EPSC Abstracts,
Vol. 4, EPSC2009-205, 2009
European Planetary Science Congress,

Ice grains From Water Ice upon Its Heating, as a Simulation of Active Comets, Geysers on Icy Moons and on Mars' Poles

Diana Laufer, Igal Pat-El, Ronen Jacovi and **Akiva Bar-Nun**

Department of Geophysics and Planetary Sciences, Tel-Aviv University, Tel-Aviv, 69978, Israel
(akivab@post.tau.ac.il; dianal@post.tau.ac.il; Fax: +972-36409282)

Abstract

We conducted a set of experiments on changes in the surface and subsurface structure of 200 µm layers of amorphous water ice due to CO_2 release from below or liquid C_3H_8 underneath the ice. These findings can explain the changes observed on the surfaces of Europa and Enceladus, where the surface temperatures are above 80 K.

In other experiments, we studied the CO_2 release from a few cm thick amorphous ice samples upon warming up. The CO_2 ice sublimates, breaking gradually the overlying water ice layer. The gas jets are accompanied by massive ejection of ice grains. The results of our measurements of the density, tensile strengths and thermal inertia are very similar to those obtained by Deep Impact mission on Comet Temple 1 [1, 2].

These findings can explain also the jets of gas and ice grains observed on active comets [3], on Mars' pole and the cryovolcanic activity on Enceladus' south pole [4, 5].

References

[1] Laufer, D., Pat-El, I. and Bar-Nun A. (2005). *Icarus* 178, 248-252.

[2] Pat-El, I., Laufer, D., Notesco, G., Bar-Nun, A. (2009) *Icarus*, 201, 406-411.

[3] Meech K.J., Pittichová, J., Bar-Nun, A., Notesco, G., Laufer, D., Hainaut, O.R., Lowry, S.C., Yeomans, D.K. and Pitts, M. (2009). *Icarus*, 201, 719-739.

[4] Spencer, J. R., Pearl, J.C., Segura, M., Flasar, F.M., Mamoutkine, A., Romani, P., Buratti, B.J., Hendrix, A.R., Spilker, L.J. and Lopes, R.M.C. (2006). *Science* 311, 1401-1405.

[5] Jaumann, R., et al. (2008) *Icarus* 193, 407–419.