

Was there life on Mars? Assessing habitability and biosignatures on the red planet

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Geomorphological and mineralogical evidence indicates liquid water was present at/near Mars's surface through at least the first billion years of Mars's history and brines are likely seasonally active on the surface today. Despite these revelations, significant questions remain regarding the chemistry of these aqueous solutions and what these conditions may mean for Mars's habitability. My research focuses on primary mineral weathering in extreme environments (including brines and lava caves), which influences habitability as well as the potential to form and preserve textural and geochemical trace fossils, or biosignatures. This talk will focus on how brines influence chemical weathering, which will help constrain whether Mars was habitable once the planet transitioned to a relatively cold, dry climate, ~3 billion years ago. In addition, we will examine microbial colonization of lava caves with different internal climates. These microorganisms create textural and geochemical trace fossils, or biosignatures that we may be able to detect on Mars. This work helps us better understand the types of potential habitats on Mars and the how we might to determine whether these habitats were indeed inhabited.