

Civilian Application of the Infrasound IMS Data: Study of the Temperature and Wind Velocity Vertical Profiles in the Atmosphere

The problem of using infrasound monitoring data for sounding of the vertical profiles of wind velocity and temperature in the atmosphere is discussed. The sounding altitudes are in the range from 20 to 150 km. The surface explosions and volcano eruptions are suggested as the sources of acoustic pulses. The IMS data were analyzed for the following different events: the vapor cloud explosion occurred at an oil depot near Buncefield in the UK on 2005, December 11; the volcano Tungurahua eruptions in Ecuador; the explosions occurred on June 2, 2011, at the artillery weapon storages in Udmurtia, and the Chelyabinsk meteoroid explosion. The effective sound speed profiles were obtained. For the first time the parameters of the fine-scale layered structure of wind velocity and temperature have been estimated in the stratosphere. It is important to note that the estimates of the vertical gradients of the effective sound speed in the upper stratosphere and lower thermosphere are not available from other remote sensing methods (radars, lidars). The future prospective for using the infrasound monitoring system data is outlined.

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