The theory of radio probing of planetary ionospheres, which is based on geometrical optics approximation, is widely known and has repeatedly been used in processing radio occultation experimental data in order to obtain the vertical profile of electron concentration *N(h)*. The obtained profiles *N(h)* and the measured parameters of the radio signal are related by integral equations that imply that the functions used are continuous and smooth; therefore, the procedures employed are very sensitive to various nonstationarities in the experimental data.

The altitude profile of the electron concentration N(h) is closely connected with measured characteristics of the signal by integral equations. In the spherically symmetric approximation the electron concentration is found from radio occultation data by solving the integral equation:

$$N(p) = -\frac{2\,m\,f\,c}{V_{\perp}\,e^{2}}\,p\int_{\rho}^{H_i}\frac{\Delta f\,dr}{\sqrt{r^{2}-p^{2}}}$$

Where

$$p = H_0 + \frac{L\cdot c}{V_{\perp}\cdot f}\Delta f(p)$$

e and m are the charge and mass of the electron, f is the frequency of the radio signal, $\Delta f$ - residual variations of signal frequency due to influence of Venus ionosphere

For electronic computation we used a technique described in Gavrik A.L. and Samoznaev L.N. "The analysis of errors of Venus daytime ionosphere occultation results caused by Venus ionospere asphericity", Cosmic Research, 1985, v.23, No.1, pp.148-157. and Savich N.A., Andreev V.E., Vyshlov A.S., Gavrik A.L. ets. "The daytime ionosphere of Venus from the "Venera-15,16" radio occultation data", Journal of Communications Technology and Electronics, 1986, v.31, No.11, pp.2113-2120. This technique takes into account ray refraction and provides more accurate integral value from noise data.

The two-frequency radio probing of the Venusian ionosphere was conducted during the period from October 10, 1983, to September 24, 1984. The antenna located near the city of Evpatoria (Ukraine) received coherent signals from the "Venera 15" and "Venera 16" orbiters at wavelengths of 32 cm and 8 cm. The standard equipment provided signal amplification, heterodyning, and filtering. Next, the signals were fed into a dispersion interferometer complex, which, with the use of closed-loop sistem, performed narrowband filtering. Digital registration system coded by dual-channel analog-digital converters with 8 bit. Digitization frequency ~550 Hz was formed by the hydrogen standard and the intensity of an electromagnetic field was written on magnetic tapes. Digital processing of records gives us with amplitude and phase for both signals. Subsequent processing and analysis of the experimental data provide us with altitude distributions of electron concentration in the ionosphere N(h), under different conditions of its illumination by the sun and for different regions of the planet. The uniqueness of these experimental data lies in the fact that some of recorded effects of the ionospheric plasma are 2.5 times and other 6 times stronger than the effects observed during Venus missions accomplished by other countries.

The data structure consists of two file types. The first file type has a file name staring from letter 'a' (for example, a0566_b15.012) and it contains information about experiment: name of a satellite, date and time when a radio ray were positioned near main maximum of electronic concentration, latitude, longitude and zenith angle. The second file type (for example, 0566_b15.012) has the experimental data in text format. There are two columns, the first one describes height in kilometers and another one shows concentration in cm^3.

The error in determination of the point of closest approach of the radio beam to the planetary surface is not precisely known due to the conditions under which the experiment with the Venera-15 and -16 spacecraft was performed and can reach 2 km in some occultation sessions. The error of determination of the profiles N(h) caused by the effect of asymmetry has not affected the main results obtained by the method of dual-frequency radio probing. Used technique does not allow to determine real distributions of electron density below 120 km since errors of definition N(h) exceeded 5x10^3 cm^-3 and could be greater than 100% of real concentration. As usual the error near maximum N(h) is about 10000-20000 cm^-3. For top part of ionosphere the error caused influence of interplanetary plasma is about 500 cm^-3, but can vary from 200 cm^-3 to 5000 cm^-3 for some sessions depending on phase variations in radio ray.