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Behaviour of granular matter under reduced-gravity conditions

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We present a study on low-gravity surface flows of granular materials. Planetary surfaces of small solar-system bodies are usually covered by granulates called regolith. We are interested in the static and dynamic characteristics of regolith under the low-gravity conditions prevailing on the surfaces of small bodies in the solar system. We are particularly interested at which lower boundary in g-level particles become dominated by cohesive forces.

We investigated the effect of the reduction of the gravitational acceleration on the granular-flow behaviour. The experiments were performed under microgravity conditions in the Bremen Drop Tower and were using a slowly rotating centrifuge for simulating low-gravity environments. Surface flow effects were simulated in two flat (quasi-2D) sand glass experiments, in a rotating tumbler and in an avalanche box. We will present results from 15 microgravity experiments in an acceleration range between 0.01 g and 1 g.