

## Impact experiments on permafrost

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Permafrost is widely observed on the northern area of the earth. The permafrost is composed of soil and water ice, that is formed under the ground at the temperature below 0 C. Recent planetary exploration found that liquid water flew on the surface of Mars even now, so that we can expect the permafrost under the ground of Mars as well.

The characteristic crater so called pit crater is only observed on Mars and icy satellites. Because Mars surface may widely have permafrost underground and the icy satellites have thick icy crust, the water ice may play an important role for the origin of the pit crater. Therefore, we made impact experiments on ice-rock mixtures simulating the icy crusts and permafrost on Mars. The experiments clarified how the crater morphologies depend on the ice-rock ratios of the sample and the relationship between the crater volume and the projectile kinetic energies. The physical mechanism to form the pit crater and the scaling law of the crater on the ice-rock mixture were discussed according to the experimental results.