

# **The thermal sublimation process and atmosphere of Iapetus**

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Iapetus, one of the outer icy satellites of Saturn, is characterized by a large albedo asymmetry (0.04 vs. 0.5) between the leading and trailing hemispheres. The origin of this color dichotomy is still a puzzle. A related question is whether the long-term surface icy material transport driven by thermal sublimation might be effective in modifying or shaping some of the observed features. We have made use of the preliminary results reported by the CIRS observations on Cassini to construct a surface temperature map. The peak temperature on the dark side reaches 130K and the corresponding value on the bright side is about 100K. If the dark material is composed mainly of water ice, the related sublimation process - in addition to ion sputtering and photo-sputtering - could support the formation of a thin atmosphere. This surface-bound atmosphere is of exospheric nature and the surface transport of the

water molecules is characterized by ballistic motion from low latitude region to the poles. We will present our simulation results on the short-term and long-term mass transport and atmospheric processes.