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# Features of propagation of acoustic signals in a viscous stratified atmosphere with temperature inhomogeneity

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In the study of propagation of acoustic waves in the atmosphere on short distances of a few tens of kilometers, and the long distances reaching the ionosphere it is necessary to consider the effect of temperature, which varies throughout the thickness of the atmosphere and especially in its upper layers.

In this paper we analyzed the effect of dependence of temperature of the atmosphere on the height on the propagation of intense signals. It is shown that in the real atmosphere and the characteristic parameters of acoustic signals are favorable conditions for a strong change in the rate of evolution of the signal, and in the upper layers appears the effect of "freezing" of the profile - a sharp increase in temperature leads to a significant slowdown of nonlinear and dissipative effects, and as a result, the spread of the pulse at greater heights than in the isothermal case. We received the exact solution for an arbitrary distribution of temperature, applicable at low altitudes, and the analytical solution for a linear temperature change with altitude, applicable in the study of the middle part of the atmosphere, as well as for most of the atmosphere, which affects the ionosphere, because at these sites temperature change can be approximated by a linear function.