



Soil factors of ecosystems' disturbance risk reduction under the impact of rocket fuel

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Environmental impacts occur at all stages of space rocket launch. One of the most dangerous consequences of a missile launch is pollution by components of rocket fuels ((unsymmetrical dimethylhydrazine (UDMH)). The areas subjected to falls of the used stages of carrier rockets launched from the Baikonur cosmodrome occupy thousands of square kilometers of different natural landscapes: from dry steppes of Kazakhstan to the taiga of West Siberia and mountains of the Altai–Sayany region. The study aims at assessing the environmental risk of adverse effects of rocket fuel on the soil. Experimental studies have been performed on soil and rock samples with specified parameters of the material composition. The effect of organic matter, acid–base properties, particle size distribution, and mineralogy on the decrease in the concentration of UDMH in equilibrium solutions has been studied. It has been found that the soil factors are arranged in the following series according to the effect on UDMH mobility: acid–base properties > organic matter content > clay fraction mineralogy > particle size distribution. The estimation of the rate of self-purification of contaminated soil is carried out.

Experimental study of the behavior of UDMH in soil allowed to define a model for calculating critical loads of UDMH in terrestrial ecosystems.