GEOCHEM NEWSLETTER

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IN THIS ISSUE

So.Ge.I. – ITALIAN GEOCHEMICAL SOCIETY

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Letter from the President

Orlando Vaselli

Dear Friends and Colleagues,

This is the very first issue of the Geochem-newsletter in English. It is not snobbism but it is due to the fact that at the end of the year I would once again try to affiliate our Society to the European Association of Geochemistry. I think that this is a very important target and let's hope we will succeed. We have our (bi-yearly) congress which alternates with the joint congress of four geological societies, i.e. the Italian Society of Geology, the Society of Mineralogy and Petrology, the Italian Association of Volcanology and our society. We organize schools, workshops and we have our newsletter.

As you already know, the congress will be held from the 19th to the 21st of September, 2023 in Potenza. In this respect, I am pleased to inform you that the organizing committee has received 878 abstracts: 440 as oral and 366 as poster presentations. In the next few days, the scientific committee (4 representatives of our society are in this committee) will provide the final list of those sessions which have received a sufficient number of abstracts (presumably 20). The joint congress of Potenza, titled "*The Geoscience paradigm: resources, risk and future perspectives*", is the most important event that the geological community will have in 2023. It is also useful to remind that the deadline to submit your own participation to the field work is on the 20th of June, the closure of the early-bird registration is on the 21st of June, 2023. It is important to note that the So.Ge.I presidency committee has decided to give 3 grants to PhD students and young researchers. The registration fees will be paid by our society. Unfortunately, there was a misunderstanding with the organizing committee and these 3 grants are not still visible in the congress sites. Starting from the 22nd of May, the potential participants may apply via the following link: https://www.geoscienze.org/N224/student-grants.html. The applications has to be sent to presidenza@societageochimica.it. The deadline is on the 1st of June.

This congress has a two-fold importance for our society, among others. It will allow to give visibility to our young researchers and have the General Assembly (in presence), during which we have to start thinking about the candidates for the presidency and the members of the So.Ge.I. committee since we will complete our 4-years term of office on the 31st of December 2023. It is thus reasonable that before Christmas we are going to have the elections (on-line) for the president, the four members of the presidency committee (including the treasurer) and the web-master.

Before the joint congress, two other events organized by So.Ge.I. are on their way. The first one is the School of Volcanology (from the 19th to the 23rd of June, 2023) on "*Sampling and Measuring Techniques of Volcanic Fluids: Science meets Practice*". The school will be held at the Island of Vulcano. More than 80 are the participants to this free-of-charge school and about 20 are the teachers from different universities, CNR and INGV. The aim is that to cover all the aspects related to the fluids discharging in volcanic areas. The students will have the possibility to interact with the experts and touch with their hands the most common and innovative instrumentations to collect and measure fluids. A few days after the School of Volcanology, the CAMGEO School, dedicated the sampling and analysis of geological matrices, will take place. The main topics is "*Conventional and not-conventional isotopes applied to environmental sciences*". The CAMGEO School will be held at Abbadia San Salvatore (Siena) from the 11th to the 14th of July. There are still a few seats available. Please, pay attention to the deadline for participating to the school: 28th of May. The full program is visible at our web-site.

Now, I briefly describe the content of this issue which is, unfortunately, rather poor, though interesting. Once again, I do wish to invite all of you to submit some short communications related to field works, on-going projects, summary of events such as congresses, short courses, workshops (where the Italian Society of Geochemistry has been involved) and so forth.

This is the case of the report produced by Francesca Pasquetti, Júlia Carvalho Lannes Galvão Fonseca, Marco Luppichini, Cynthia Victoria Sassenroth and Matteo Nigro as organizers of the first conference "*Water in Geosciences*" (https://watergeo2023.dst.unipi.it/) which was held in Pisa on the 2nd and 3rd of March 2023. About 50 people attended the conference and 5 key-note speakers were invited. I wish to thank the members of the organizing committee for the successful event. I hope that this conference will be replicated in the near future.

The second contribution is by Rebecca Biagi who described the activity carried out at Nisyros (Dodecanese Islands, Greece) from the 14th to the 28th of April, 2023. Several researchers and PhD students were involved in a multidisciplinary project dedicated hydrothermal eruptions, gas chemistry and volcanic gas dispersion. Diffuse CO_2 fluxes, fumarolic gas sampling, radioactivity analyses, air quality measurements and so forth were carried out in the Lakki Plain of the Nisyros Caldera.

Finally, Jacopo Cabassi presented a new way to catalogue and download the publication of the So.Ge.I. members. According to this new method of selection, which covers the time span from the 4th of January to the 21st of April, 2023, a list of 62 papers, published by our members, is reported. This precious and important contribution and the papers' list by Jacopo Cabassi are a sort of thermometer of the productivity of our community and, as already evidenced in previous newsletter, is amazing how our members are able to encompass such a high number of topics, further strengthening the importance of our discipline in theoretical and applied approaches.

Before concluding this letter, I would like to remind you that on the 10th and 11th of May, the first Italian workshop, sponsored by So.Ge.I., on Fluid and Melt Inclusions was held at the Botanical Garden of Palermo. The event was attended by 39 participants belonging to universities, CNR and INGV. In the next issue, Francesco Maria Lo Fort (one of the organizers) will summarize for our community the event. Naples will host the second Congress BeGeo, titled "*Sustainability and risk: BeGEO scientists on the road to the future*" (https://www.begeos.it/begeo2023/) from the 3rd to the 6th of October, 2023.

The last but not the least, So.Ge.I. will support the conference "*GeothermiX: How Earth's heat is studied and impacts society"* organized by Evelina Dallara, Lazzarotti Marco, Furfori Ilaria, Parnas Marella and Macelloni Fabio (University of Pisa) to be held in Pisa from the 29th of November to the 1st of December, 2023. More details will be provided as soon as we will get them.

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Members' Activities

Conference Water in Geosciences

Francesca Pasquetti

Water in Geosciences
Pisa - 2023

We just wrapped up a successful conference on "Water in Geosciences" (2nd and 3rd March 2023) at the Earth Science Department of the University of Pisa! This conference, organized by a group of Ph.D. students of the Earth Science Department (*Fig. 1*), aimed to address the theme of water from a multidisciplinary perspective.

Key topics ranged from tracking water flows in various natural systems, to the study of the resource in contexts subject to environmental and anthropical pressures, to the landscape shaping capacity of water, and the past traces from aquatic environments.

An international set of keynote speakers, including both young researchers and internationally renowned researchers, attended with valuable presentations.

The conference provided a precious opportunity for Ph.D. students and young researchers to meet and discuss the current and crucial issue of water. Young researchers also had the opportunity to meet national and international senior researchers and professors to benefit from their expertise.

Overall, it was an incredibly informative and thought-provoking event, and we look forward to seeing the impact that this sharing-knowledge will have on our understanding of water resources and their management in the future.

About 50 people attended this conference, including presenters and listeners, as well as the Organizing and Scientific committee and the Chairpersons of different sessions.

We thank all the presenters coming from different Italian universities and different countries who attended the conference with very interesting research works.

Special thanks go to the keynote speakers: **Dr. Polona Vreča** - Jožef Stefan Institute, Slovenia; **Prof. Daniele Penna** - Dipartimento di Scienze e Tecnologie Agrarie, Alimentari, Ambientali e Forestali, Università di Firenze, Italia; **Prof. Helenice Vital** - Department of Geology Federal University of Rio Grande do Norte, Brazil; **Dr. Adrià Barbeta Margarit** - Department of Evolutionary Biology, Ecology and Environmental Sciences University of Barcelona, Spain; **Dr. Giovanni Coletti** - Dipartimento di Scienze Dell'ambiente e della Terra, Università Milano Bicocca, Italia.

This conference has been funded by a grant for scientific initiatives organized by PhD students provided by the University of Pisa and for this reason was free of charge for the participants. Therefore, another special thanks go to the University of Pisa for this precious opportunity and to the Department of Earth Science that provided the location and the means for the realization of this event.

The conference was also supported by Museo di Storia Naturale di Calci, Museo di storia naturale del mediterraneo di Livorno, Associazione Giovani Ricercatori BeGEO Scientists, Società Geochimica Italiana (SoGeI) and Associazione Internazionale Idregeologi (IAH-Sezione Italiana).

Fig. 1 The Organizing Committee. From left to right: Cynthia, Matteo, Julia, Francesca and Marco.

The Organizing Committee
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#WaterInGeo2023 #PisaConference
#WaterManagement
#EnvironmentalResearch
https://watergeo2023.dst.unipi.it

Opening ceremony and Greetings.

During the conference

The fieldtrips to Pisa and Massaciuccoli Lake

Coffe breaks and poster session

Members' Activities

Quantifying volcanic gas dispersion at Nisyros island (Greece)

Rebecca Biagi

Between April 14 and 28, 2023, a volcanic gas survey was carried at the Island of Nisyros (Dodecanese, Greece). This activity is part of an ongoing project led by Georgios E. Vougioukalakis (Hellenic Survey of Geology and Mineral Exploration, Greece) and Roberto Sulpizio (Dipartimento di Scienze della Terra e Geoambientali, Università Aldo Moro, Bari, Italy). Several researchers took part in this volcanological, geochemical and physical investigation including Ph.D. students, and faculty members specialized in different disciplines of Earth Sciences. They synergically collaborated. In detail, among other participants, Antonio Costa, Giovanni Chiodini, Giancarlo Tamburello, Laura Sandri and Giulio Bini (Istituto Nazionale di Geofisica e Vulcanologia, Bologna, Italy), Silvia Massaro, Manuel Stocchi and Fabio Dioguardi (Dipartimento di Scienze della Terra e Geoambientali, Università Aldo Moro, Bari, Italy), Jacopo Selva (Dipartimento di Scienze della Terra, dell'Ambiente e delle Risorse, Università Federico II, Napoli, Italy), Rebecca Biagi, Franco Tassi and Orlando Vaselli (Dipartimento di Scienze della Terra, Università di Firenze, Italy) joined the project, whose main goals are to investigate and quantify the dispersion of CO_2 and H_2S inside the caldera, through the application of probabilistic methodologies. The project is mostly focused on supporting risk quantification and mitigation actions in active volcanic areas where harmful volatile contaminants are naturally released, posing a significant risk to the environment and public health.

The Island of Nisyros is a Quaternary stratovolcano located in the easternmost volcanic group of the South Aegean Active Volcanic Arc, along with Kos, Yali, and other minor islands (*Fig. 1a*). The volcanic activity in the Kos-Nisyros-Yali volcanic complex dates back at least 3Ma. The most recent activity is represented by hydrothermal explosions that occurred in historical times and formed the phreatic craters of Polybotes Megalos and Phlegethon (1871-1873), and Polybotes Micros (1887). Nowadays, the island has a truncated cone shape with a base diameter of 8 km and a surface area of approximately 42 km^2 (*Fig. 1b*). The 4 km in diameter Lakki Plain caldera, which formed <20 ka from a major collapse of the volcanic edifice, shows widespread fumarolic activity, whose outlet temperatures are at boiling point of water, high soil diffuse degassing, and thermal anomalies fed by a >1000 m deep hydrothermal system having a temperature of 300-350 °C (e.g. Caliro et al., 2005; D'Alessandro et al., 2013). The fumarolized hydrothermal craters can be divided into three main groups: the Kaminakia craters, the Stephanos crater (*Fig. 2*), and the youngest area, which includes the post-caldera dome (Lophos) and the Phlegeton, Polybotes Megalos, and Polybotes Micros craters. Steam is the primary component of the fumarolic fluids, followed by CO_2 and H_2S whose estimated total output is close to 1 kg/s and <0.3 kg/s, respectively (Caliro et al., 2005; D'Alessandro et al., 2013). Although the present-day total gas emission is not particularly high, the hydrothermal system shows a large flux of energy (134–270 MW; Bini et al., 2019) which may potentially increase during future unrest episodes, possibly triggering hydrothermal explosions, as happened in the past few centuries.

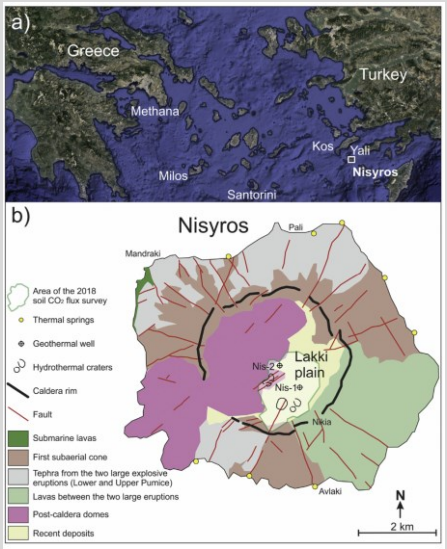

Fig. 1 a) Volcanoes of Aegean Arc. b) Geological map of Nisyros Island (from Bini et al., 2019).

Fig. 2 Stephanos crater (photo by Rebecca Biagi).

The geochemical survey allowed to determine the present-day CO_2 diffusive and fumarolic flux along with a 1-week CO_2 and H_2S concentrations in air, to validate the gas model skills in forecasting the observations. To accomplish this:

Members' Activities

1. Soil CO_2 fluxes were measured in the Stephanos crater (301) and Phlegeton (63) using the accumulation chamber method (Chiodini et al., 1998) (*Fig. 3*). The instrument, developed by Perugia University, is composed of (i) a cylindrical metal chamber with a volume of 2.8 L, (ii) an infrared sensor LICOR Li-820 which works in the range of 0–20,000 ppm of CO_2, (iii) an analog-digital converter, and (iv) a smartphone which receives and saves the data through Bluetooth connection (Cardellini et al., 2017).

Fig. 3 Giancarlo Tamburello dealing with the accumulation chamber (photo by Silvia Massaro).

2. Seven gas samples (*Fig. 4*) were collected from fumaroles located at (i) Stephanos crater (2 samples), (ii) Kaminakia carter (1 sample), (iii) Phlegeton carter (1 sample), (iv) Polybotes Micros crater (1 sample), (v) Lophos (1 sample), and (vi) Ramos (1 sample). Gas sampling was performed using pre-evacuated 60 mL glass flasks equipped with a Thorion® valve and filled with 20 mL of a 4 M NaOH and 0.15 M $Cd(OH)_2$ suspension to trap soluble and acidic gas species in the liquid phase, and to separate SO_2 (dissolved in the liquid phase) and H_2S (precipitating as CdS) to prevent any reaction in the gas phase (Montegrossi et al., 2001). Fumarolic gas was conveyed into the sampling flask using a 0.7 m long titanium tube, inserted as deeply as possible into the vent, and connected to a sampling line constituted by dewared glass tubes (Montegrossi et al., 2001; Vaselli et al., 2006). Parallelly, seven steam condensate samples were collected using the forementioned sampling line and stored in 50 mL high-density polyethylene bottles.

Fig. 4 Fumarolic gas sampling (photo by Rebecca Biagi).

3. CO_2 and H_2S concentrations in air were measured using five low-cost stations (*Fig. 5*) developed by the Fluid Geochemistry Team of Florence University and equipped with NDIR sensors for CO_2 concentrations (400-10,000 ppm) and electrochemical sensors for H_2S concentrations (0-50 ppm). The stations were positioned (i) inside the Stephanos crater, (ii) next to the footpath for the Stephanos crater, and (iii) at Emporios (about 350 m a.s.l.), in the north rim of the Lakki plain caldera.

Fig. 5 Low-cost station for CO_2 and H_2S in Emporios (photo by Rebecca Biagi).

4. Nine samples for CO_2/H_2S ratio in the air were collected next to the fumaroles and the CO_2-H_2S low-cost stations by bubbling the air in 25 mL of a 4 M NaOH and 0.15 M $Cd(OH)_2$ trap using a portable pump with a flux of 200 cc/min (*Fig. 6*).

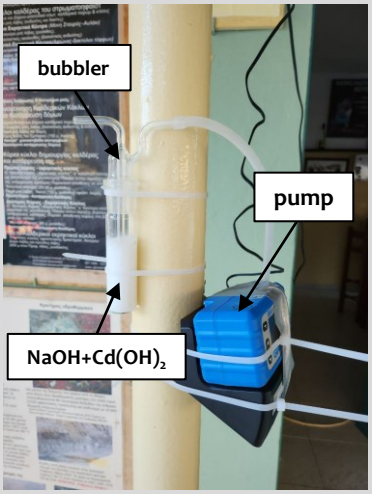

Fig. 6 Bubbler with basic trap for CO_2/H_2S ratios in the air (photo by Rebecca Biagi).

5. Four direct measurements of the steam output from the Stephanos fumaroles were performed using a stainless-steel cylindrical instrument designed by Italiano and Nuccio (1992).
6. 3D and 2D anemometers were installed to record the wind speed and direction, both inside and outside Stephanos crater, during the survey. Moreover, an atmospheric CO_2 logger Testo 160 IAQ was installed at 20 cm of height from the ground next to the 3D anemometer.
7. A photogrammetric relief with a drone was performed in order to obtain a detailed DEM of the investigated area (*Fig. 7*).

Fig. 7 Photogrammetic relief with drone (photo by Silvia Massaro).

Members' Activities

The next steps will see the application of probabilistic dispersion modeling to provide probabilistic concentration maps of gas dispersion scenarios, investigating also a potential worse case of unrest occurring in the Lakki plain caldera, in order to support risk quantification and mitigation actions in an area actively visited by tourists throughout the most part of the year.

Fig. 8 The working team (photo by Silvia Massaro).

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Events and Opportunities

Special Issues

- *Geochemistry and Mineralogy of Clays and Their Application to Paleoclimatic and Paleoenvironmental Reconstruction*

  Minerals (IF 2.818)

  Website

  Deadline for manuscript submissions: **31 May 2023**

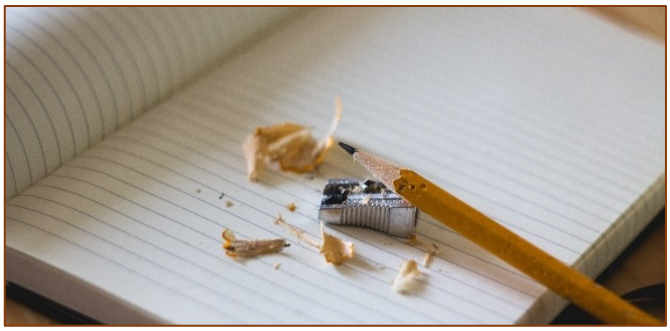
- *Multi-element Geochemical Mapping in South and Central Asia at National Scale*

  Journal of Geochemical Exploration (IF 4.166)

  Website

  Deadline for manuscript submissions: **31 August 2023**

Events and Opportunities



Schools and Workshops

Vulcano International Summer School 2023
Sampling and Measuring Techniques of Volcanic Fluids: Science meets Practice

Vulcano Island (Italy), 19-23 June 2023

Website

Registrations are closed

CAMGEO School 2023
Conventional and not-conventional isotopes applied to environmental sciences

Abbadia San Salvatore (Italy), 11-14 July 2023

Website

Registration deadline: **28 May 2023**

Events and Opportunities

Conferences and Congresses

SIMP, SGI, SOGEI, AIV Joint Congress
The Geoscience paradigm: Resources, Risks and future perspectives

Potenza (Italy), 19-21 September 2023

Website

Early Registration deadline: **21 June 2023**

Online Registration deadline: **9 September 2023**

BeGEO2023
Sustainability and Risk: BeGEO Scientists on the road to the future

Naples (Italy), 3-6 October 2023

Website

Abstract submission deadline: **1 June 2023**

Early Registration deadline: **31 July 2023**

GeothermiX
How Earth's heat is studied and impacts society

Pisa (Italy), 29 November-1 December 2023

Details will be provided as soon as possible on the So.Ge.I. website

Members' Publications

Editorial: Proposal and application of a new method for selecting members' publications

Jacopo Cabassi

If the members' number can be regarded as a thermometer of a society's interest, appreciation and value, it could be said that So.Ge.I. is currently enjoying excellent health, with steadily growing number of members from the different levels of the Italian academic world and research centers (from Msc and PhD students to professors and researchers). Consequently, the number of publications related to the society is rapidly and inexorably increasing.

To date, the selection of publications has been based on consulting the *Google Scholar* and *Scopus* (*Elsevier*'s abstract and citation database) profiles of each of the society's members, and then choosing and cataloguing all articles with an impact factor greater than 2 and, separately, books or book chapters. This "manual" operation was certainly as accurate and precise as possible but it was only functional for a small number of members. With today's members around 140 units, a different, more automated, and reproducible method has to be adopted.

Accordingly, a change of approach is proposed below, specifically:

1. The selection of publications will be made through *Scopus*, which is widely identified as one of the most comprehensive, reliable, relevant, up-to-date research, without any kind of filter concerning the impact factor of the journals. Thus, from now on only publications present in Scopus will be considered.

2. *Mendeley Reference Manager*, a free reference manager, will be used as a collector and organizer of publications downloaded from Scopus. In fact, *Mendeley* and *Scopus*, both from *Elsevier*, interface perfectly, so much so that there is a feature on each author's page that allows the entire list of publications to be downloaded directly to *Mendeley*.

3. Within the *Mendeley* software, a collection of members' publications can be created, e.g., using the year filter. The *Mendeley Cite* citation tool, i.e. a plugin for *Microsoft Office 365*, allows to transfer the collection directly into a *Word* file, in a prearranged and selectable citation format and style.

The list of publications in the present newsletter was created following this selection approach. If it receives the consent and approval of the members, it will henceforth be adopted to list the scientific publications of the society on a four-monthly basis.

Members' Publications

List of Members' Publications (IF≥2)

referred to the period Jan 04, 2023 – Apr 21, 23

Aguilera, F., Grosse, P., Guzmán, S., Michelfelder, G., & **Taussi, M.** (2023). Editorial: Volcanism in the Central Volcanic Zone of the Andes. *Frontiers in Earth Science*, *11*. https://doi.org/10.3389/feart.2023.1130976

Ayari, J., **Barbieri, M.**, Barhoumi, A., Boschetti, T., Braham, A., Dhaha, F., & Charef, A. (2023). Trace metal element pollution in media from the abandoned Pb and Zn mine of Lakhouat, Northern Tunisia. *Journal of Geochemical Exploration*, *247*. https://doi.org/10.1016/j.gexplo.2023.107180

Baccolo, G., El Khair, D. A., Nastasi, M., Sisti, M., Ferrè, C., Alewell, C., & Comolli, R. (2023). $^{210}Pb_{xs.}$ is a viable alternative to ^{137}Cs for tracing soil redistribution in mountain pastures affected by heterogeneous Chernobyl fallout. *Earth Surface Processes and Landforms*, *48*(4), 708–720. https://doi.org/10.1002/esp.5512

Baneschi, I., **Raco, B.**, Magnani, M., Giamberini, M., Lelli, M., Mosca, P., Provenzale, A., Coppo, L., & Guidi, M. (2023). Non-steady-state closed dynamic chamber to measure soil CO_2 respiration: A protocol to reduce uncertainty. *Frontiers in Environmental Science*, *10*. https://doi.org/10.3389/fenvs.2022.1048948

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Billi, A., Smeraglia, L., Aldega, L., Balsamo, F., Barberio, M. D., Boschi, C., **Caracausi, A.**, Carminati, E., Iannace, A., Mercuri, M., Pizzati, M., & Tavani, S. (2023). Dolostone pulverization induced by coseismic rapid decompression of CO_2-rich gas in nature (Matese, Apennines, Italy). *Earth and Planetary Science Letters*, *604*. https://doi.org/10.1016/j.epsl.2023.117996

Brugnone, F., **D'Alessandro, W.**, Parello, F., **Liotta, M.**, Bellomo, S., Prano, V., **Li Vigni, L.**, Sprovieri, M., & **Calabrese, S.** (2023). Atmospheric Deposition around the Industrial Areas of Milazzo and Priolo Gargallo (Sicily–Italy)—Part A: Major Ions. *International Journal of Environmental Research and Public Health*, *20*(5). https://doi.org/10.3390/ijerph20053898

Buccianti, A. (2023). Preface. *Computers and Geosciences*. https://doi.org/10.1016/j.cageo.2023.105337

Buccione, R., Vitale, S., Ciarcia, S., & **Mongelli, G.** (2023). Geochemistry and Geometrical Features of the Upper Cretaceous Vitulano Para-Autochthonous Karst Bauxites (Campania Region, Southern Italy): Constraints on Genesis and Deposition. *Minerals*, *13*(3). https://doi.org/10.3390/min13030386

Buono, G., **Caliro, S.**, Paonita, A., Pappalardo, L., & **Chiodini, G.** (2023). Discriminating carbon dioxide sources during volcanic unrest: The case of Campi Flegrei caldera (Italy). *Geology*, *51*(4), 397–401. https://doi.org/10.1130/G50624.1

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