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Dusty plasma effects in the atmosphere of Mars and near the Martian Surface

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Dusty plasma effects in the Martian atmosphere [Izvekova & Popel (2017)] are discussed. A specific feature of the Martian atmosphere is the presence of dust grains in a wide range of altitudes (see Figure 1). Taking into account the presence of the Martian ionosphere and the high conductivity of the medium at lower altitudes, the appearance

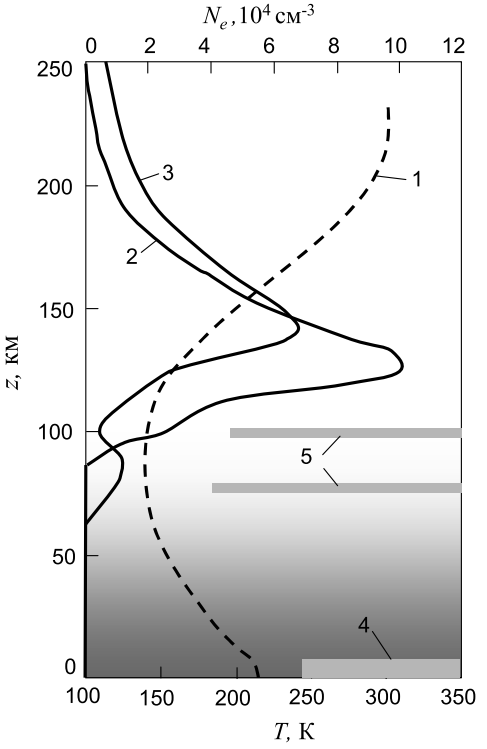

Figure 1. Altitude profiles of the (1) temperature, (2) electron number density in the daytime ionosphere (below 80 km, the number density of charged grains drops to ~ 1 cm^{-3}), and (3) number density of ionospheric electrons at the time of sporadic layer formation at altitudes of 65–100 km. Stripes 4 and 5 show the positions of the layers of clouds consisting of frozen carbon dioxide and water ice. According to observations, dust grains with number densities depending substantially on the latitude and time can be present at altitudes of up to 100 km.

of plasma systems in the Martian atmosphere can be considered quite a common phenomenon. Special attention is paid to Dust Devils that frequently form in the Martian atmosphere and can efficiently lift dust grains. The processes of dust grain charging as a result of triboelectric effect and generation of electric fields in a Dust Devil are discussed.

The dynamics of dust grains in such a vortex is simulated with allowance for their charging and the generated electric field. This work was supported by the Russian Foundation for Basic Research (project no. 18-02-00341).

Reference

Izvekova, Yu. N., & Popel, S. I. 2017, *Plasma Physics Reports*, 43, 1172