Height dependences of the neutral temperature between 90 and 120 km obtained with aid API technique

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Most of the experimental data on the neutral temperature were obtained below 90 km. There are a little data in height interval 90 and 120 km. The API technique [1] allows to us to obtain additional data. Results of neutral temperature determination at the E-region heights using API technique are presented in this paper. The method of the determination of the neutral atmosphere parameters is based on a creation the artificial periodic irregularities (API) by a high-power, high frequency radio wave. API are located probe pulsed radio waves. The amplitudes of the back scattered signals from API are indicated. The determination of the API relaxation times after turning off HF facility allows us to define the temperatures and densities of the neutral atmosphere in height interval 90 -120 km.

The amplitude measurements of the back scattered by API signals were carried out near Nizhny Novgorod 7.04.2004 and 6.04.2005 (λ = 56.15^o N, ϕ = 44.3^{o}E). The duration of one observation circle were equal 20 seconds: 3s heating (by a high-power HF waves) and 17 s location of the API by the probe waves after powerful transmitter switching off (three circles for a minute). The relaxation times τ of API were averaged during 10 minutes, then its height dependences τ***(h)*** and the neutral scale height ***H*** were determined. The temperature ***T*** was defined from the neutral scale height. The altitude resolution was equal about 3 km.

The main difficulty the measurements of the height profiles of the temperature at this height interval connected with strong atmospheric wave activity (acoustic and internal gravity wave and tides). These phenomena lead to a strong variability of the atmospheric temperature in the individual measurements, masking undisturbed profile.

Existence of two level mesopause lays in the frame this problem. The measurements of ***T(h)*** in absence of the strong wave disturbances with aid API showed that there is a temperature minimum above 100 km. The observation 2004-2005 years confirmed this fact. This minimum could be observed or owing shear of the mesopause to higher level or the occurrence of the second minimum into interval between 100 è 110 km. At spring seasons we observed the temperature minimum of about 90-110 K between 108 and 110 km. Comparison with analogical observation in the previous years showed that the height of this pause could vary right until 100 km and corresponding temper-

ature up to 120 K.

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References

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