteed observation of the noisy Cocks of the Rock in their natural environment. Possibility of seeing monkeys. (1-2 hour hike R/T)
- 19:00 Dinner and overview about the hike into the Caldera of Reventador.

**September 21 Hike into the Caldera of Reventador**

- 08:00 Breakfast
- 09:00 Hike into the Caldera of Reventador (4-5 hours O/W)
- 13:00 Lunch at campsite Reventador
- 14:00 Exploration of the Caldera and Gas Workshop activities
- 18:00 Dinner at campsite. Free time to stroll around the area or sit by the bonfire. Sleep in general campsite.

**September 22 Full day Gas Workshop activities in the Caldera**

Breakfast, Box Lunch and Dinner  
PM: Dinner at campsite. Free time to stroll around the area or sit by the bonfire. Sleep in general campsite.

**September 23 Hike out of the Caldera**

- 07:00 Breakfast
- 09:00 Hike out of the Caldera (3- 4 hours O/W)
- 13:00 Lunch and relaxation by the pool
- 14:00 Leave for Quito. Optional stop at the Jamanco Hot springs (\$3)
- 18:00-20:00 Arrive in Quito.

**Does not Include:**

Additional beverages or snacks  
Light rain poncho & Large Knapsack to carry all your gear

*Note: The hike up to the Caldera is strenuous. Every person must carry their own sleeping bag and mat*

**If you are interested in this field trip, please complete the Registration Form in the CCVG website:**

<https://goo.gl/forms/aUhwmgZQxRy5dzqp1>

Date	time	Activities	Overnight
04/10/2017		Preparation for Galápagos	Hotel in Quito
05/10/2017	06:00	Travel to Galápagos	Hotel in Isabela
06/10/2017	07:00	1) Sampling at Minas de Azufre 2) Visit to Volcan Chico 3) Visit to volcanic areas	Hotel in Isabela
07/10/2017	07:00	1) Sampling at Minas de Azufre 2) Visit to Volcan Chico 3) Visit to volcanic areas	Hotel in Isabela
08/10/2017	07:00	1) Sampling at Minas de Azufre 2) Visit to Volcan Chico 3) Visit to volcanic areas	Hotel in Isabela
09/10/2017	05:00	Travel back to Quito	



*Sierra Negra fumarolic field. T measurements performed in 2014 yielded temperatures between 80 and 250 °C.*

## **GALAPAGOS**

Maximun 80 participants

### **October 5 Depart from Quito around 08:00 to Galápagos**

We'll take a plane around 9 in the morning to Baltra, there will take a bus and a ferry to Santa Cruz. From Santa Cruz pier we'll take a boat to Isabela. We'll arrive at the end of the afternoon and spend the night at the hotel.

### **October 6 Volcán de Azufre or Minas de Azufre, Volcán Chico, touristic tour**

Breakfast

Bus to the departure point in Sierra Negra volcano, from here the **first group** will visit Volcán Chico, a small volcanic cone formed in the 2005 Sierra Negra eruption. The visit takes around 3 hours walking.

The **second group** will go make a touristic activity like snorkling for example.

The **third group** will visit the sampling site: Volcán de Azufre.

We will walk about 2-3 hours to reach the fumarolic field. The walk is over a flat terrane at low altitude (900 masl). Nevetheless it can be humid and very hot. At the fumarolic field we can perform different activities:

- Direct sampling
- Direct measurements by multigas
- Difuse CO<sub>2</sub> through soil
- Mobile DOAS
- UV-IR cameras

### **October 7 Volcán de Azufre or Minas de Azufre, Volcán Chico, touristic tour**

We will perform the same activities as on the previous days but changing according to the different groups.

### **October 8 Volcán de Azufre or Minas de Azufre, Volcán Chico, touristic tour**

We will perform the same activities as on the previous days but changing according to the different groups.

### **October 9 Leave Galápagos to Quito**

**If you are interested in this field trip, please complete the Registration Form in the CCVG website:**

<https://goo.gl/forms/aUhwmgZQxRy5dzqp1>

### Registration Fee for Workshop, Tungurahua and Cotopaxi, Pululahua or Guagua Pichincha Field Trips

Single room: 1340 USD  
Double room: 1135 USD  
Students : 900 USD

#### These prices include:

- Workshop materials: T-shirt, pen, field notebook.
- Ice-breaker
- Transportation.
- Accomodation at Quito on 24 and 30 September and from 1 to 3 October.
- Accommodation and meals at Baños
- Field transportation and meals including coffee breaks and box-lunches.
- Transport to the airport only on October 4.

#### Not Included:

- One dinner in Baños
- Four dinners in Quito

### Optional Pre workshop field trip to Reventador

Double room: 532 USD

#### Includes:

- Lodging the night of September 19
- Transportation from, during and back to Quito
- Local guides
- Excursions mentioned in the Itinerary
- Shared Lodging (1 night Hotel Reventador & 2 nights Camping)
- Full board (4 Lunches, 3 Dinners & 3 Breakfasts)
- Equipment: Rubber boots, Sleeping bag and Mat
- Lodging the night of September 23

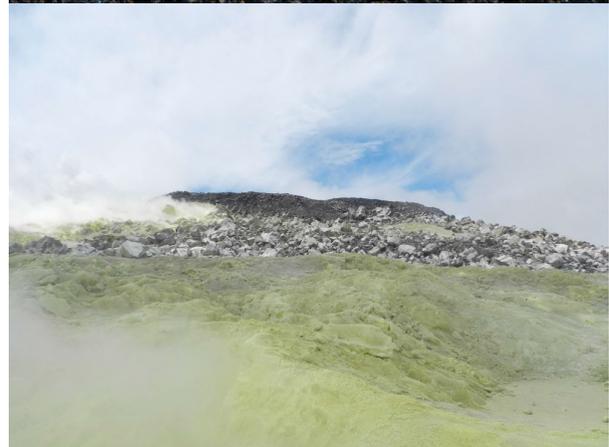
\* *The field trip leaves from a hotel near Quito Airport*

### Optional Post workshop field trip to Galápagos

Double room: 1650 USD

#### Includes:

- Accomodation on October 4 at Quito
- Flight ticket from Quito-Baltra-Quito
- Accomodation and meals in Galápagos
- Entrance fee to the National park
- Transport to Isabela
- Field campaing at Sierra Negra
- Visit to Volcán Chico
- Visit to volcanic areas



Abstracts should be submitted to:

*Franco Tassi* ([franco.tassi@unifi.it](mailto:franco.tassi@unifi.it)); and  
*Nicole Bobrowski* ([Nicole.Bobrowski@iup.uni-heidelberg.de](mailto:Nicole.Bobrowski@iup.uni-heidelberg.de))  
by 15 July.

Abstract format is as follows:

**ABSTRACT TITLE**

(Centered, in capital letters, Bold, 12 pt font, Times New Roman)

(Authors:)

First name Last name, Affiliation, Country (Centered, 12 pt font, Times New Roman, Presenting author in bold)

First name Last name, Affiliation, Country (Centered, 12 pt font, Times New Roman)

First name Last name, Affiliation, Country (Centered, 12 pt font, Times New Roman)

Abstract text (12 pt font, justified, Times New Roman, 250 Word Limit)

**Payment**

Two payment forms are proposed:

- **Paypal payment:** A payment link is available on the CCVG website at: <http://www.iavcei-ccvg.org/workshops/>. **Please note that there is a 5% fee for using paypal. The total workshop costs when paying using paypal are as follows:**

*Single room: 1407 USD*

*Double room: 1192 USD*

*Students : 945 USD*

- **Direct bank account transfer:** Please make deposits into the following account:

Name: ECUADOR JOURNEYS

Account: Corriente 0524396-3

Bank: Banco del Pacifico

BIC: PACIECEG500

Address:

Banco del Pacifico

Av. Naciones Unidas E7-95

Quito, Ecuador

Please make sure to cover any transfer fees charged by banks, so we receive the full amount. If we do not receive the full amount, difference must be paid upon arrival in Ecuador.

*Please confirm your payment by e-mail to [juanzec@yahoo.com](mailto:juanzec@yahoo.com) including the bank receipt or transfer number.*

## **Local Organizing Committee**

Silvana Hidalgo  
Patricio Ramón  
Instituto Geofísico - Escuela Politécnica Nacional  
Parque Nacional Galápagos

## **Logistics**

Jonathan Hall, Ecuadorian Journeys

## **IAVCEI Organizing Committee**

Franco Tassi, Leader CCVG  
Nicole Bobrowski, Leader CCVG  
Taryn Lopez, CCVG Secretary  
Maarten de Moore, CCVG Editor & Webmaster

***Important Note:*** Ecuador has placed a requirement to enter the country. Your passport must be valid for at least 6 months. It cannot expire within 6 months of your travels within Ecuador. You will not be allowed to board the plane to travel.

*You are required to have Health Insurance to enter the country.*

## **Important Dates**

### **Pre-registration and fee payment begins:**

May 2017

### **Abstracts deadline:**

July 15, 2017

### **Registration fee payment ends:**

August 15, 2017

### **Pre-conference Field Trip**

September 20 to September 23, 2017

### **Workshop:**

September 24 to October 3, 2017

### **Post-Conference Field Trip**

October 5 to October 9, 2017