

The solar activity influence on the temperature in the mesopause and lower thermosphere

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Results of measurements of parameters of the emissions of the upper atmosphere (hydroxyl and atomic oxygen), obtained in last years, have allowed to reveal the new dependences connected to influence of solar activity on a temperature regime of an atmosphere at heights of mesopause and lower thermosphere. At the analysis of the long-term data on seasonal variations of temperature and intensity hydroxyl emission it was revealed, that the amplitudes and phases of harmonics contain the components dependent both from solar activity and from a seasonal changes. With change of latitudes the ratio of the amplitudes dependent only from solar activity F10.7 obtained for an interval of latitudes 45-55 N will change, as near to equator the semi-annual harmonic is prevailing. It is necessary to note, that such character of influence of solar activity on temperature and intensity of hydroxyl emission is caused by features of variations of the altitude distributions of temperature in mesopause region. It is shown that its mid-annual value increases with solar activity while the difference between summer and winter values of temperature decreases with increase in solar activity. For atomic oxygen emission 557.7 nm the dependences of mean annual values and amplitudes of harmonics of its parameters from solar activity have found out positive correlation in the spring in the middle of summer it sharply weakens. After growth of this correlation near to an autumn equinox it again weakens in prewinter months when the autumn maximum of intensity is observed. All the regularities display distribution of atomic oxygen in region of mesopause and they are necessary for taking into account at construction of its altitude structures.

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