



MarsSedEx I: feasibility test for sediment settling experiments under Martian gravity

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Gravity has a non-linear effect on the settling velocity of sediment particles in liquids and gases. However, Stokes' Law, the common way of estimating the terminal velocity of a particle moving in a gas or liquid assumes a linear relationship between terminal velocity and gravity. For terrestrial applications, this "error" is not relevant, but it may strongly influence the terminal velocity achieved by settling particles in the Martian atmosphere or water bodies. In principle, the effect of gravity on settling velocity can also be achieved by reducing the difference in density between particle and gas or liquid. However, the use of analogues simulating the lower gravity on Mars on Earth is difficult because the properties and interaction of the liquids and materials differ from those of water and sediment, i.e. the viscosity of the liquid or the interaction between charged surfaces and liquid molecules. An alternative for measuring the actual settling velocities of particles under Martian gravity, on Earth, is offered by placing a settling tube on a reduced gravity flight and conduct settling tests within the 20 to 25 seconds of Martian gravity that can be simulated during such a flight. In this presentation we report on the feasibility of such a test based on an experiment conducted during a reduced gravity flight in November 2012.