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506.06 - Thermal stability of water ice in Ceres' crater Oxo

Dwarf planet Ceres, target of the NASA Dawn mission, exhibits evidences of ammoniated phyllosilicates on its surface [1], compatible with a likely outer Solar System origin. Considerable amounts of water ice have recently been detected in some craters by the Visible InfraRed mapping spectrometer (VIR) onboard Dawn in some small fresh crater, such as Oxo, located at about 40° N. The exposure mechanism of water ice is unknown:

cryovolcanism, cometary type sublimation/recondensation [2] or impacts with other bodies are likely mechanisms. The evaluation of the time stability of the water ice is crucial to understand the plausible mechanism for its existence. For this purpose, we developed a 3D finite-elements model (FEM) by using the topography given by the shape model of Ceres derived on the basis of images acquired by the Framing Camera in the Survey mission phase. The illumination conditions are provided by the SPICE toolkit. We performed several simulations by analyzing the effect of thermal inertia and albedo on the temperature and rate of ice sublimation. The results of the simulations about the stability of water ice will be presented. [1] De Sanctis et al. NATURE, doi:10.1038/nature16172 [2] Formisano et al. MNRAS, doi:

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