Initial results of Akatsuki radio occultation observations

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Radio science (RS) experiment in Akatsuki mission aims to determine the vertical structure of the atmosphere with radio occultation technique. The quantities to be retrieved are the vertical profiles of the temperature, H2SO4 vapor density, and electron density. Advantages of Akatsuki RS over previous missions are close coordination with onboard cameras and a rather dense sampling of the low latitude thanks to the equatorial orbit. An ultra-stable oscillator provides a stable reference frequency (Allan deviation < 1E-12 for 1-1000 s). Up to now (Jan 2017) eight occultations of the Venus atmosphere (15 profiles) have been observed from March to July in 2016. Mostly low to middle latitudes were observed in the first occultation season. Findings obtained so far include the local time dependence of the thermal structure in the cloud layer, small-scale disturbances near the cloud top, and a possible long-term change of the temperature below the cloud. Derivation of H2SO4 vapor density and electron density are ongoing. The structure of the solar corona and its variation were also explored by radio occultation technique during solar conjunction in June 2016.

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