

MODERN STATUS AND PROBLEMS OF STUDIES OF THE MIDDLE AND UPPER ATMOSPHERE TEMPERATURE REGIME AND COMPOSITION LONG-TERM CHANGES (A REVIEW)

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Appreciable strengthening of changes of a temperature regime practically at all altitude levels of an atmosphere of the Earth is observed. These changes are caused by influence of the different factors, including by increase of the human activity. A study of the regularity of long-term changes of a thermal regime at various heights is especially important, as they display the tendency of global change of the Earth climate. The results of such studies obtained on the basis of the analysis of measurements of different characteristics in the middle and upper atmosphere are discussed. Long-term variations of the annual mean and monthly mean atmospheric temperature at the heights from 30 to 120 km during 20th century have been revealed from the rocket data, nightglow spectrophotometric measurements, and ionospheric data. For middle latitudes the long-term variations of altitudinal distribution of mean values of the temperature were revealed as well as their relation to the solar activity. Altitudinal distributions of the long-term trends were determined. It was shown, that there is a general decrease of the mean annual temperature at heights of middle atmosphere up to approximately 90 km. Such cooling of the middle atmosphere is the reason of subsidence of the upper layers of the atmosphere. There is difference between temperature trend profiles for winter and summer conditions at heights of mesopause and lower thermosphere. The long-term variations of minor chemical active components for these regions of atmosphere are presented. The tasks of future investigations related to the long-term variations of thermal regime of atmosphere for different latitudes are discussed.