There are many simple questions in snow avalanche dynamics that remain unanswered: why do snow avalanches travel so far and appear to have so little friction? Why do large avalanches travel relatively farther than small avalanches? In this presentation we address these questions by studying how potential energy is converted to kinetic energy and dissipated at the basal boundary and in the core of the avalanche. We find that the basal boundary is not only a sink of potential energy but a source of random granular fluctuations. The fluctuations cannot exert a resultant force in the mean against the downward motion of the avalanche. This implies that, in steady state, there must be a balance between the generation of fluctuation energy at the basal layer and the destruction of fluctuation energy in the core of the avalanche. Although this random kinetic energy is, in principle, free and reversible, it is doomed to be irreversibly destroyed by random binary collisions in the avalanche core – in the fluidized layer. Of importance is the fact that before disappearing, the fluctuation energy interacts with the churning and rubbing motion of the avalanche changing indirectly, but dramatically the viscous properties of the slide. The most probable flow state is the one that distributes the gravitational work rate into the minimum frictional dissipation in accordance with flow constraints such as surface roughness, snow properties and slope steepness.

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