

About influence of cosmic rays on the Earth ozone layer as observed by microwave radiometry

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This report summarises some evaluations of ozone layer state connection with the cosmic rays intensity as it follows from the data of protracted microwave observations. Microwave ozone data obtained at N. Novgorod (56°N, 44°E) and Apatity (67°N, 35°E) stations during 1998-2003 (usually at winter) are used. Using the averaged line spectra (at the frequencies of 101736 and 110836 MHz), the vertical distributions of ozone volume density were calculated in the interval of $z = 25-60$ km under error not exceeding $\pm 10\%$. Neutron monitor data at Apatity (<http://pgi.kolasc.net.ru/cosmicRay>), Troitsk (Moscow, <http://cr0.izmiran.rssi.ru/mosc/main.htm>) and GOES-8 data (<http://spidr.ngdc.noaa.gov/spidr/index.html>) were used for comparison with ozone variation. This analysis shows that the connection between proton fluxes and ozone densities (the altitudes $z = 25, 40$ and 60 km were considered) becomes statistically significant at the moments of enhanced solar activity. Such connection is mostly prominent at high latitudes. As to the correlation coefficient between the neutron number and ozone volume density, its magnitude can vary from statistically significant value to negligibly small one. However, there is an evident tendency for the correlation coefficient to change its sign from negative to positive value if the altitude grows from 25 to 60 km. It was shown also that the dynamic processes in stratosphere can essentially disturb the ozone layer and probably to distort the results of the cosmic rays influence.