Quasi-biennial variations of solar activity during 11-years of a cycle and their display in the variations of the temperature of a middle atmosphere

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Quasi-biennial oscillations (QBO) with the period about 2.7 years originally were revealed in behaviour of the solar activity in the beginning of the 20-th century and then in the 60-th years in variations of a wind regime of the stratosphere. In all cases the method of Fourier analysis of temporal series was used. The essential progress in the research was made during the last years by application of narrow-band digital filters for separation of the quasi-biennial component. It has turned out, that QBO are distinctly traced in variations of the solar activity and are displayed in the variations of the ionosphere and temperature of the mesopause and lower thermosphere. It is shown, that QBO represents inharmonic wave train of fluctuations with decreasing of the period and amplitude. Preceding uncertainties in estimations of the periods QBO are connected just to such character QBO. Their regularities are described by function Airy, being the decision of the linear differential equation of the second order. In conditions of an 11-year's cycle the observable variations are a superposition of the three consecutive fading wave trains, arising with an interval 10-11 years. Basic wave train arises shortly before the end of a previous solar cycle. Within a maximum the period of fluctuations is about 3 years and linearly decreases till 1.5-2 years to the end of a cycle. The duration wave train is about 22 years. The fluctuations of such character are traced in long-term variations of activity of the stars of classes G5-K7. Their nature is connected to oscillatory process in convective zone of the Sun. QBO of the temperature of a middle atmosphere occur according to QBO of the solar activity. Synchronous phase and opposite in phase the correlation depends on the height of a considered layer of an atmosphere.