Experiments on the formation of rampart crater by grain flow with evaporating phase

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We have conducted analogue experiments towards simulation of forrmation of rampart crater. Rampart crater is a class of crater found peculiarly on Mars having fluidized ejecta. We consider evaporation of the flow-constituent material plays an important role in the movement as well as in the formation of the surface features. Experimental system is a suspension of liquid N2 and flour powder. Pouring this suspension on flat flour powder/volcanic ash surface simulates the situation when gravity collapse of the vapor plume generated during the impact event hits the martian surface. By intense evaporation of liquid N2, emitted gas from the bottom surface of the suspension works as a lubricant for long distance mobility. At the sametime scratched pattern is remained on the original surface of flour/ash, which is similar to those observed on the inner lobe of fresh rampart crater. These observations strongly suggest of the important role of the permafrost in the ejecta material.