



International Summer Meeting on Volcanic Lakes
“Different perspectives and approaches to study a volcanic lake”
Monticchio Lakes (Basilicata, Italia)
25-29 June 2018

Introduction

The aim of this scientific meeting held at Monticchio Laghi, Rionero in Vulture, Potenza (Basilicata, southern Italy) was to experience a multi-disciplinary scientific activity at two volcanic lakes, i.e. Monticchio Grande and Monticchio Piccolo, focusing on peculiar approaches and methods of investigation of volcanic lakes from the geochemical, biological and limnological perspective.



Monticchio lakes are hosted within two maars formed 140 ka ago during the last eruptive activity of Mt. Vulture. The area is characterized by intense CO₂ degassing and bubbling gases are present along the Lake Piccolo shoreline. Lake rollover, fish-kill events were witnessed on June and August 1810 and in 1820, with the formation of water fountains up to 6 m high. Lake Piccolo is the tributary of Lake Grande through an artificial channel. It has a maximum depth of 38 m, a surface area of 1.6×10^5 m², and a volume of 3.98×10^6 m³. Steep walls, a funnel shape, and a depth-ratio value of 0.64 characterize the lake morphology. Lake Grande has a maximum depth of 35 m, a surface area of 4.1×10^5 m², and a volume of 3.25×10^6 m³. A large portion of this lake has a flat bottom not exceeding 12 m depth. Consequently, its depth ratio is relatively low (0.25). A channel built by monks of the nearby monastery, to prevent water level increases, connects Lake Grande to the Ofanto River. The



dissolved gas reservoir shows CO₂ and CH₄ at relevant and comparable concentrations (bioactivity-type lakes).



Organization, participants and main sponsors

The scientific committee of the International Summer Meeting on Volcanic Lakes 2018 consisted of researchers and professionals from prestigious research institutions and national university institutes:

- Franco Tassi, University of Florence, Italy
- Fatima Viveiros, University of the Azores, Portugal
- Martin Zimmer, GFZ, Germany
- Gladys Melian Rodriguez, ITER, Spain
- Bertram Boehrer, UFZ, Germany
- Cristiana Callieri, CNR-ISE, Italy
- Dmitri Rouwet, INGV Bologna, Italy
- Antonio Caracausi, INGV Palermo, Italy
- Guendalina Pecoraino, INGV Palermo, Italy
- Michele Paternoster, University of Basilicata, Italy

The organizing committee, with the administrative support of *Associazione Naturalistica GEODE*



(Palermo, Italy), consisted of, as follows:

- Franco Tassi, University of Florence, Italy
- Michele Paternoster, University of Basilicata, Italy
- Sergio Calabrese, University of Palermo, Italy
- Orlando Vaselli, University of Florence, Italy
- Jacopo Cabassi, CNR-IGG, Italy
- Francesco Capecchiacci, University of Florence, Italy
- Stefania Venturi, University of Florence, Italy
- Francesco Magi, University of Florence, Italy

The 28 participants were young and senior researchers having different scientific backgrounds (geochemists, limnologists, biologists, volcanologists) from Italy, USA, Romania, Hungary, Germany, Holland and France.

Sponsors: Società Geochimica Italiana (SOGEI, official patronage); Springer; Società Italiana di Mineralogia e Petrologia (SIMP); Commission of Volcanic Lakes (CVL-IAVCEI); West Systems; Provincia di Potenza; APT Basilicata; Università degli Studi della Basilicata; Thermo-Fisher Scientific; Dipartimento di Scienze dell'Università della Basilicata.



The meeting: presentations and field activities



The meeting aimed to encourage and promote the exchange of expertise among international scientists in the study of limnic systems in volcanic environments, especially favouring the discussion and the development of new multidisciplinary and methodological research approaches.



The 26th of June was entirely dedicated to oral presentations and discussions. Case studies and theoretical lessons relevant to the study of volcanic lakes were presented. The talks were carried out in the evocative scenery of the Abbey of San Michele Arcangelo, located above Lake Piccolo. During the day, it was also possible to visit the Museum of Natural History of Vulture inside the abbey.



The 27th and 28th June were dedicated to practical activities, carried out in both the Monticchio lakes

(Grande and Piccolo), for the measurement of physical-chemical parameters and the collection of samples for laboratory analysis. More specifically, water and dissolved gas sampling was carried out along vertical profiles from the lake surface to the bottom at selected depths, at a site corresponding to the deepest point of the lakes. The sampling equipment consisted of Rilsan[®] tubes ($\phi=6$ mm) connected through steel connectors. Water was pumped via the tubes up to the surface by means of a 100 mL syringe equipped with a three-way valve and transferred into plastic bottles and glass vials for analysis of anions, cations, trace species, dissolved gases and microbial populations. Samples of sediment from the bottom of the lakes were collected by means of depth corers and dredges. Measurements of CO₂ and CH₄ fluxes from the lake surface were also carried out by means of a floating accumulation chamber, simultaneously with measurements in air of concentration and isotopic composition of methane.





On the 29th of June, a round table was held, with an open discussion about present and future research of volcanic lakes. The production of a joint scientific publication collecting all the data produced in the framework of the meeting was proposed. The idea was to adopt a multi-disciplinary and multi-methodological approach to provide a complete characterization of the two lake environments. The creation of an internet site to allow real-time data and measures sharing was also proposed.

In the afternoon, an excursion to the nearby city of Matera (UNESCO site) took place, representing the final official activity of the meeting

