IAVCEI Commission on Volcanic Lakes

First Circular

CVL 12th Workshop

Pampanga and Laguna, Philippines

March 9-18, 2026

INVITATION

On behalf of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)-Commission on Volcanic Lakes (CVL) and the Department of Science and Technology-Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS), we are excited to invite you to the 12th CVL Workshop (CVL 12), to be held in Clark, Pampanga, with field workshops at the Pinatubo Crater Lake and San Pablo Maars in the Philippines on March 9-18, 2026.

The goal of the workshop is to bring together researchers from a wide range of disciplines such as physical volcanology, hydrology, limnology, biogeochemistry, geochemistry, and geophysics to exchange ideas and open a dialogue on a broad range of topics regarding volcanic lakes applied research such as: latest developments in field measurements; biogeochemical, and geophysical monitoring of volcanic lakes, modeling of volcanic lake systems processes, hazards recognition, forecasting, and mitigation.

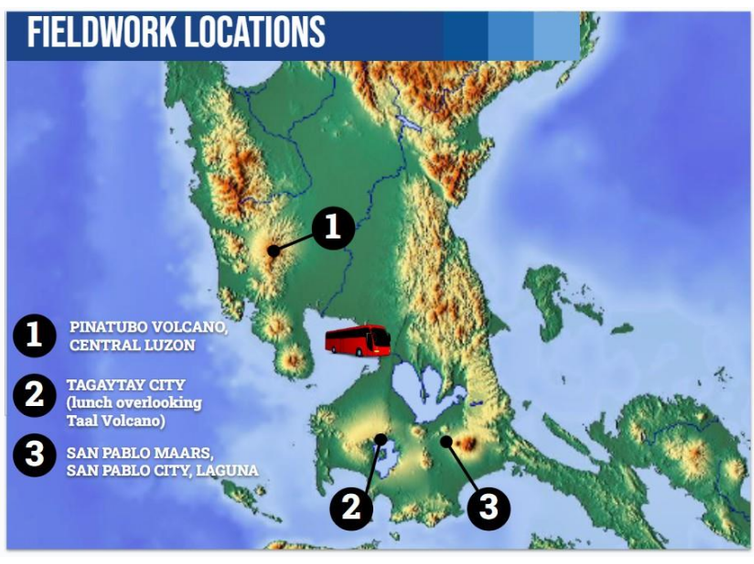
CVL 12 is designed to offer both oral and poster scientific sessions and field visits to volcanic areas where crater lakes and maars exist.

Field activities such as water sampling along vertical profiles, diffuse CO_2 measurements, and fumarole gas sampling can be done at the Pinatubo Crater Lake (1), while other activities such as sediment core sampling, field testing of water drones, and microbiological and water sampling can be carried out in San Pablo Maars (3). Other field activities based on participants' interests may be planned.

GENERAL INFORMATION

Luzon is the largest and most populous island in the Philippines, located in the northern part of the archipelago. It serves as the country's political, economic, and cultural center, home to the capital city, Manila, as well as key regions such as Central Luzon and Northern Luzon. The island features a diverse geography that includes mountain ranges like the Sierra Madre and Cordillera, active and dormant volcanoes, vast plains, lakes, and coastal areas.

March marks the beginning of the dry season in most parts of Luzon, particularly in Central Luzon, where the workshop venues are located. The weather is typically warm and dry, with average daytime temperatures ranging from 25°C to 34°C (77°F to 93°F). Humidity levels are moderate, and rainfall is minimal—ideal conditions for outdoor activities and fieldwork.



The main venue for the workshop is **Clark** in **Pampanga province**, located in Central Luzon. Once a former U.S. military base, Clark has transformed into a modern, well-planned economic zone with excellent infrastructure, accommodations, and

conference facilities. It is known for its accessibility, safety, and growing reputation as a hub for both business and tourism.

Clark is approximately **80 kilometers (about 50 miles)** north of Manila, the national capital. By car or bus, the travel time from **Metro Manila to Clark** typically ranges from **1.5 to 2.5 hours**, depending on traffic conditions.

Mount Pinatubo
Located near the tripoint of Zambales, Tarlac, and Pampanga provinces, Mount Pinatubo is famous for its cataclysmic eruption in 1991, one of the largest volcanic events of the 20th century. Today, it features a stunning crater lake and remains an important site for geological studies and environmental recovery.
San Pablo Maars
The city of **San Pablo** in **Laguna province** is known for its seven crater lakes, formed by ancient maar volcanoes. These maars are low-relief volcanic craters filled with water, offering insights into phreatomagmatic eruptions and geomorphological evolution. The city is surrounded by lush greenery and sits on the foothills of Mount Banahaw and Mount Cristobal.

Clark to Mount Pinatubo: Approximately **50–60 kilometers** (1.5 to 2 hours by 4WD or tour vehicles, depending on access points).
Clark to San Pablo, Laguna: Roughly **120 kilometers** (2.5 to 3.5 hours by car, depending on traffic).
Mount Pinatubo to San Pablo: About **130 kilometers** (approximately 3 to 4 hours by land), making it feasible to structure multi-day field trips between both locations.

Airport Access: Clark International Airport vs. NAIA
Flying into **Clark International Airport (CRK)** is generally more convenient for events based in Central Luzon, like this workshop. CRK is **just 15–20 minutes** from the Clark Freeport Zone, avoiding the heavy congestion of Metro Manila. It also caters to both domestic and international flights, with increasing connectivity to regional hubs in Asia and the Middle East.

In contrast, **Ninoy Aquino International Airport (NAIA)** in Manila, while offering more international routes, often faces significant traffic delays. Travelers using NAIA must account for 2 to 3 hours (or more) of travel time to reach Clark, depending on Manila's traffic conditions.

SCIENTIFIC SESSIONS

We anticipate that the scientific session (oral and poster) will take place in the first two days of the workshop, and we invite ideas or proposals for up to 5 thematic symposia. The program wishes to include sessions focused on diffuse CO_2 degassing measurements, and gaseous emissions from lakes, geochemical and microbiological characterization of lake waters, hydrogeological and geophysical modeling of lake environments, as well as on active volcanism and phreatic events and volcanic hazard assessment, to better understand the interplay of these processes that may be causing changes in the chemical composition of these volcanic lakes and associated hydrothermal springs. Of particular interest in the Philippine setting is the occasional change in the color of Pinatubo Crater Lake, and we welcome contributions that explore this phenomenon, with submissions ranging from modeling to monitoring, and everything that may help us understand these changes.

PINATUBO VOLCANO ERUPTION

The cataclysmic eruption of Pinatubo Volcano on 15 June 1991 is the second-largest volcanic eruption of this century and by far the largest eruption

to affect a densely populated area. The eruption produced high-speed avalanches of hot ash and gas, lahars, and a cloud of volcanic ash hundreds of kilometers across. The impacts of the eruption continue to this day.

From June 7 to 12, the first magma reached the surface of Pinatubo Volcano. Because it had lost most of the gas contained in it on the way to the surface (like a bottle of soda pop gone flat), the magma oozed out to form a lava dome but did not cause an explosive eruption. However, on June 12 (Philippine Independence Day), millions of cubic meters of gas-charged magma reached the surface and exploded in the reawakening volcano's first spectacular eruption.

When even more highly gas-charged magma reached Pinatubo's surface on June 15, the volcano exploded in a cataclysmic eruption that ejected more than 5 cubic kilometers (1 cubic mile) of material. The ash cloud from this climactic eruption rose 35 kilometers (22 miles) into the air. At lower altitudes, the ash was blown in all directions by the intense cyclonic winds coincident with the passage of a tropical cyclone (International Name: Yunya; Local name: Diding) in the Philippine Area of Responsibility (PAR), and winds at higher altitudes blew the ash southwestward. A blanket of volcanic ash (sand- and silt-size grains of volcanic minerals and glass) and larger pumice lapilli (frothy pebbles) blanketed the countryside. Fine ash fell as far away as the Indian Ocean, and satellites tracked the ash cloud several times around the globe.

Huge avalanches of searing hot ash, gas, and pumice fragments (pyroclastic density currents) roared down the flanks of Pinatubo Volcano, filling once-deep valleys with fresh volcanic deposits as much as 200 meters (660 feet) thick. The eruption removed so much magma and rock from below the volcano that the summit collapsed to form a large volcanic depression (caldera) 2.5 kilometers (1.6 miles) across.

Much weaker but still spectacular ash eruptions occurred occasionally through early September 1991. From July to October 1992, a lava dome was formed in the new caldera as fresh magma rose from deep beneath Pinatubo.

- *Chris Newhall, James W. Hendley II, and Peter H. Stauffer*

1991 Pinatubo Volcano eruption photo acquired from USGS

PINATUBO CRATER LAKE

The June 1991 eruption of Mount Pinatubo, Philippines breached a significant, pre-eruptive magmatic-hydrothermal system consisting of a hot (>300°C) core at two-phase conditions and surrounding, cooler (<260°C) liquid outflows to the N and S. The eruption created a large, closed crater that accumulated hydrothermal upwellings, near-surface aquifer and meteoric inflows. A shallow lake formed by early September 1991 and showed a long-term increase in level of ~1m/month until an artificial drainage was created in September 2001. Comparison of the temporal trends in lake chemistry to pre- and post-eruptive springs distinguishes important processes in lake evolution. The lake was initially near-neutral pH and dominated by meteoric influx and Cl–SO_4 and Cl–HCO_3 hydrothermal waters, with peaks in SO_4 and Ca concentrations resulting from leaching of anhydrite and aerosol-laden tephra. Magmatic discharge, acidity (pH~2) and rock dissolution peaked in late 1992, during and immediately after the eruption of a lava dome on the crater floor. Since cessation of dome growth, trends in lake pH (increase from 3 to 5.5), temperature (decline from 40 to 26°C), and chemical and isotopic composition indicate that magmatic degassing and rock dissolution have declined significantly relative to the input of meteoric water and immature hydrothermal brine. Higher concentrations of Cl, Na, K, Li and B, and lower concentrations of Mg, Ca, Fe, SO_4 and F up to 1999 highlight the importance of a dilute hydrothermal contribution, as do stable-isotope and tritium compositions of the various fluids. However, samples collected since that time indicate further dilution and steeper trends of increasing pH and declining temperature. Present gas and brine compositions from crater fumaroles and hot springs indicate boiling of an immature Cl–SO_4 geothermal fluid of near-neutral pH at approximately 200°C, rather than direct discharge from magma. It appears that remnants of the pre-eruptive hydrothermal system invaded the magma conduit shortly after the end of dome emplacement, blocking the direct degassing path. This, along with the large catchment area (~5km^2) and the high precipitation rate of the area, led to a rapid transition from a small and hot acid lake to a large lake with near-ambient temperature and pH. This behavior contrasts with that of peak-activity lakes that have more sustained volcanic gas influx (e.g., Kawah Ijen, Indonesia; Poas and Rincon de la Vieja, Costa Rica).

- Stimac et al., 2004

1994 Pinatubo Volcano summit crater lake photo by DOST-PHIVOLCS

2023 Pinatubo Volcano summit crater lake photo by DOST-PHIVOLCS

SAN PABLO MAARS

San Pablo City is located in the Province of Laguna and is situated approximately 70 kilometers away from Metro Manila. It is famous for its seven (7) lake-filled maars, namely: Bunot, Calibato, Mohicap, Palakpakin, Pandin, Sampaloc, and Yambo. The seven lakes were formed through the interaction of shallow magma with groundwater, causing an explosion that created crater-like depressions that eventually have been filled with meteoric water.

The 7 lakes of San Pablo are part of the monogenetic volcanic centers, of the pull-apart 'Macolod Corridor' rift zone, with reported ages of 1.05 ± 0.05 Ma (De Boer et al., 1980) and 0.84 ± 0.13 Ma (Oles, 1991) from basaltic to andesitic rocks in the eastern side of the monogenetic volcanic field (Sudo et al., 2000). Additionally, ages 0.20 ± 0.04 Ma (Wolfe and Self, 1983), 0.14 ± 0.04 Ma (Oles, 1991) and 0.10 ± 0.02 Ma (Wolfe and Self, 1983) were obtained from dacitic to rhyolitic rocks in the western side of the monogenetic volcanic field (Sudo et al., 2000). Moreover, these basaltic scoria cones and maars are observed to align according to NE-SW and NW-SE trending fault systems present within the Macolod Corridor (Forster et al., 1990).

Available research themes conducted on the San Pablo maars as of this writing are predominantly focused on limnology, biodiversity, and socio-economic development.

2024 satellite image of the San Pablo Maars via Google Earth Pro

SAMPALOC LAKE

Sampaloc Lake is the largest among the seven lake-filled maars with surface area of approximately 104 hectares and maximum depth of approximately 27 meters. It is one of San Pablo City's popular tourist attractions and a source of income for surrounding communities as it is abundant in different species of freshwater fish.

Photo: Ralph Daryl Photography via San Pablo City Tourism Page

CALIBATO LAKE

Calibato Lake is the deepest among the seven lakes with a maximum depth of 156 meters and surface area of approximately 43 hectares. It is also a source of abundant fish for nearby communities.

Photo: Ralph Daryl Photography via San Pablo City Tourism Page

PANDIN AND YAMBO LAKE

Known as "The Twin Lakes", Pandin and Yambo Lakes are only separated by a narrow strip of land. Unlike the other lakes, both Pandin and Yambo are classified as oligotrophic due to low nutrient supplies, high dissolved oxygen level and little organic matter.

Pandin Lake has a surface area of 24 hectares and a water depth of approximately 62 meters.

Yambo Lake has a surface area of 30.5 hectares and water depth of approximately 38 meters.

Photo: Ralph Daryl Photography via San Pablo City Tourism Page

Photo: Ralph Daryl Photography via San Pablo City Tourism Page

MOHICAP LAKE

Mohicap Lake is the smallest among the seven lakes with surface area of approximately 23 hectares and water depth of approximately 30 meters. The lake is also a major source of tilapia (*Oreochromis niloticus*) for Metro Manila and suburbs.

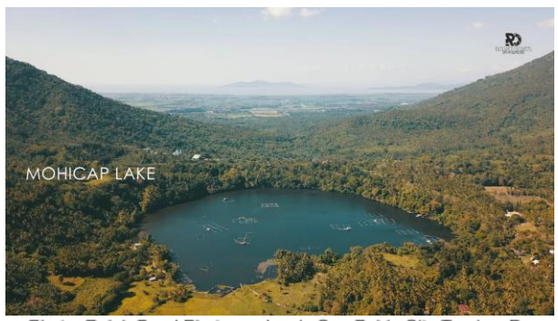


Photo: Ralph Daryl Photography via San Pablo City Tourism Page

PALAKPAKIN LAKE

The shallowest among the seven lakes is Palakpakin Lake, with a water depth of approximately 8 meters and surface area of approximately 48 hectares.

Photo: Ralph Daryl Photography via San Pablo City Tourism Page

BUNOT LAKE

Bunot Lake, which is a neighboring lake to Sampaloc Lake, has a surface area of approximately 30.5 hectares and maximum depth of approximately 23 meters.

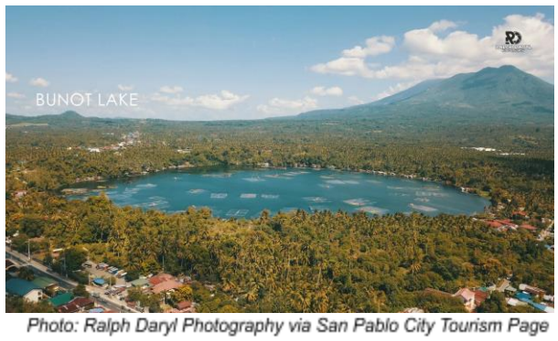


Photo: Ralph Daryl Photography via San Pablo City Tourism Page

COST

Conference fees are at this stage estimated to be **600 Euro** per person. The fee includes the following:

- Registration
- Rental fee of the conference venue and its amenities (welcome dinner, coffee breaks, and socials) for 3 days in the venue hotel.
- 3 nights' accommodation at the Airbnb in Santa Juliana, Tarlac (O'donnell) based on double room occupancy from March 12 - 15, 2026.
- 3 nights' accommodation at a hotel/resort in San Pablo, Laguna, based on double room occupancy (limited single rooms will be available) from March 15 - 18, 2026 .
- Limited single rooms will be available. Details will be posted in the second circular.
- Dinner at the Airbnb in Santa Juliana.
- Government fees for climbing Pinatubo Volcano.
- Rental of off-road vehicles for transport to the drop-off and pick-up point.
- Packed lunch boxes and snacks on all field days
- Coffee breaks and snacks
- Conference kit
- Transfer from San Pablo to hotels close to Ninoy Aquino International Airport (MNL). We recommend booking hotels close to the airport if staying for an extra day in Manila.

Not included in the conference fee are:

- Airfare to the Philippines
- Transfer from CRK (or MNL) Airport to the venue hotel
- Accommodation in Clark from March 9 - 11, 2026
- Cost of any touristic activities.

IMPORTANT DATES

September 5, 2025 - Second Circular

September 15, 2025 - Registration / Abstract submission opens

November 10, 2025 - Deadline for registration and abstract submission

November 25, 2025 - Notice for oral and poster presentation

November 30, 2025 - Deadline for the registration fee

March 9 - 18, 2026 - CVL 12 Workshop

PRELIMINARY PROGRAM

DAY 1 - March 9, 2026
- Arrival of the participants via Clark International Airport (CRK) or transfer of participants from Manila International Airport (MNL) to Hotel in Clark, Pampanga.
- Check-in of the participants to their respective hotels. Grant recipients will be billeted at the Conference hotel in a double room arrangement.
- Icebreaker / Cocktail

DAY 2 - March 10, 2026
- Registration, Official Opening Ceremony
- Start of the Scientific Sessions (Oral and Poster)
- Welcome Dinner

DAY 3 - March 11, 2026
- Continuation of the Scientific Sessions
- Planning meeting for the fieldwork

DAY 4 - March 12, 2026
- Check out from Clark hotel and transfer to the Airbnb at the foot of Pinatubo Volcano
- Field trip along O'Donnell River, introduction to the eruptive deposits of Pinatubo Volcano
- Option to hike for an overnight at the Crater Lake.

DAY 5 - March 13, 2026
- Field activities at Pinatubo Crater Lake
- Option to camp overnight in the Crater Lake

DAY 6 - March 14, 2026
- Continuation of the field sampling in Pinatubo Crater Lake

DAY 7 - March 15, 2026
- Check out from Santa Juliana Airbnb and travel to San Pablo, Laguna
- Stop at the PHIVOLCS Main Office and Tagaytay overlooking Taal Volcano

DAY 8 - March 16, 2026
- Field activities in one of the Seven Lakes of San Pablo (the two lakes for field area will be announced in the second circular.)

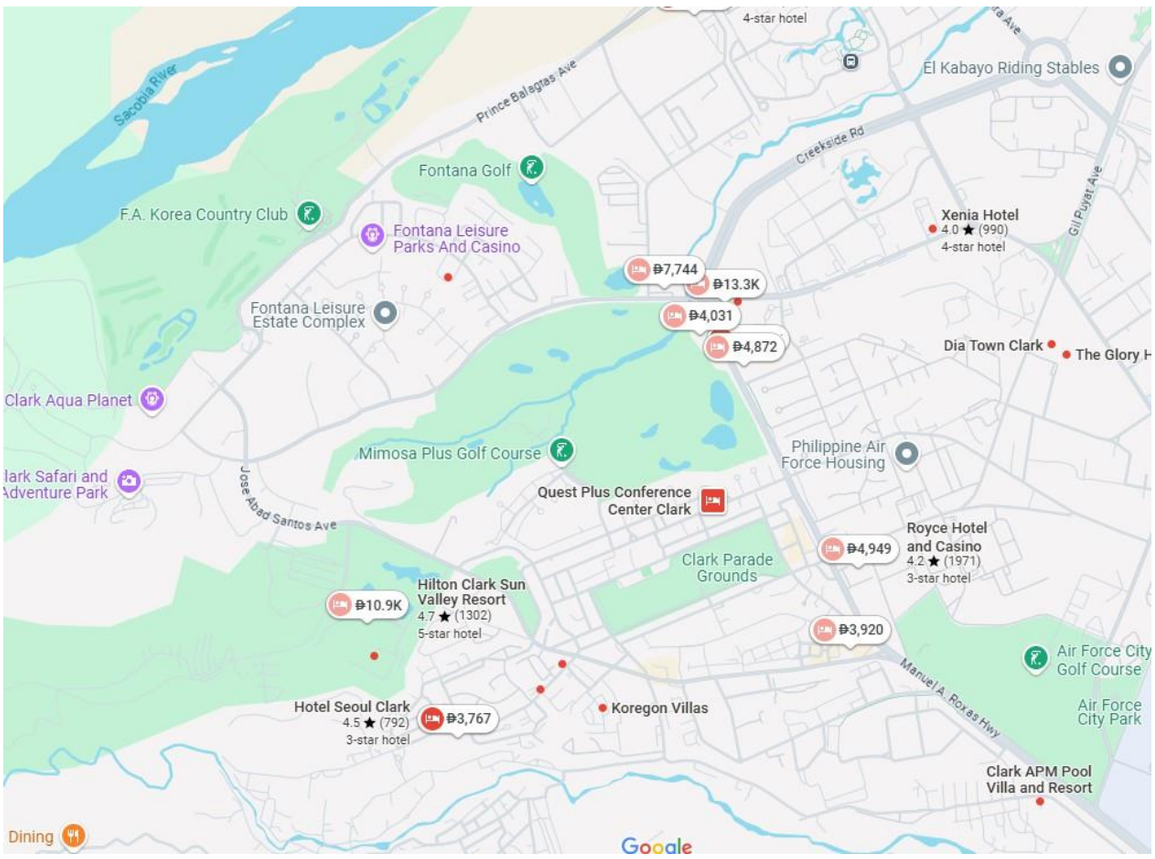
DAY 9 - March 17, 2026
- AM - Continuation of field sampling at Seven Lakes of San Pablo
- PM - Business Meeting
- Evening - Closing Ceremonies and Farewell dinner

DAY 10 - March 18, 2026
- Check-out and departure of participants to Manila
- Fly out from Ninoy Aquino International Airport (MNL).

VENUE AND ACCOMMODATIONS:

The venue of the conference will be announced in the upcoming circulars. This will be around Metro Clark, Pampanga.

Participants must arrive on March 9 and stay at their reserved hotels in Clark for the nights of March 9-11, 2026.



On booking websites, you will find most hotels, including those listed below, from budget-friendly options to luxury accommodations. You can make reservations directly through the websites of most of the hotels.

List of hotels.

1. Swissotel Clark Philippines (swissotelclark.com)
2. Hotel Seoul Clark (www.hotelseoul-clark.com)
3. Best Western Plus Metro Clark (bestwesternplusmetroclark.com)
4. Clark Marriott Hotel (www.marriott.com)
5. Midori Clark Hotel and Casino (www.midorihotel.com)
6. Punta Clark Hotel (puntaclark.com-hotel.info/en/)
7. Widus Hotel Clark (www.widus.com)
8. Royce Hotel and Casino (www.roycehotelandcasino.com)

In the succeeding days of the workshop, participants will stay at an Airbnb. Because of the limited choices for accommodations in the field area, the organizers will select the best available Airbnb.

More details to come in the upcoming circular.

LOCAL ORGANIZING COMMITTEE (LOC)

- Teresito C. Bacolcol
- Ma. Mylene M. Villegas
- Raymond Patrick R. Maximo
- Danikko John V. Rivera
- Robjunelieaaa B. Lim
- Marie Thess Quilalang-Gemal
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- Dynie F. Doloiras
- Kristine Dionne B. Lagunsad
- Mary Diana M. Laron
- Melissa Mae P. Tamayo
- Karl Vincent C. Soriano
- Marilou Del Rosario

SCIENTIFIC COMMITTEE

- Jacopo Cabassi - CNR-IGG, Italy
- Agnes Mazot - GNS, New Zealand
- Jennifer Lewicki, USGS, USA
- Franco Tassi, University of Firenze, Italy
- Zachary Smith, UC Berkeley, USA
- Felipe Aguilera Barazza - Ckelar Volcanoes/UNAB, Chile
- Alain Bernard - ULBruxelles, Belgium
- Bruce Christenson - GNS, New Zealand
- Dmitri Rouwet - INGV Bologna, Italy
- Ma. Mylene Villegas, DOST-PHIVOLCS, Philippines
- Raymond Patrick R. Maximo, DOST-PHIVOLCS, Philippines

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- Agnes Mazot - Leaders
- Felipe Aguilera Barazza - Secretary General
- Dmitri Rouwet - Past Leader/Webmaster
- Jeniffer Lewicki - Past Leader
- Corentin Caudron - Past Leader
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CVL 12 Workshop

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