

Abstracts *Volume*

MAY 21 to 25, 2018



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Presentation

Since the first “International Maar Conference” (IMC) meeting, the series has become one of the most successful discussion forums in volcanology, mainly because it provides a unique opportunity to bring together people from many different volcanological fields (physical volcanologists, sedimentologists, modellers, petrologists, etc), any of whom may become involved in some way in the study of different eruption styles of basaltic volcanism and, in particular, those occurring in monogenetic volcanic fields. Previous IMC meetings have been held in a wide diversity of places (Hungary, Slovakia and Germany) that posed different problems in terms of eruption dynamics, products and landforms in these volcanic areas.

The city of Olot, the main location of the La Garrotxa Volcanic Field, the most recent area in the Quaternary Catalan Volcanic Zone, will provide a unique opportunity for holding a multidisciplinary volcanological forum that will focus on different aspects of maars and monogenetic volcanism. In Olot and its surroundings volcanoes are present in many aspects of local society, as its cultural heritage, local history, architecture or even in its excellent cuisine. People live among volcanoes and they are aware that they represent the most characteristic feature of their region. Protection of all this area and of the volcanoes in particular, has been effective since 1982, when it was declared as a Natural Park (The Garrotxa Volcanic Zone Natural Park) by the Catalan Government.

The Local Organizing Committee and the International Association of Volcanology and Chemistry of Earth’s Interior (IAVCEI) are pleased to welcome you to the 7th International Maar Conference (IMC) in Olot (Spain) in May 21- 25, 2018.

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Lakes in maar volcanoes: the sedimentary record of paleontology, climate change and hydrochemistry

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The geometry of Maar-diatreme craters usually leads to develop hydrologically closed lakes that contain anoxic bottom conditions. Such settings are ideal for the preservation of complete and detailed sedimentary records of past environmental changes. These records include climate evolution, ecological reconstructions, hydrochemistry and human impact in natural systems. Exceptionally preserved fossils in such meromictic lakes are also an important source to study the history of life and its evolution.

This session wants to create synergies between volcanologists and other researchers dealing with limnology, hydrochemistry, mineralogy, paleontology, and climate proxies, among many others.

Maar sediment in central Vietnam Highland near Pleiku: An archive of regional monsoon intensity?

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Current global warming increases atmospheric humidity and will likely affect the East-Asian monsoon system across Vietnam. It is essential to understand the long-term regional climatic variability to properly evaluate present and potential future trends along global climate change. In the absence of a long written history and instrumental records in Vietnam, we must rely on geoarchives recording the paleoenvironmental history. Sediments from East-Asian maar lakes provide long-term records of monsoon variability, position and strength, for example in Cambodia, Myanmar and China (e.g., Sharma, 2014; Sun et al., 2016; Yang et al., 2016). Central Vietnam's Pleiku volcanic field features numerous maar lakes and dry maars which formed before 0.2 Ma ago (Nguyễn et al., 2013). Their natural sedimentary archives extend from the Holocene deep into the Pleistocene (Kitagawa et al., 2015; Nguyễn-Văn et al., 2017).

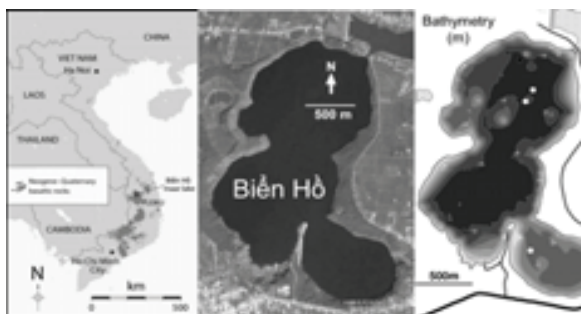


Fig. 1 – Central Vietnam's Highland features a cluster of maars near Pleiku. We cored the deepest and other parts of Biển Hồ maar lake (three white hexagons on bathymetric map) and some other maars in the area.

In three field campaigns between March 2016 and November 2017, we recovered numerous exploratory, up to 3.5 m deep gravity and piston cores from Biển Hồ maar lake near Pleiku (14° 03'03.5" N, 108° 00'00.2" E; Fig. 1) at water depths up to ~21 m (Fig. 2). A slightly cohesive microbial mat (Fig. 3B) has been observed to cover organic-rich, anoxic, sapropelic sediment below, except for occasional clay-rich flood layers following intense

precipitation, such as in the fall of 2016 (United Nations, Viet Nam Office, 2016).



Fig. 2 – Gravity and piston coring in November 2017 on an improvised platform on Biển Hồ maar lake from water depths up to ~21 m.

The most recent ~15 cm of sediment are visibly laminated, whereas deeper sediment is typically dark-olive with rare color boundaries, yet XRF and magnetic susceptibility data suggest mm-scale variance over depth. Deeper sediment recovered in November 2017 contained horizontally positioned, well-preserved leaves and grass fragments that are subject to AMS radiocarbon dating (Fig. 3A).

A November 2017 hydrographic survey in Biển Hồ maar lake demonstrated thermal stratification and oxygen-depleted bottom water. By November 2017, iron (III)-containing reddish minerals in the topmost flood layer from 2016 (Fig. 3C) had been reduced to dark iron (II)-containing minerals and had been covered by a newly deposited bacterial mat on olive sediment.

Our preliminary observations suggest that Biển Hồ maar lake's suboxic bottom water protects modern laminated sediment from bioturbation (Fig. 4). Even if deeper, dark-olive sediment fails to be consistently laminated, careful documentation of its mineral content over depth may reveal a record of paleoflooding in terms of occasionally enhanced influx of weathering products from the maar's crater in response to potentially stronger monsoon activity or changes in landcover around the maar.

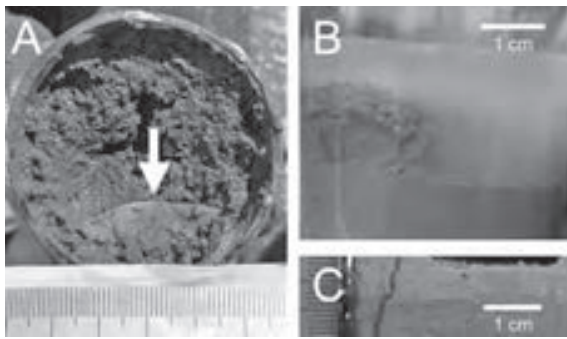


Fig. 3 – A: A well-preserved leaf was found in a core below the piston at a depth of 180 cm in Biển Hồ sediment. Other leaves, clusters of grass fragments, and wood bark were recovered in November 2017 from more than 12 horizons for radiocarbon dating. B: A curled-up microbial mat from the sediment/water interface after coring in March 2016. C: A reddish, freshly deposited 2016 flood layer was recovered in January 2017 above darker, olive sediment.

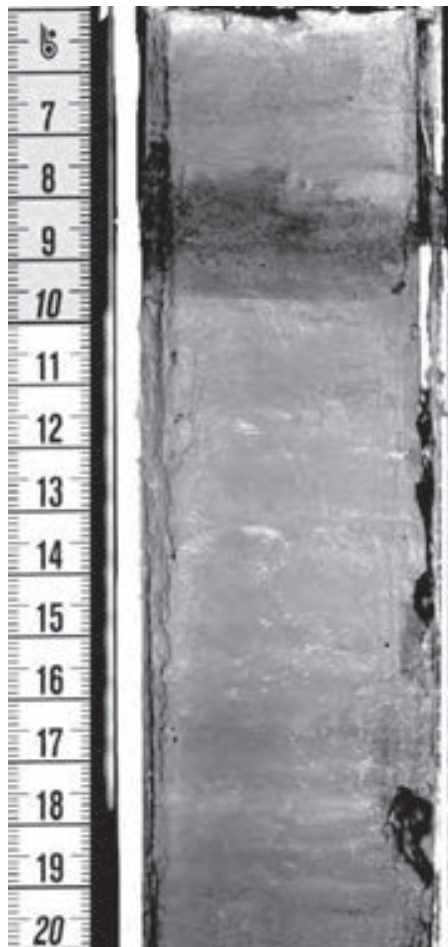


Fig. 4 – Photograph of a gravity core from Biển Hồ maar lake from March 2017 that was opened at LacCore in July 2017. Despite partial oxidation and disturbance at the top during transport from Pleiku to Hanoi, unrefrigerated storage in Hanoi, and transport to the USA, the core preserved evidence of lamination. The depth scale is in cm.

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