



About the quasi-periodical variations of particles saltation

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Recent experimental results have revealed the quasiperiodic in time changes of the concentration of aerosol particles during saltation [1-3]. A similar effect early was observed in the laboratory for particles 5-53 μm in size [4]. The such type of behavior is probably connected with pulsations of the wind velocity near the vicinity of sand surface. One of the clearly defined observed mode lies in the frequency range from 100 to 200 Hz. This range can be associated with the wave structures of small aeolian ripples [2]. Variations in concentrations from 10 to 100 Hz are also detected. These low frequency range possibly is due to changes at the level of the surface structure, which in turn affects the characteristic concentrations of particles saltation. In particular, it can be noted that the mutual arrangement of particles in the near surface layer affects the main size of the detached particles.

Taking into account the fact that at the same time a certain proportion of particles remains on the surface, while others roll over, a model for establishing the windward slope of the aeolian relief form was considered [5]. The factors contributing to the formation of a known layering in the depth of the aeolian relief form are considered [6]. In a numerical experiment the characteristic internal dynamic processes that determine the peculiarities of the wind removal are considered [7]. Three modified types of states of the outer layer of sand: close-packed, porous, or consisting of a set of particles separated from each other are analyzed. The dynamics of the particle flux concentration values are determined taking into account local surface rearrangements within one saltation. During this time changes in the concentration of particles of saltation particles turn out to be close to a periodic time dependence. When taking into account the deposition of particles, the time series becomes more complex with continuing periodicity. The observed time periods of the numerical experiment are close to empirical values.

This study was supported by the RFBR (17-05-41121) and the Presidium of the Russian Academy of Sciences (programs 28 and 51).

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