

Approaches for Retrieving Sulfur Species Abundances from Dual X-Ka-band Radio Occultations of Venus with EnVision and VERITAS



Jet Propulsion Laboratory
California Institute of Technology

A. Akins, T. Bocanegra-Bahamón, K. –N. Wang, P. Vergados, C. Ao, S. Asmar, and R. Preston, *The Planetary Science Journal* (2023) 10.3847/PSJ/accae3

New radio occultation experiments at Venus will be sensitive to the amounts of H_2SO_4 and SO_2 in its cloud level atmosphere, but how accurate will they be?

Here, we conduct detailed simulations of retrievals of gas and aerosol abundances in Venus' clouds from radio link attenuation measurements with EnVision

We find that, while the measurement is challenging, **the resulting inferences of sulfur species abundances will be sufficiently accurate to derive insights into Venus' sulfur cycle and the relationships between cloud-level atmospheric chemistry and dynamics.**

Retrievals of SO_2 in particular should be accurate enough to identify strong (perhaps volcanically driven) injections from the lower atmosphere

The results from future spacecraft radio science investigations will serve as valuable benchmarks to atmospheric chemical and dynamical modeling, moving us ever closer to understanding Venus' current atmosphere and its evolution over time

