Bimodal distribution of sulfuric acid aerosols in the upper haze of Venus

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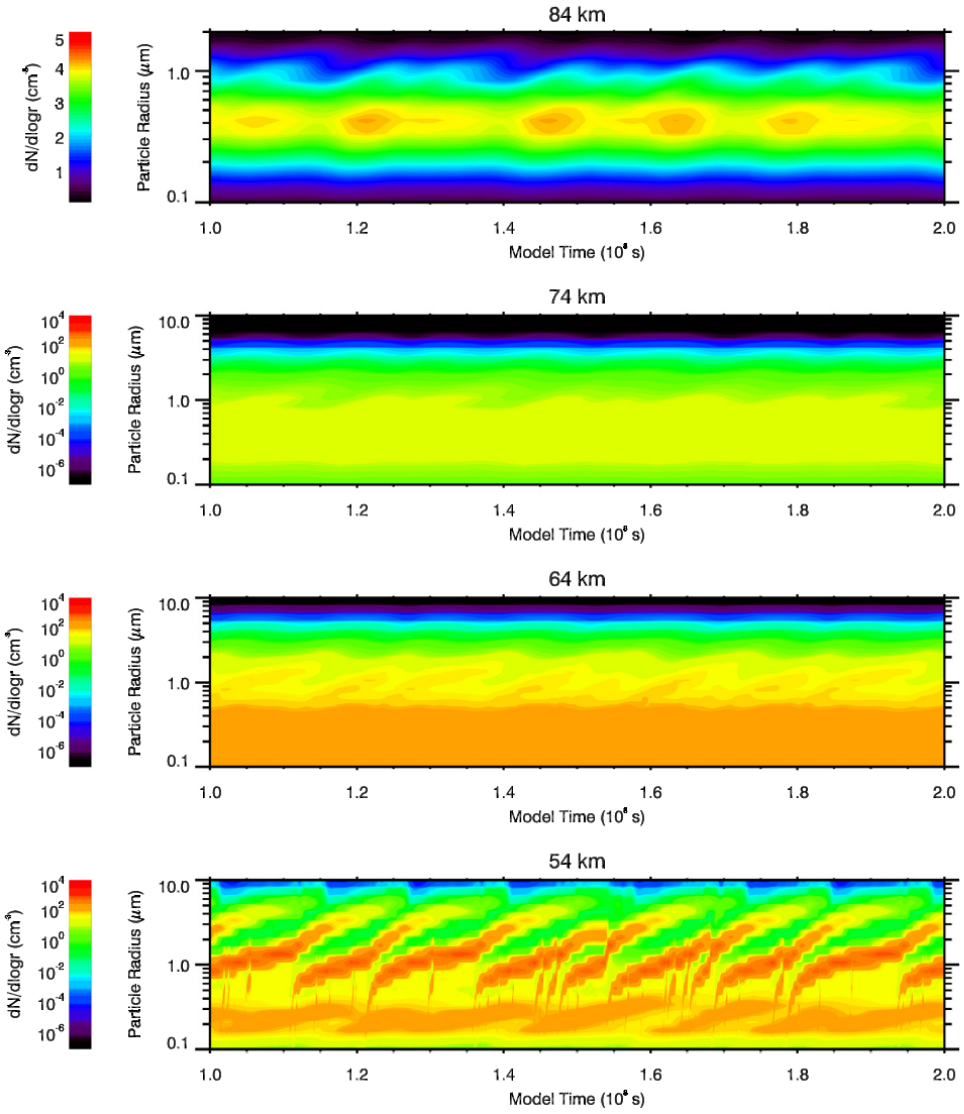
Peter Gao, a graduate student in the Geological and Planetary Science Division at Caltech, recently lead an effort to analyze observed variations in the haze above the main cloud deck, in the Venus mesosphere (60 – 100 km).

A 1-dimensional version of the Community Aerosol and Radiation Model for Atmospheres (CARMA) model was used to simulate the evolution of the haze microphysics.

They found that the observed bi-modal particle size distribution could result as small droplets nucleated locally on meteoric dust mixed with larger particles transported upward from the main cloud deck.

Interestingly, within the main cloud deck, they found that fallout of nucleation-sized particles, combined with upwelling of sulfuric acid vapor from below the cloud led to oscillatory particle growth, which could result in sulfuric acid rain.

These results have been published in the March issue of ICARUS (v231, 83-98, 2014)



Time evolution of the nominal particle size distribution at 84, 74, 64, and 54 km over 10^8 seconds. Note strong , periodic particle growth in the middle cloud (54 km).