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# The regular thin structure of the upper cloud layer of the Venus northern polar atmosphere observed from radio occultation data

**V.N. Gubenko** (1)**,** V.E. Andreev (1) and A.G. Pavelyev (1)

1. Institute of Radio Engineering and Electronics of the RAS (Fryazino branch), Fryazino, Moscow region, Russia (vitali-a@mail.ru)

Observations of radio wave scintillations represent an important tool for measuring of small-scale irregularities in the atmosphere of Venus. Thin stable layers, which are commonly observed in the Earth stratosphere under cloud-free conditions, can contribute to radio wave scattering in the Venus atmosphere. If scintillations observed in the different occultations are correlated, then these scintillations may be attributed to the regular layers.

The results of the cross-correlation and spectral analysis of amplitude fluctuations of radio waves of 32 cm band in seven sessions of radio occultation measurements of the northern polar atmosphere, using Venera-15, -16 spacecrafts are presented. Correlated thin regular structures were observed in the polar atmosphere at altitudes between 59.0 and 61.5 km in the period from 23 to 25 October, 1983.It was found that vertical thickness of these structures is $<$1 km, their horizontal extension can exceed 180 km, and they remained essentially unchanged during 49 hr despite the large temporal variability of the random environment. Separation of power spectra on the regular and random parts shows that the random variances were 14%, 45% and 58% from the total variances in October 23, 24 and 25, respectively. Nevertheless, our results demonstrate that both the layer growth and layer decay are not observed in this period.

We assume that the phase transitions of minor constituents may be responsible for the formation of thin stable layers inside upper polar clouds. The sulfuric acid monohydrate, identified in Venus clouds, crystallizes and can be thermodynamically stable at

temperatures observed in the Venus atmosphere at altitudes above 59 km.