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Some inner satellites of giant planets are still outgassing: Triton, Enceladus, Io

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Process of atmospheric formation in the Solar system continues. There are three celestial bodies (except Earth) still emitting considerable amounts of volatiles though these bodies' masses do not allow keeping appreciable amounts of emitted volatiles in their vicinity and creating real atmospheres. It was earlier shown that the wave oscillations in form of stationary waves more or less rapidly changing their phases (plus to minus and inversely) sweep out volatiles from planetary depths [1]. These stationary waves, proportional in their amplitudes to the radii of tectonic granules (Mercury R/16, Venus R/6, Earth R/4, Mars R/2) and inversely proportional to orbital frequencies, form the planetary surface relief range of which increases with the solar distance [2]. In the opposite direction increases the sweeping out force of these waves and, consequently, atmospheric masses increase [3]. In the satellite systems of the outer giant planets this regularity is preserved in that the inner satellites (even small as Enceladus) surprisingly continue to push out volatiles. To do so, really very thorough washing out of entire body should be executed by very fine oscillations. Very fast orbits (Triton – 5.9 days; Enceladus – 1.37 d.; Io – 1.769 d.) secure this. Titan with rather fast orbit (16 d.) has enough mass and gravity to create and keep an atmosphere. Triton has a tenuous nitrogen atmosphere with small amounts of methane. A part of its crust (the southern "continental" segment) is dotted with geysers believed to erupt nitrogen with some admixture of dust entrained from beneath the surface. The geyser plumes are up to 8 km high. There are many streaks of dark material laid down by the geyser activity. Enceladus spews out icy material from the south pole region called "Tiger stripes". Some of the tiny ice particles go into Saturn orbit, forming the doughnut-shaped E ring ("detached Enceladus' atmosphere"). Io has at the moment more than 150 active volcanoes making plumes of sulfur and sulfur dioxide hundreds of kilometers high. It is admitted that Io's orbital eccentricity is a main reason for volcanism creating its patchy atmosphere and plasma tore ("detached atmosphere"). It is interesting that the latest MESSENGER data show that spacious volcanic effusions cover Mercury and one region appears to have experienced a high level of volcanic activity. Chains of small deep pits occur in the region along with the larger 30 km across crater. The innermost planet Mercury is deeply degassed and almost dry. Areal volcanic effusions, clear traces of contraction (escarps or lobate ledges), numerous chains of deep pits (craters) controlled by lineaments or weakness zones witness this. Not able to keep an atmosphere in the close vicinity to mighty Sun, Mercury still has traces of Na, K, Ca, Mg, and noble gases in its exosphere (but it seems that sputtering from the surface is a main reason for their appearance).
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