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A New Method for the Detection of Small-scale Wave-like Features in the Venusian Atmosphere with the Venus Express Radio Science Experiment VeRa

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Wave structures are common phenomena in planetary atmospheres. Different kind of waves were observed in the thick Venus atmosphere[1,2,3]. Measurements at high temporal and spatial resolution are needed to identify such structures. The Venus Express Radio Science Experiment VeRa observed about 700 vertical profiles of temperature, pressure and neutral number density in the Venus atmosphere. The profiles cover the altitude range between 40km and 90-100km. Variations in the temperature profiles were interpreted as wave structures down to 60km[1]. One kind of waves are gravity waves which propagate vertically in the Venusian atmosphere. One open question is the contribution of topographical features to their formation.
VeRa data may clarify wave formation mechanisms for associated altitude regions in particular using occultation open-loop data. The processing of the open-loop data may reveal a spectrum of wave frequencies with the prospect to detect small-scale atmospheric phenomena. Multipath effects remain still a problem in particular within the cloud layer which can only be addressed with open-loop data.

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