



# THÉO BRIOLET

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## Ph.D. Overview

High reactivity of carbonate rocks to acid solution may trigger series of physico-chemical processes during fluid flow in rock formations mainly resulting in mineral dissolution. Further comprehension of these phenomena is key for a better understanding of karstic environment genesis and evolution, and is essential to ensure long-term integrity of geological CO<sub>2</sub> storage sites. A multi-scale experimental approach is developed in this PhD to better characterize rock microstructural controls on dissolution processes. Core-flood experiments are carried on rock and powder limestone samples using CO<sub>2</sub>-equilibrated water, and non-destructive characterization methods (CT-Scan,  $\mu$ CT-Scan, 3-weights method, NMR, acoustic wave velocities) are used before and after alteration to highlight effects on hydromechanical properties. Method coupling in-situ CT-scan observation and coreflood device is also implemented to better constrain microstructural controls on dissolution processes. Chemical characterization of effluents is performed to allow saturation index calculation using thermodynamic modeling softwares JChess and PhreeqC.

## EDUCATION

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2021 - Present • **Ph.D.:** "Integrated experimental study of the impact of the alteration on the hydromechanical properties of rocks" - Ecole Normale Supérieure, IFP Energies Nouvelles

2016 - 2021 • **Master's & Bachelor's Degree:** Earth Sciences, Planets and Environment - Geology major - Institut de Physique du Globe de Paris, Université Paris Diderot

## EXPERIENCE - RESEARCH INTERSHIPS

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February 2021 - June 2021 • "Characterization of microstructural controls on the weathering of carbonate rocks" - IFP Energies Nouvelles

May 2020 - August 2020 • "Bibliographic and experimental study of carbonate rocks alteration by a CO<sub>2</sub>-rich fluid" - IFP Energies Nouvelles

January 2019 - February 2019 • "Study of ionic filtration in sedimentary deposits using isotopic fractionation of chlorine" - Institut de Physique du Globe de Paris

## PUBLICATIONS

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2024 - Bauer, D., Briolet, T., Adelinet, M., Moreaud, M., Agelas, L., Farag, G., Zaafour, Z., Faille, I., Sissmann, O., Pelerin, M., Youssef, S., Fortin, J. & Bemer, E. Experimental and numerical approaches towards a better comprehension of reactive transport. *Science and Technology for Energy Transition (STET)*

2023 - Geymond, U., Briolet, T., Combaudon, V., Sissmann, O., Martinez, I., Duttine, M. & Moretti, I. Reassessing the role of magnetite during natural hydrogen generation. *Frontiers in Earth Science*, 11, 1169356.