



Dust emission under weak wind conditions: Direct observations and model.

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The direct observations of fine mineral dust aerosol ($0.15\text{--}15\ \mu\text{m}$) were carried out on extensive sand areas in desertified lands of Kalmykia in 2007, 2009-2011 under conditions of weak wind and strong heating of the surface, almost in the absence of saltation processes. The results of measurements show that the fine mineral dust aerosol ($0.15\text{--}0.5\ \mu\text{m}$) in the region under consideration contributes considerably to the total aerosol content of the atmospheric surface layer. Data on the mass concentrations of fine aerosol are treated on the basis of physical model estimates obtained for fluid dynamic parameters in the viscous thermal boundary layer near the ground surface. Deviations of these mass concentrations from their background values are related to a temperature drop in the thermal layer at the surface and from the values of friction velocity. For small and moderate values of friction velocity, these mass concentrations increase proportionally to a temperature drop with an exponent of about 0.5, and, for high friction velocities, this exponent becomes negative (-0.5), which implies a decrease in these concentrations with an increase in a temperature drop.