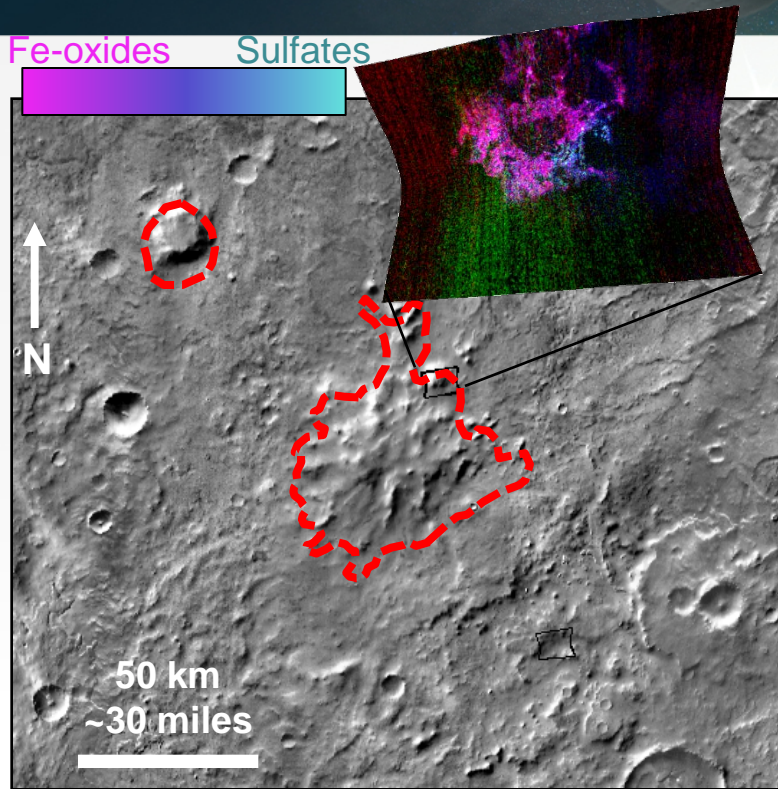


Volcanoes Must Have Erupted Through Ancient Mars Ice Sheet

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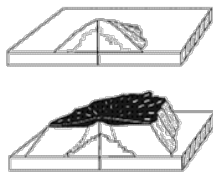
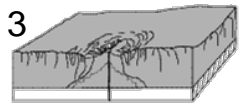
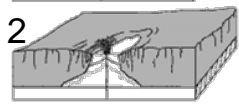
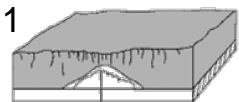
A new analysis of CRISM data has revealed a combination of sulfate-, zeolite-, and iron oxide-rich rocks on volcanoes in ancient terrain near Mars' South Pole, supporting the past occurrence of large ice sheets that have since disappeared.

- On Earth, volcanoes that erupt beneath ice sheets, called subglacial volcanoes, produce a wide variety of minerals and mineraloids including glass, clay-like minerals (phyllosilicates), sulfates, iron oxides, and zeolites. The volcanoes themselves also have a characteristic flat-topped shape created by lava interacting with ice and forming a cap at the top of the ice (bottom left).

- The new analysis found a subset of these minerals on flat-topped volcanoes (top left), indicating that an ice sheet had been present when they erupted. This lent further support to an earlier suggestion by previous researchers that had been based on landforms in the same area.

- These studies can be used to reconstruct the ice sheet that was once present, and reveal information about Martian paleoclimate.

An ice sheet (in grey, left) is present as a volcano erupts (1). As the volcano grows (2) the remaining land form (right) remains. As the eruption reaches the ice surface (3),



interaction between the magma and the water gives these volcanoes their characteristic cap, steep slopes, and flat tops.