



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA
DEPARTMENT OF BIOLOGICAL, GEOLOGICAL,
AND ENVIRONMENTAL SCIENCES

Petrology and geochemistry of high-pressure reduced fluids in subduction zones

Supervisor: Alberto VITALE BROVARONE (University of Bologna); co-supervisor Simone TUMIATI (University of Milano Statale)

A three-year PhD position will be available at the University of Bologna, Italy, to participate in an EU-funded, ERC project on deep serpentinization and genesis of high-pressure natural H₂ and abiotic hydrocarbons in subduction zones.

The PhD project will focus on the genesis and transport of strongly reduced fluids at subduction zone conditions by integrating field, laboratory experimental, and theoretical approaches following preliminary work by the group (Vitale Brovarone et al., 2017; 2020; Giuntoli et al., 2020). The PhD candidate will work in close collaboration with the experimental petrology laboratory at the University of Milano Statale (Prof. Simone Tumiati). A Master degree (or equivalent) in Earth Sciences is required. The applicants should demonstrate a strong interest and existing knowledge in metamorphic petrology, geochemistry, and fluid-rock interactions, and have some experience with analytical/modeling techniques in petrology and geochemistry.

The project is fully funded by the ERC Consolidator Grant *DeepSeep*. The successful candidate will be one of two PhD students due to start in November 2021, and one of a cohort of four PhD students and several PostDoc researchers to be hired during the 5 years of the project. Teamwork skills will be required within the group and with international collaborators.

The PhD candidate will be based at Alma Mater Studiorum, University of Bologna, the oldest university in the Western World and one of the biggest universities in Italy (<https://www.unibo.it/en/university/who-we-are/our-history>). The city of Bologna was ranked first for life quality in Italy in 2020.

The call will be published in March/April 2021 on the University of Bologna website. Preliminary information on the application procedure can be found here: <https://www.unibo.it/en/teaching/phd/information-enrolling-phd-programme/how-to-apply-phd-programme>

Potential candidates are kindly invited to contact the PI of the project (alberto.vitaleb@unibo.it) as of now for general information, by providing a CV, a full publication list, a statement of interest, and contact information of three potential referees. The University of Bologna is committed to increasing the number of women in research and therefore applications from female candidates are strongly encouraged.

Giuntoli, F., Vitale Brovarone, A., & Menegon, L. (2020). Feedback between high-pressure genesis of abiotic methane and strain localization in subducted carbonate rocks. *Scientific Reports*, 10(1), 1–15. <http://doi.org/10.1038/s41598-020-66640-3>

Vitale Brovarone, A., Sverjensky, D. A., Piccoli, F., Ressico, F., Giovannelli, D., & Daniel, I. (2020). Subduction hides high-pressure sources of energy that may feed the deep subsurface biosphere. *Nature Communications*, 1–11. <http://doi.org/10.1038/s41467-020-17342-x>

Vitale Brovarone, A., Martinez, I., Elmaleh, A., Compagnoni, R., Chaduteau, C., Ferraris, C., & Esteve, I. (2017). Massive production of abiotic methane during subduction evidenced in metamorphosed ophiocarbonates from the Italian Alps. *Nature Communications*, 8, 14134–13. <http://doi.org/10.1038/ncomms14134>