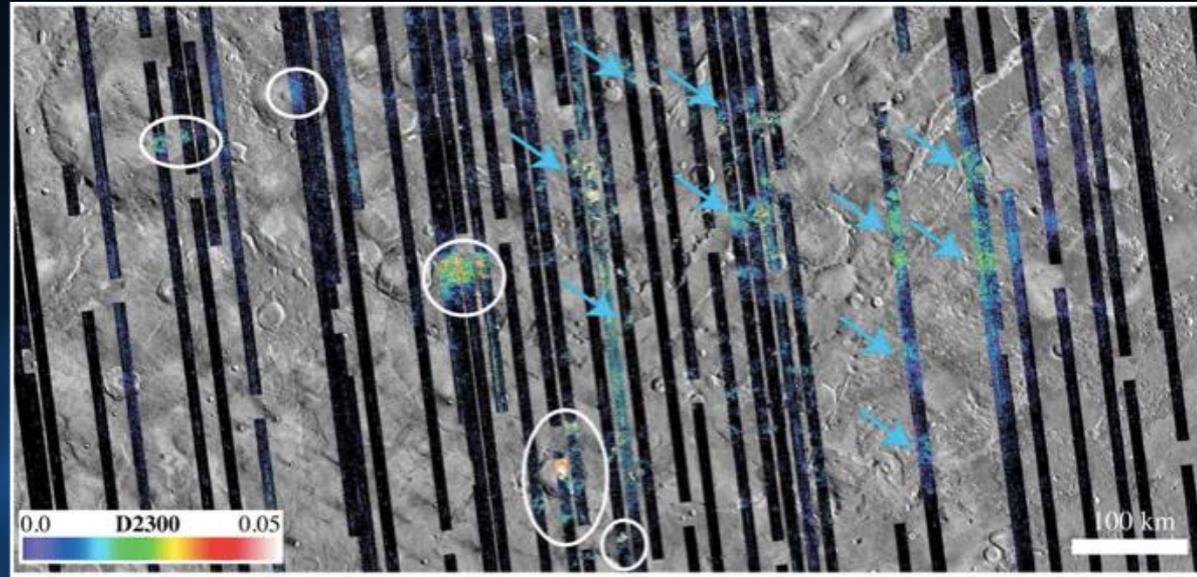


Mars Crustal Clays Formed During an Early “Steam” Atmosphere Phase

The extensive Martian clays present a conundrum: the models proposed to explain their formation require conditions that are not predicted by computational climate simulations. Experiments now suggest an alternative scenario.

Clays are formed in water but Mars climate models can't predict the large amount of water needed to create the clays we observe.

The new idea is that, during the final stages of Mars formation, the hot magma like surface produced water and CO₂ as supercritical fluids — neither gas nor liquid. Laboratory experiments showed that supercritical water and CO₂ can react extremely rapidly with minerals typically found in early planetary crusts to make hydrated silicates (clays) which may be the best explanation of the observations.



Top: CRISM mapping data showing clay detections (white circles, blue arrows) in the Nili Fossae region.



Left: Results of crustal evolution modeling showing predicted surface distribution of clays (blues) excavated from depth by impact craters and basins.