THE MULTILAYER VERTICAL STRUCTURE OF CLOUDS IN THE JOVIAN ATMOSPHERE.

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Introduction: A lot of works informs us about the possibility of multilayer structure of clouds in the atmosphere of Jupiter (for example, [2], [4], [5], [14], [16], [17], [18], [19]). This is results of analysis and comparing of spectrophotometric measurement data of sunlight reflected by a planet with the calculated values for modeled optical thick atmosphere with big quantity of free appointed parameters which characterize the optical properties for additional layers.

The Galileo Probe discovered a few cloud layers during the Mission in 1995 [15].

The determination of vertical structure of clouds in the atmosphere of Jupiter there is a main goal of present work. For this aim we used a method of analysis which not requires an artificial insertion of additional aerosol layers for matching of measuring data and calculations. We processed the data of spectral measurements of the geometrical albedo of the Jupiter's disk [5] at absorption bands of methane with centers in the wavelengths range 700 – 900 nm. And we used our program codes for calculations (see details at [12] and [13]). The method [7] for determination of the extent of deviation from homogeneous condition of vertical structure of cloud layer for the optical thick atmospheres was used. We calculated the scattering characteristics for the modeled polydisperse medium with using the values for aerosol particle parameters from the works [10] and [6] which are based at the results of polarimetric investigations of Jupiter's atmosphere. In accordance with results of the work [11] we used the values of methane monochromatic absorption coefficients they was redefined for the physical conditions in the atmosphere of Jupiter [8].

The ratio of aerosol τ_{eff}^{a} and gas τ_{eff}^{g} components of the scattering effective optical depth of the Jovian atmosphere in the methane absorption bands versus the atmospheric pressure *P* represented at the Fig. 1. Certainly the effective optical depth forms the field of sunlight diffuse reflected by the planet's atmosphere. The graphic view of dependences shows a presence of distinct cloud layers (the arrows show a gaps between layers at altitudes corresponding to pressures of about 0.4 and 0.55 bars). It clearly appears that peaks of high density of aerosol layers are at altitudes corresponding to pressures of about 0.3, 0.5 and 0.75 bars and with a small peak of about 1.3 bars.

That is interesting to note that some of altitudes location of peaks of cloud density in this work are in a good agreement to the results of works [1], [14] and [19].

We suppose that the small mismatching of plots for a different absorption bands of methane which are formed at equal pressure levels in the Jovian atmosphere arises because of using the not precise value of particles size in a distribution function (see [9] and [11]). And we plan to found the true size of cloud particles in our next works.

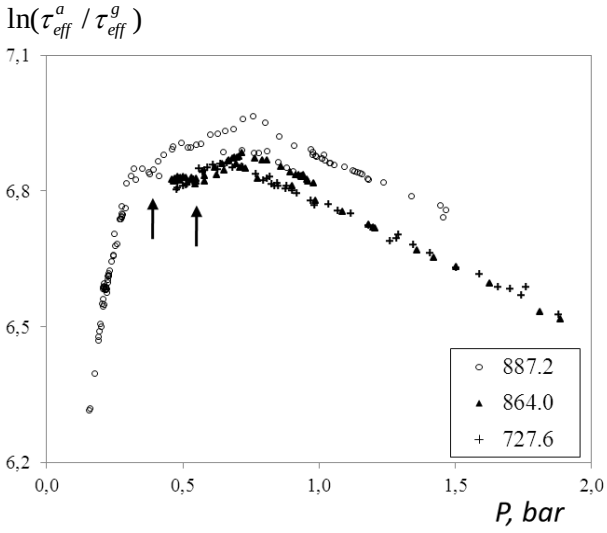

Fig. 1. The appearance of gaps (marked by arrows) between the cloud layers of the Jovian atmosphere on the graphic shape of the ratio for aerosol and gas components of the scattering effective optical depth versus the atmospheric pressure in the methane absorption bands with centers on 887.2, 864.0 and 727.6 nm.

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