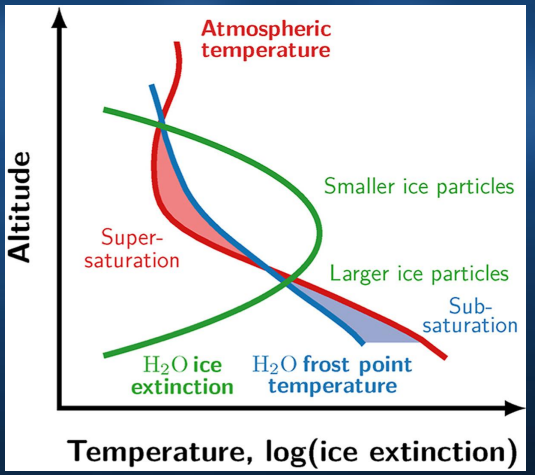
Is Mars middle atmospheric water vapor close to saturation?

Artist rendition of CRISM gathering data from reflected sunlight on Mars



Schematic model of cloud evolution

The saturation state of water vapor in the martian middle atmosphere allows us to better understand the mechanisms behind the planet's water cycle and how efficient the ascent of water vapor to the upper atmosphere is.

- This study used temperature and water ice profiles from the Mars Climate Sounder (MCS) on NASA's Mars Reconnaissance Orbiter (MRO) with co-located measurements of water vapor from the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) and the Nadir and Occultation for MArs Discovery (NOMAD) instrument onboard the ExoMars Trace Gas Orbiter (TGO) to investigate the saturation state of the martian atmosphere.
- The study found that supersaturation ratios typically do not exceed 2 to 3, even in instances during a Global Dust Storm, which suggests that the average state of atmospheric water on Mars is close to saturation, and that large supersaturations are not required to form ice clouds.
- This evidence points to a traditional understanding of cloud formation on Mars with similarities to the formation and evolution of Polar Mesospheric Clouds on Earth and showcases the importance of combining multiple datasets to answer complex questions.

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