

Geo-processes in Mineral Carbon Storage (GMCS)

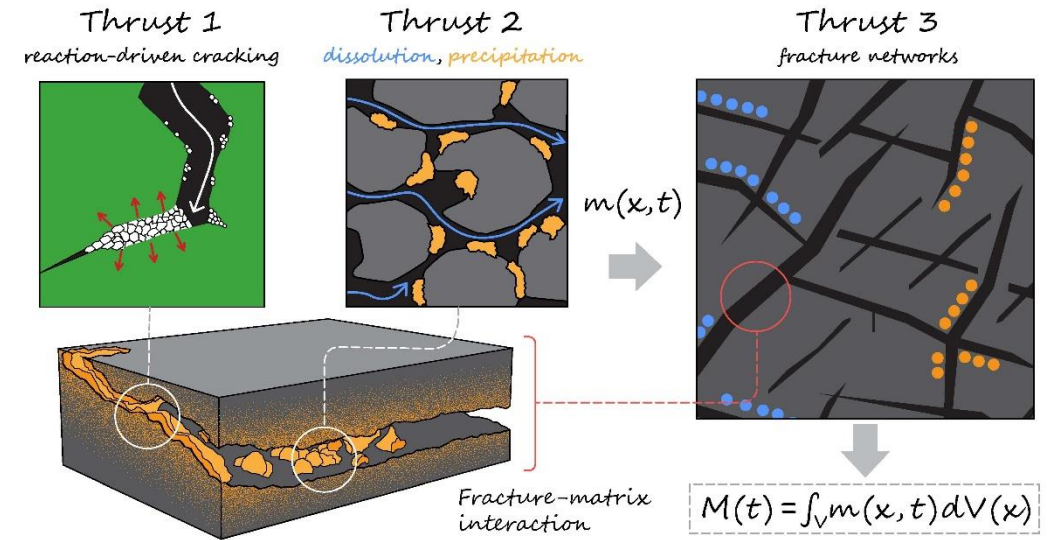
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MISSION: To develop the fundamental science that will lead to realizing the full potential for the large-scale subsurface storage of CO₂ via mineralization

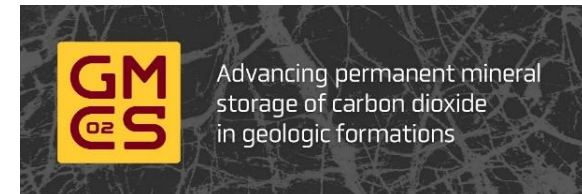
RESEARCH PLAN: A promising strategy to reduce anthropogenic CO₂ is to permanently mineralize carbon in the subsurface. To allow for the engineered enhancement of this process, GMCS is closing critical knowledge gaps by:

- (1) identifying the coupled chemo-hydro-mechanical processes leading to the formation of microcracking in the rock matrix;
- (2) delineating the transport mechanisms that deliver the CO₂ charge to reactive sites;
- (3) establishing computational and sensing technologies that integrate this knowledge into large-scale characterization and prediction of the effectiveness of a host rock.

We aim to evaluate, for a given CO₂ storage operation within a given rock mass, the evolution of the amount of carbon $M(t)$ mineralized: $M(t) = \int_V m(\mathbf{x}, t) dV(\mathbf{x})$



GMCS ... where geomechanics meets geochemistry in the subsurface



<https://gmcs.umn.edu/>

