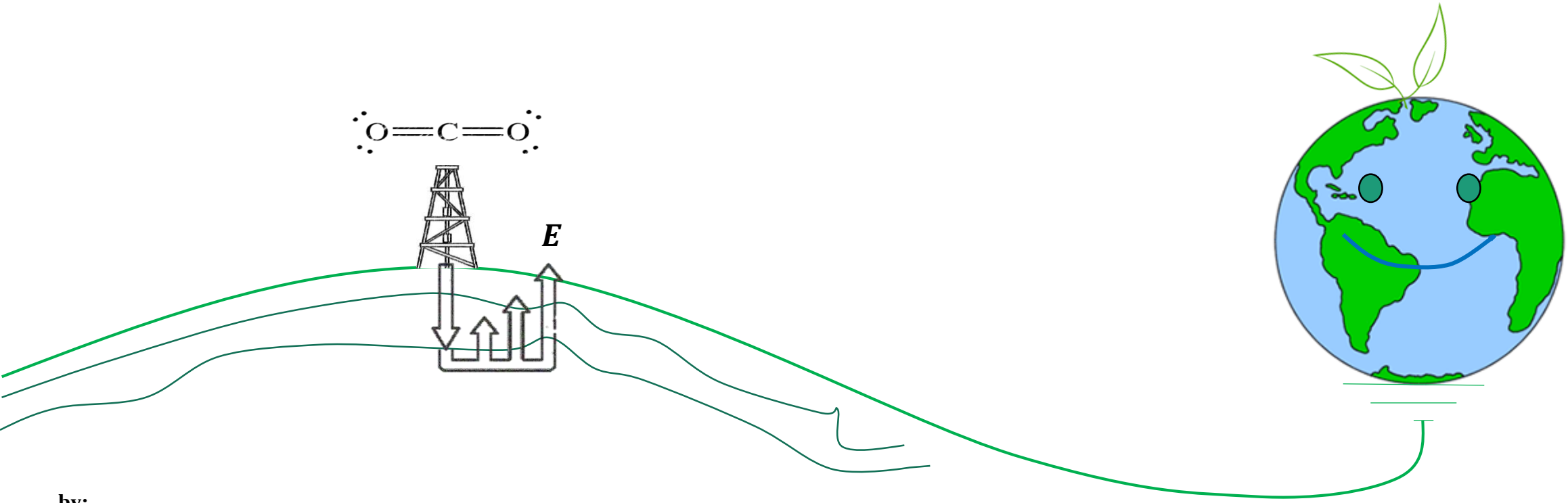
Study of the evolution of mechanical and hydraulic properties of sedimentary rocks induced by CO_2 injection at lab-scale



by:

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under the supervision of:

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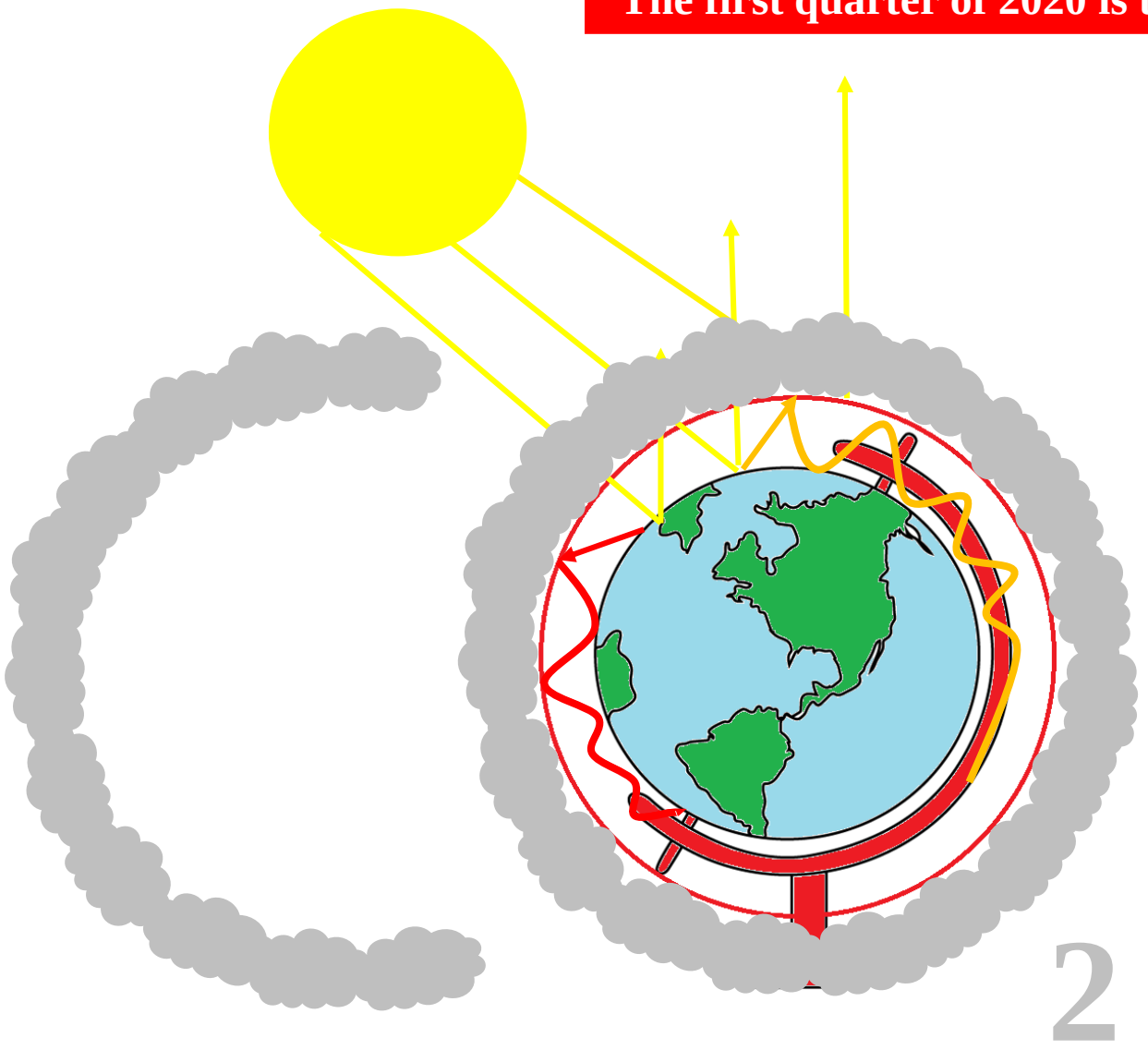
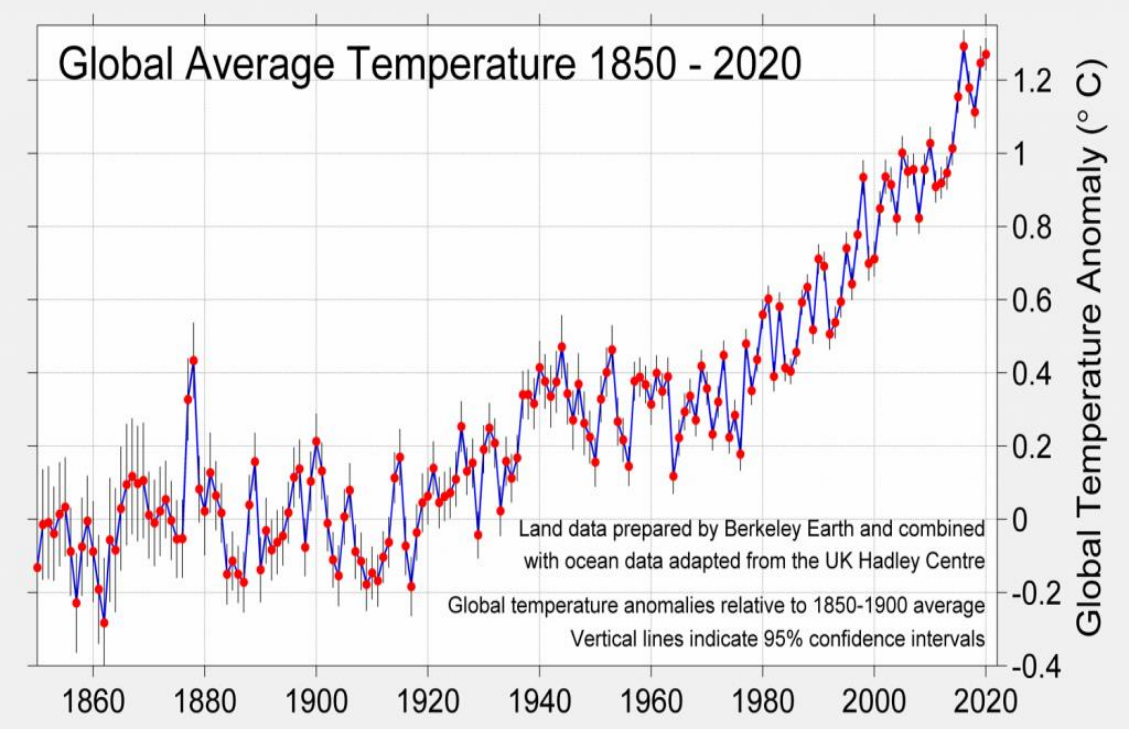
EXCELENCIA SEVERO OCHOA

The first quarter of 2020 is the second warmest on record!



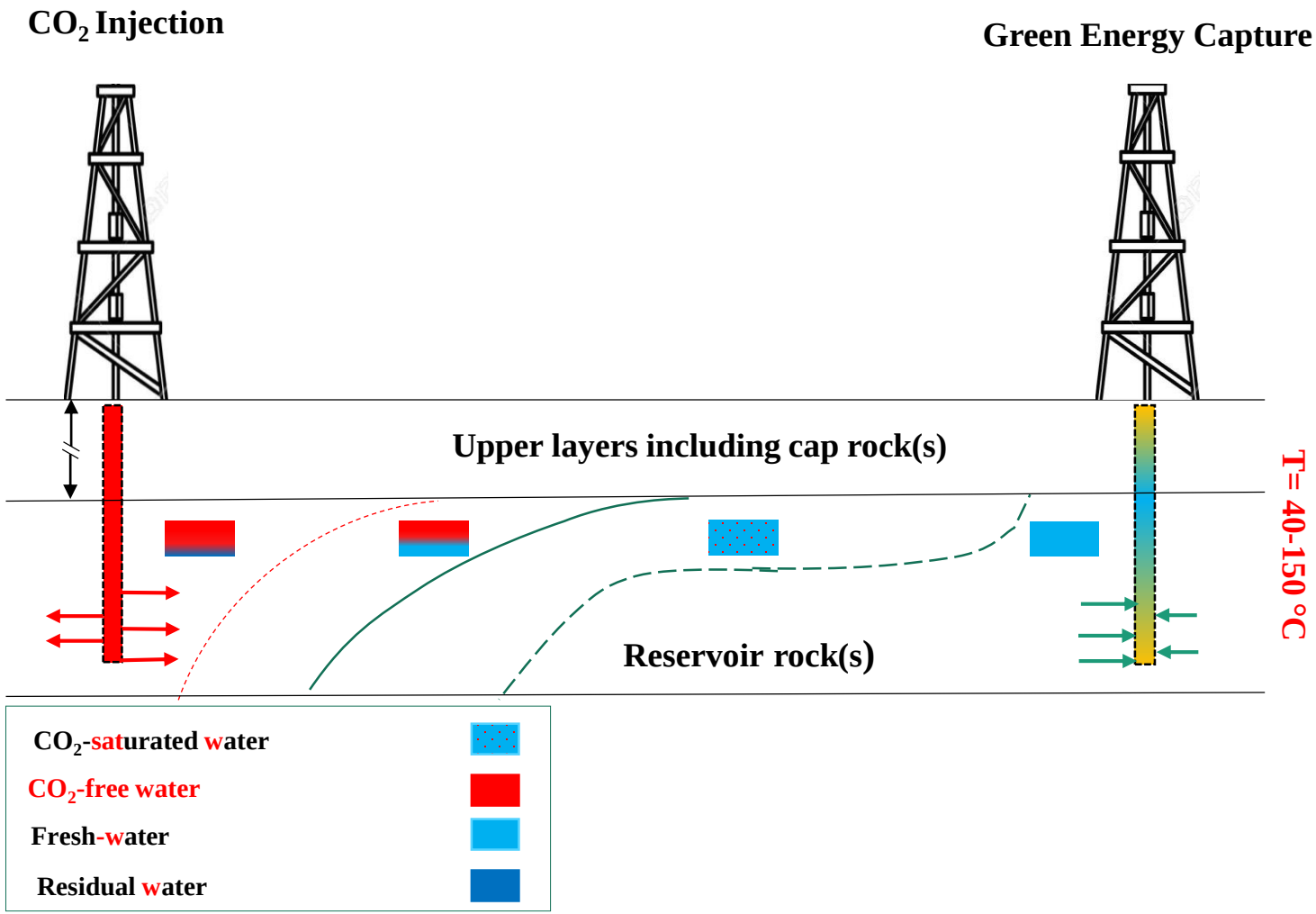


Berkeley Earth

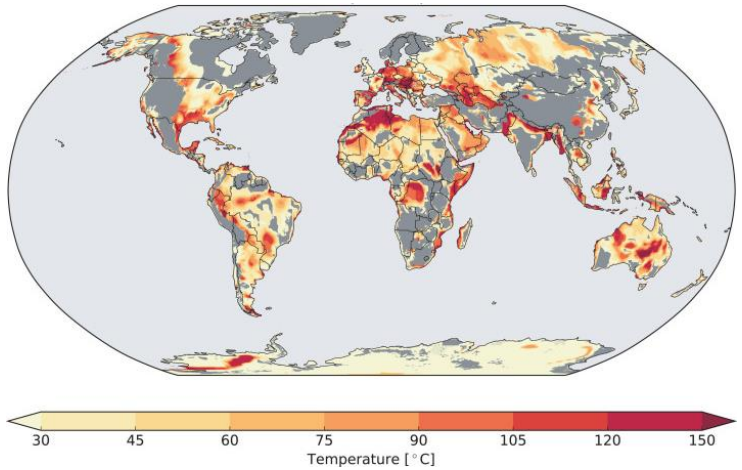
Greenhouse Gas Effects

Global Warming

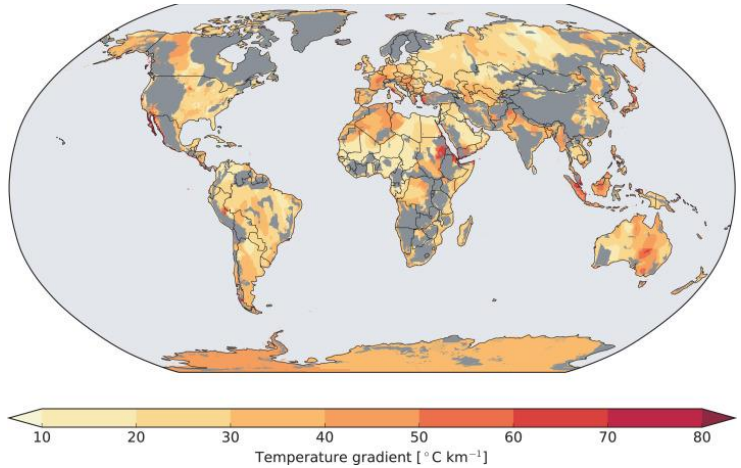
There is an enormous potential for direct geothermal heat exchange from aquifers!



Maximum aquifer temperature



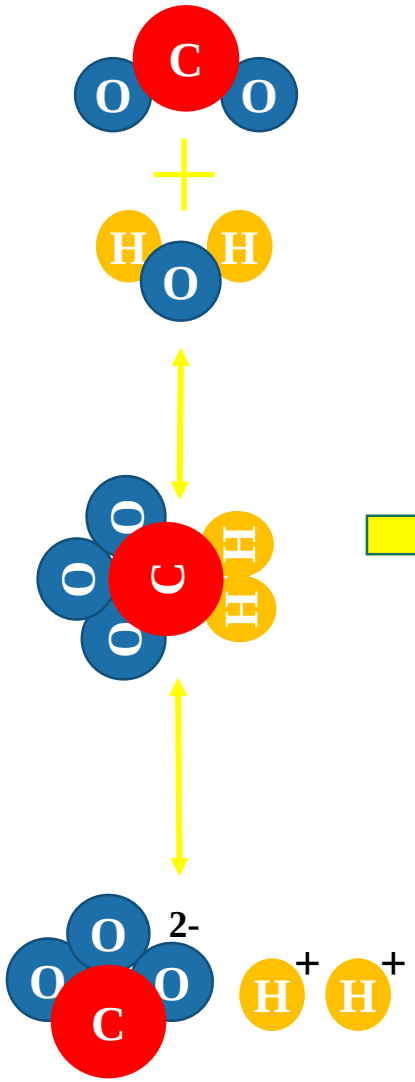
Global aquifers geothermal gradient



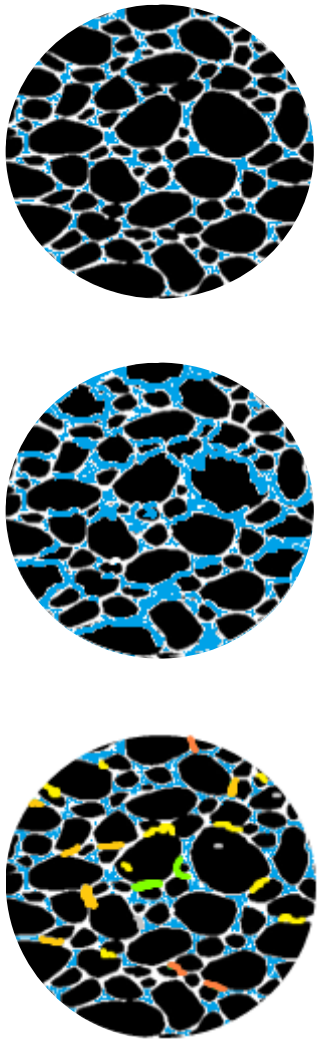
Limberger et al. (2018)

CO_2 injection perturbs the initial subsurface equilibrium conditions

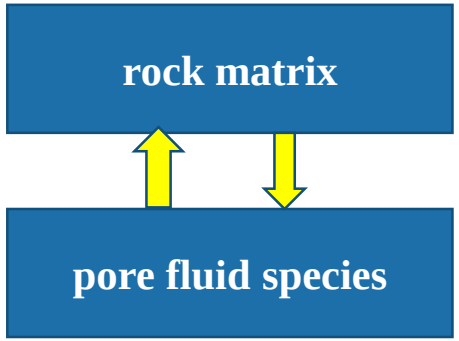
CO_2 acidifies brines



Induced chemical reactions : mineral dissolution and precipitation



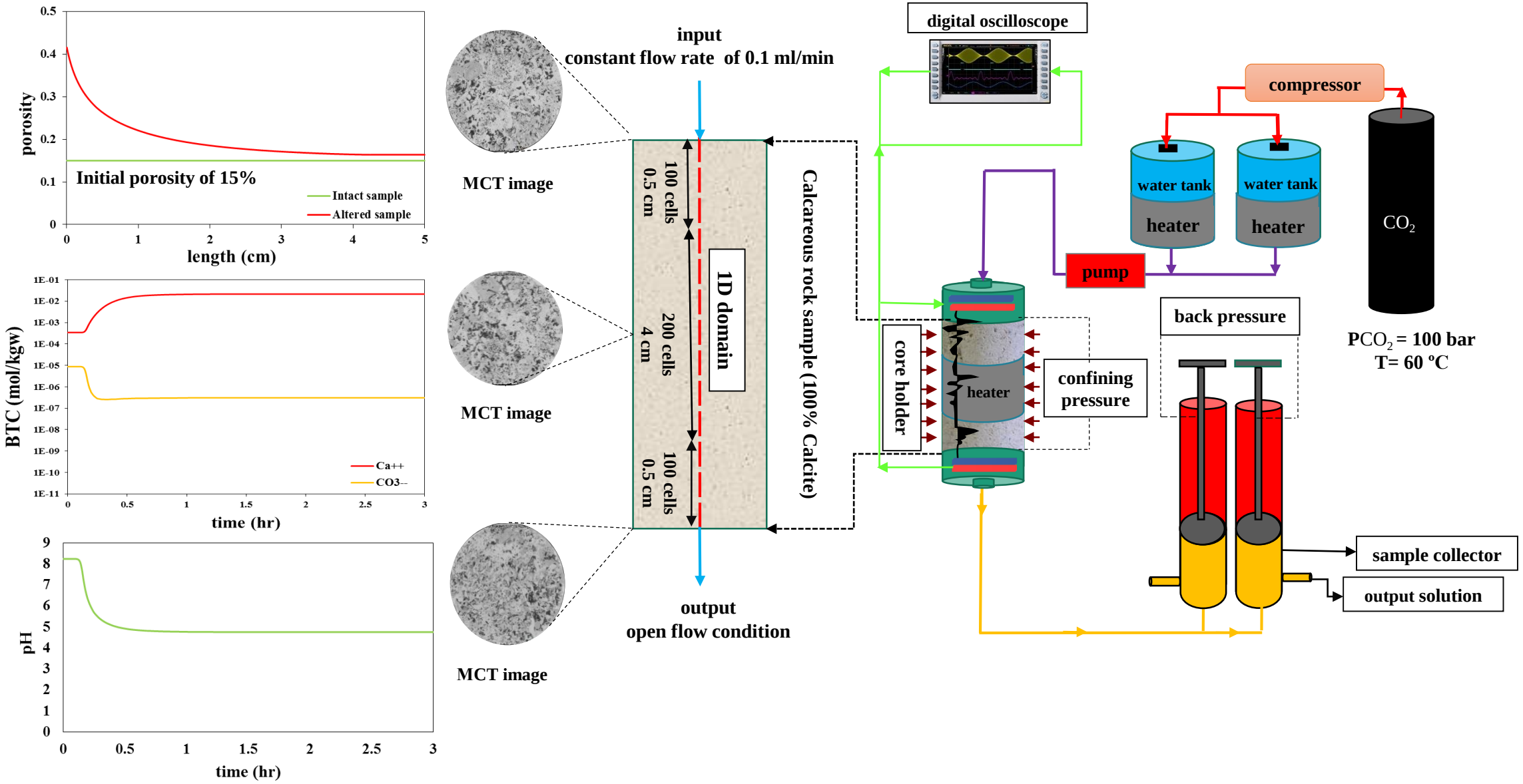
Time-dependent changes in hydraulic and mechanical properties of the rock



Changes

- Porosity
- Pore size distribution
- Wettability
- Permeability
- Capillary pressure
- Elastic properties
- Shear strength
- Plastic properties
- Fracture toughness

Laboratory-scale experiments are necessary to develop quantitative relationships for coupled CHM processes



Thank you for your kind attention!