Geophysical Research Abstracts
Vol. 17, EGU2015-4536, 2015
EGU General Assembly 2015

Understanding the nucleus of 67P/C-G through laboratory experiments

Diana Laufer and Akiva Ba-Nun
Tel Aviv University, Dept. of Geosciences, Tel Aviv, Israel (dianal@post.tau.ac.il)

On August the 6th, 2014 the Rosetta spacecraft arrived at Comet 67P/Churyumov-Gerasimenko and on November the 12th, the Philae probe landed, sending the most detailed close-up pictures, with a few meters resolution, of the surface of the comet.
We will present an explanation of the observed surface features on the comet nucleus, as derived from our laboratory experimental results, such as craters, boulders, active areas and smooth terrains, due to ice sublimation and evolution of gases from the interior of the nucleus. A large flux of ice grains was observed to emanate from the central part "the neck" of the nucleus. Our experiments demonstrated that a huge flux of ice grains is ejected together with gas jets from the ice. As the comet approaches the Sun, gases emerge from pockets up to the ice surface quiescently and also accumulate in larger cavities which explode to release gas jets together with a huge amount of micron size ice grains, forming craters and smooth surfaces.
Also comparing our experimental results on the density, thermal conductivity and mechanical strength with the in situ results of comet 67P C-G, as done with comet Temple 1 in the Deep Impact mission, will be used for better understanding of the internal properties of the nucleus.
The experimental results on gas trapping in the ice and its release upon warming up will be presented and compared with Rosetta's findings.
Authors acknowledge the funding from the Israeli Ministry of Science, Technology and Space.