



A scaling law for aeolian dunes on Mars, on Earth and subaqueous ripples

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The scaling law governing the wavelength λ at which a flat sand bed destabilises to form dunes is tested, using measurements performed in water (subaqueous ripples), in air (aeolian dunes) and in the CO₂ Martian atmosphere (Martian dunes). The main difficulty is to determine the diameter d of saltating grains on Mars. A first estimation comes from photographs of the soil taken by the rovers Opportunity and Spirit, showing grains whose diameters are smaller than on Earth dunes. We besides perform the calculation of the effect of cohesion on the saltation threshold. It confirms that the small grains visualised by the rovers should be (or have been) grains experiencing saltation. Finally, we show that, within error bars, λ scales on the drag length $L_{\text{drag}} = \frac{\rho_s}{\rho_f} d$ over 5 decades.