THE DIRTY ICE FLOW ON MARTIAN MOONS, ANALOGUE AND PROTOTYPE MODELS

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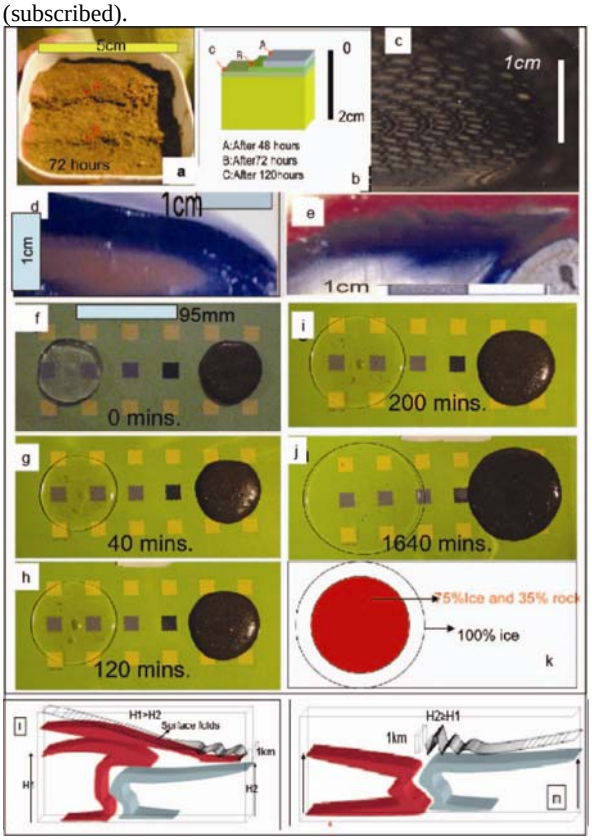
Mars has two very small satellites called Phobos and Deimos(Hall 1887 reviewed in[7]) with 22.2 and 12.6 km across respectively[15]which surfaced by deposits[5]as a thick regolith or dust and with a significant interior ice or ice and rock mixture[8,4&6]. The structure between salt and ice(and ice rock mixture) is very similar[2,9]and experiments suggest that ice flow[2,3].

The mixture of the ice and rock in the deeper part and mixture with high amount of ice in the upper parts modeled by author in the experiments with different amount of water and sand in fridge. This type of experiments with the material same to proto type is novel and designed by author not only for the Martian moons but also for the Martian brines [In prep.].The water is special material with high conductivity which show deformations in very short time and produce similar structures but in small scales by temperature changes. In these experiments sand fragments cemented by ice and produced a sandstone with ice cement(Fig1 a,b).The soil (layer A,B,C in Fig1b) generated by water cycling in small scale model(5×5×3cm) after 24,48,72 hours. The cover soil increased in thickness after every 24 hours in the small protype model (Fig1a,b).The experiment suggest that the ice act as cement for the primary rock mixture but evaporated very rapidly after few minutes.

In nature the dry rivers are covered by dust or residual deposits. The PDMS 36[10] suggested for modeling viscous materials like salt or ice [9, 1, 2&3].

Sand and PDMS mixture is good material for the simulations of the Ice and basalt articles in the Martian moons. The experiments showed that the ice and rock mixture flow more slowly in compare to pure ice(Figs c to n).However the ice-rock mix sheets are surrounded by other sheets suggest forming of upright folds in the upper part of the suture fronts of viscous sheets(Figs 1 m,n). The models (Figs 1c to n)and field studies on viscous sheets on Earth(Iranian salt glaciers) and also photo geology of the Martian moons(subscribed) suggest that the flow folds change from top to lower part of the flowing sheet(Figs 1m,n). The marker layers refolded by major recumbent folds by changes in the spreading rates[9] The measurements suggest that the rate of flow in the surface salt of the Mars planet(and any related moon) is much slower than Earth because of temperature fall[2].If the planet is cold and covered by deposits the channel very soon can be cover by the new deposits. The experiment and field study showed that the flow rate have a positive relationship with temperature [1, 2&3]. The flowing material formed caterpillar tank track fold(Figs c,d,e) in all viscous spreading sheets, specially similar structure formed on scale models of the Martian moons(Figs f to k).

Both the physical analogue modeling and novel protype modeling suggest that the ice and ice rock mixture layers spread but in different rates.The author's experiments show that the PDMS with 50% sand flow as a viscous material similar to a PDMS sheet with no sand content but the rate is1/5 rate of that (Figs 1 f to k). Means that the ice and rock mixtures flow in similar manner as pure ice (Figs, 1c to k).Most of the viscous material on Martian moons are blind and covered by deposits which generated suture areas between different sheets (Figs 1 l, m).The viscous sheets indent each others base on the rate of spreading, viscosity height and hardness (Fig l, m). The elastic movements may generated very shallow folds as lineaments in the map view (subscribed).



Conclusion: The structural analysis by photo geology investigated traces on the Martian moons (subscribed). The analogue and protype models confirm the finding and suggest that the linear structures on the pictures by NASA [7] probably are related to the flowing dirty ice material in depth. The thermal conductivity may decrease the volume of ice by evaporation(Figs 1 a,b), but the experiments and field studies in earth glaciers suggest that thin skin deformation is as a cap for the ice in depth because it is thickened by deformations with probable upright folds(Figs l.m). The potential roles of Phobos and Deimos in future human is very important , because the structural lineaments and probably drainage pattern which disappeared during time by ductile deformations suggest that the Martian moons may involve in water cycling.

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