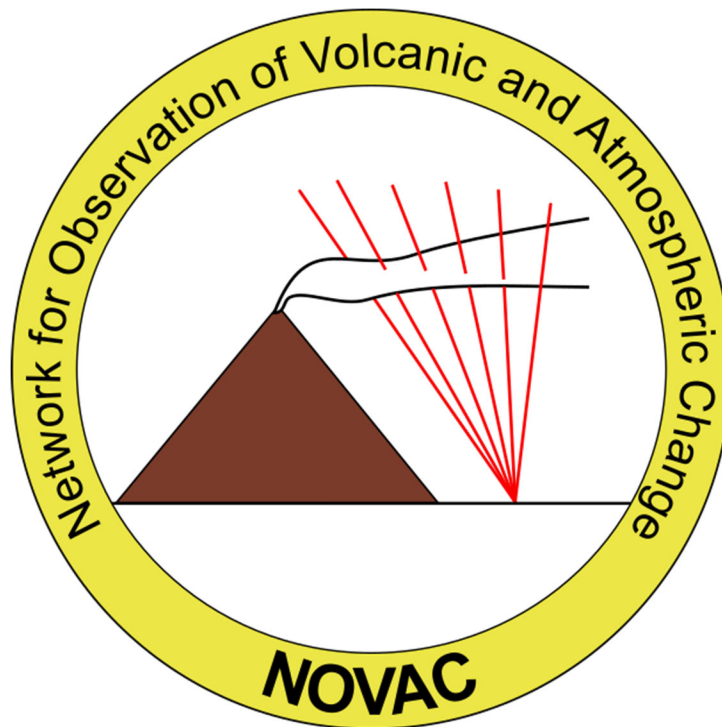


7th NOVAC Workshop

5 – 12 May, 2024

Volcán El Reventador, Ecuador



~ Workshop Program ~

(updated May 2, 2024)



Sunday, May 5, 2024

Optional pre-workshop activity	
9:00 – 15:00	Multi-GAS Demonstration Interested participants meet in the lobby of Hotel Fénix at 9:00.
Icebreaker and kickoff dinner	
17:00	Participants meet in the lobby of Hotel Fénix. Departure by Chiva to Pim's Panecillio for Icebreaker and Dinner
21:00	Return to Hotel Fénix

Monday, May 6, 2024

8:30	Meet in the lobby of Hotel Fénix, walk to auditorium	
Official Opening Ceremony at EPN, Hemiciclo Politécnico, Edificio 3 (Administración Central)		
9:00	Dr. Mario Ruiz, Director of the Instituto Geofísico, Escuela Politécnica Nacional	
9:10	Dr. Christoph Kern, USAID USGS Volcano Disaster Assistance Program	
9:20	Saadia Sánchez Vegas, Representative in Charge, UNESCO Quito	
9:30	Daniel Sánchez-Bustamante, Mission Director of USAID Ecuador	
9:40	Dr. Tarquino Sanchez, Rector of the Escuela Politécnica Nacional (EPN)	
9:50	Equipment donation from USAID	
10:00	Visit to the IG-EPN Monitoring Room / Return to Hotel Fenix	
11:00	Bus to El Reventador (Pickup from Hotel Fenix)	
14:00	Lunch en route (Gina's in Baeza)	
Evening at Hostería El Reventador		
17:00	Arrive at Hostería El Reventador, check into rooms	
19:00	Dinner	
Evening Talk		
20:00	<i>Marco Almeida</i>	El Reventador Volcano

Tuesday, May 7, 2024

Session 1 Talks		
8:30	<i>Silvana Hidalgo</i>	NOVAC monitoring on the active volcanoes of Ecuador
8:55	<i>Luisa Fernanda Meza Maldonado</i>	Recent activity of the Coconucos volcanic chain - Puracé volcano
9:20	<i>Alejandro Rodríguez</i>	SO ₂ fluxes at Rincón de La Vieja volcano
9:45	<i>Allan Lerner</i>	Links between gas emissions and volcanic processes

10:10	Coffee Break
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Session 2 Talks		
10:30	<i>Zoraida Chacón Ortiz</i>	Analysis of seasonal effects on SO ₂ flux estimates from Nevado del Ruiz volcano
10:55	<i>Nicole Bobrowski</i>	New possibilities – BrO evaluation with the NOVAC Program, but why should we do it?
11:20	<i>Hugo Delgado</i>	Degassing patterns at Popocatepetl Volcano
11:45	<i>Catherine Lit</i>	Degassing of Taal Volcano, Philippines after the January 2020 eruption

12:30	Lunch
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Hands-on Exercises	
14:00 – 16:00	Session 1

16:00	Coffee Break
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Hands-on Exercises	
16:30 – 18:30	Session 2

19:00	Dinner
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Wednesday, May 8, 2024

Session 3 Talks		
8:30	<i>Melissa Pfeffer</i>	DOAS SO ₂ measurements during the 2021-2024 eruptions on the Reykjanes Peninsula, Iceland
8:55	<i>Rachmad Widyo Laksono</i>	Gas measurements at Merapi Volcano, Indonesia
9:20	<i>Jorge Luis Mamani Sotomayor</i>	Mini DOAS monitoring network of the Geophysical Institute of Peru, Sabancaya and Ubinas volcanoes.
9:45	<i>Pyiko Williams</i>	TBD

10:10	Coffee Break
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Session 4 Talks		
10:30	<i>Agnes Mazot</i>	Two years of SO ₂ flux data from Ruapehu volcano, New Zealand
10:55	<i>Nick Varley</i>	Gas monitoring at Volcán de Colima, Mexico
11:20	<i>Yenny Hache</i>	Evaluation of the BrO/SO ₂ molar ratio in the plume of the Galeras volcano during 2007 and 2010
11:45	<i>Skye Kushner</i>	Characterizing volcanic SO ₂ emission rates using single-station scanning DOAS instrumentation; measurements from Cleveland, Korovin, and Gareloi Volcanoes, Alaska

12:30	Lunch
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Hands-on Exercises	
14:00 – 16:00	Session 3

16:00	Coffee Break
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Hands-on Exercise	
16:30 - 18:30	Session 4

19:00	Dinner
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Thursday, May 9, 2024

Session 5 Talks		
8:30	<i>Maarten de Moor</i>	Monitoring dynamic hydrothermal-magmatic interactions at Poás volcano
8:55	<i>Christoph Kern</i>	Forecasting explosions at Sinabung Volcano, Indonesia, based on SO ₂ emission rates
9:20	<i>Tom Pering</i>	Low-cost UV cameras for permanent monitoring of sulphur dioxide emissions
9:45	<i>Fredy Vásconez</i>	A multi-camera system for volcano monitoring

10:10	Coffee Break
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Session 6 Talks		
10:30	<i>Claudia Rivera</i>	Combined direct-sun ultraviolet and infrared spectroscopies at Popocatepetl volcano (Mexico)
10:50	<i>Jonas Kuhn</i>	Volcanic HF measurement with skylight
11:20	<i>Charlotte Barrington</i>	Exploiting spatial frequency for analyzing UV spectra of volcanic plumes
11:45	<i>NOVAC Steering Committee</i>	Report of activities 2018 - 2024

12:30	Lunch
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Field Trip	
14:00	Pickups to El Reventador Caldera Make Mobile DOAS measurements on the way up?
15:30	Measurements / Demonstrations Demonstrations by Fredy Vásconez, Tom Pering, Marco Almeida, others
17:00	Discussion about the future of NOVAC: Hardware, Software, Data Use, Leadership Structure, Workshops...
18:30	Dinner in the field
Overnight Stay at Remote Field Station	

Friday, May 10, 2024

Field Trip	
6:30	Breakfast in the field
7:30	Measurements / Demonstrations
10:30	Pickups to Hostería El Reventador

12:00	Lunch at Hostería El Reventador
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Hands-On Exercises	
14:00 – 16:00	Session 5

16:00	Coffee Break
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Hands-On Exercises	
16:30 – 18:30	Session 6

19:00	Dinner
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Saturday, May 11, 2024

Hands-On Exercises	
8:30 – 10:00	Session 7

10:00	Coffee Break
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Session 7 Talks		
10:30	<i>Fredy Apaza</i>	Gas emissions during the eruptive process of the Ubinas volcano 2023
10:55	<i>Julián Ramírez Valencia</i>	Volcanic gas monitoring at Nevado del Ruiz
11:20	<i>Francisco Montalvo</i>	The actualization of the NOVAC at El Salvador active volcanoes
11:45	<i>Mario Díaz</i>	Installation and maintenance of the DOAS network at Popocatepetl volcano

12:30	Lunch
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Session 8 Talks		
14:00	<i>Santiago Arellano</i>	Plumes in 3+1-D: tomographic inversion of NOVAC data
14:25	<i>Wendel Alexander Gutiérrez Paxtor</i>	Experiences and Challenges with gas monitoring at INSIVUMEH
14:50	<i>Fabrizio Carbajal</i>	SO ₂ FC (SO ₂ Flux Calculator): Preliminary code for measuring SO ₂ flux with TROPOMI
15:15	<i>Carlos Laverde</i>	Processing and analysis of SO ₂ satellite imagery using free & open software tools to complement data from NOVAC networks

15:30	Coffee Break
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Session 9 Talks		
16:00	<i>Christoph Kern</i>	A synoptic view of volcanic gas remote sensing from the ground, air, and space
16:25	<i>Elvis Mendoza</i>	TBD

Final Discussion and Wrap Up	
16:50 – 18:30	Future Directions for NOVAC, Elections (if needed), Workshop Evaluation
19:00	Final Dinner
20:00	Farewell Party

Sunday, May 12, 2024

Transfer back to Quito	
9:00	Bus departs from Reventador
11:30	Termas de Papallacta
14:00	Lunch by the lake
17:00	Arrive in Quito. Participants can be dropped at the airport, or a hotel as needed.

Description of Technical Sessions and Hands-On Exercises

Technical design and configuration of the NOVAC Scanning DOAS

- Disassemble / reassemble scanner.
- Identify the motor switch, identify the UV-filter, change conical-flat.
- Identify all components inside NOVAC instrument box.
- Disconnect / reconnect all connections inside NOVAC instrument box.
- Connect to Axiomtek with WinSCP – edit cfg.txt and network interfaces file.

Configuration of a new NOVAC Scanning DOAS in the NOVAC Program

- Do the global configuration of the NOVAC Program, including wind downloads and sftp connection.
- Configure a new scanner in NOVAC Program.
- Make default reference files for the new scanner (using new Fraunhofer functionality?)
- Let scanner run outside and collect scans; hold SO₂ cells in front of instrument at times.
- View real time data in NOVAC Program; interpret the information.
- Connect to Axiomtek with PuTTY and do “showlog” for troubleshooting.
- Chris Lockett to update the group on new pak file handling capabilities.

Performing data analysis in the NOVAC Program

- Using data from an appropriate volcano, perform a flux re-analysis with the NOVAC Program
- Using data from an appropriate volcano, perform a BrO/SO₂ analysis with the NOVAC Program
- NOVAC PPP (discussion about how this could be used in the future)
- Possible volcanoes: Cotopaxi, Ruiz, Sabancaya, Turrialba

The NOVAC Explorer: A new tool for NOVAC data visualization

- Using NOVAC Explorer, display SO₂ emission rates from the NOVAC sftp server
- Using NOVAC Explorer, display SO₂ emission rates from a local PostFluxLog file

Mobile DOAS measurements and data analysis

- Configure the Mobile DOAS software (possibly using pre-built reference files?)
- Perform a brief test measurement, either driving a short distance or walking around the hotel, holding a cell in front of the telescope at times.
- Perform Flux analysis of selected traverse with the Mobile DOAS software. Possible: Reykjanes
- Bonus: perform flux analysis with the mDOAS software.

Software required for the Technical Sessions and Hands-On Exercises

The following software will be used during the technical sessions and hands-on exercises. All software will be run on the Windows operating system. Software will be provided on USB drives during the workshop, but participants are encouraged to install these programs before traveling to Ecuador to save time at the workshop. All software is freely available on the internet and does not require a paid license.

Software can be downloaded from the original links below, or from the following Google Drive:

<https://drive.google.com/drive/folders/1bpGgdvPbyostdMZbWgsGr2euZG1dEqwu>

Original links to the individual software packages:

- PuTTY
<https://the.earth.li/~sgtatham/putty/latest/w64/putty-64bit-0.81-installer.msi>
- WinSCP
<https://winscp.net/download/WinSCP-6.3.3-Setup.exe/download>
- NOVAC Program
Link to new release coming soon, check <https://novac-community.org/software>
- Mobile DOAS (Ocean Optics or Avantes version, depending on which spectrometer is used)
https://novac-community.org/wp-content/uploads/2024/05/MobileDOAS_v6.5_Avantes.zip
https://novac-community.org/wp-content/uploads/2024/05/MobileDOAS_v6.5_OceanOptics.zip
- MATLAB Runtime (version 9.8, no other versions are supported)
https://ssd.mathworks.com/supportfiles/downloads/R2020a/Release/8/deployment_files/installer/complete/win64/MATLAB_Runtime_R2020a_Update_8_win64.zip
- DOASIS
https://novac-community.org/wp-content/uploads/2023/06/InstallerDOASIS3.2.3505_x86.zip
- NOVAC Explorer
https://novac-community.org/wp-content/uploads/2023/11/NOVACExplorer_v1.07.zip
- mDOAS
https://novac-community.org/wp-content/uploads/2023/10/mDOAS_v3.19.zip
- GhostScript
<https://github.com/ArtifexSoftware/ghostpdl-downloads/releases/download/gs10030/gs10030w64.exe>
- Notepad++ (optional, but nice to have)
<https://github.com/notepad-plus-plus/notepad-plus-plus/releases/download/v8.6.5/npp.8.6.5.Installer.x64.exe>

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Workshop locations

Fénix Hotel

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Quito, Ecuador
Tel: +593 2 254 0629
WhatsApp: +593 99 983 0400
www.fenixhotel.ec

Hostería El Reventador

Km 159 Vía Quito – Lago Agrio
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Tel: +593 99 357 7143
www.hosteriaelreventador.com

Las Mercedes Airport Hotel

Tulio N2-13 y Thomas Baquero
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