Geophysical Research Abstracts
Vol. 18, EGU2016-3652, 2016
EGU General Assembly 2016

Dust ablation in Pluto's atmosphere

Mihaly Horanyi (1), Andrew Poppe (2), and Zoltan Sternovsky (1)

(1) U. of Colorado, LASP, Physics, Boulder, United States (horanyi@colorado.edu), (2) U. of California, Berkeley (poppe@ssl.berkeley.edu)

Based on measurements by dust detectors onboard the Pioneer 10/11 and New Horizons spacecraft the total production rate of dust particles born in the Edgeworth Kuiper Belt (EKB) has been be estimated to be on the order of $5 \cdot 10^3$ kg/s in the approximate size range of 1 - 10 μm. Dust particles are produced by collisions between EKB objects and their bombardment by both interplanetary and interstellar dust particles. Dust particles of EKB origin, in general, migrate towards the Sun due to Poynting-Robertson drag but their distributions are further sculpted by mean-motion resonances as they first approach the orbit of Neptune and later the other planets, as well as mutual collisions. Subsequently, Jupiter will eject the vast majority of them before they reach the inner solar system.

The expected mass influx into Pluto atmosphere is on the order of 200 kg/day, and the arrival speed of the incoming particles is on the order of 3 - 4 km/s. We have followed the ablation history as function of speed and size of dust particles in Pluto's atmosphere, and found that volatile rich particles can fully sublimate due to drag heating and deposit their mass in narrow layers. This deposition might promote the formation of the haze layers observed by the New Horizons spacecraft. This talk will explore the constraints on the composition of the dust particles by comparing the altitude of the deposition layers to the observed haze layers.