Geophysical Research Abstracts
Vol. 21, EGU2019-7199, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

Detection possibilities of Ganymede's water exosphere with MAJIS

Christina Plainaki (1), Giuseppe Sindoni (1), Luigi Cafarelli (1), Davide Grassi (2), Anna Milillo (2), Alessandro Mura (2), Alessandra Migliorini (2), and Giuseppe Piccioni (2)

(1) Italian Space Agency, Rome, Italy (christina.plainaki@asi.it), (2) INAF - Institute of Space Astrophysics and Planetology, Rome, Italy

Ganymede's exosphere is the actual interface between the icy surface of this moon and Jupiter's magnetospheric environment. The deposition of neutral species from the exosphere onto the moon's surface will spectrally mask the weathering products (e.g., deposition of water) or directly start new chemical patterns (e.g., oxidation by oxygen-bearing species). Moreover, the efficiency of weathering and particle release from the surface may be reduced by the action of the charged particle environment. In this perspective, its characterization is of key importance to achieve a full understanding of the ice alteration processes induced by the radiation environment.
Several scientific instruments that will operate on board JUICE have the potential to study Ganymede's exosphere. Among them, the Moons And Jupiter Imaging Spectrometer (MAJIS) will have the chance to investigate the composition of the moon's exosphere components. In this work, we estimate the expected non-LTE emission from wtaer molecules and speculate on the detection possibilities with JUICE/MAJIS. The exospheric water density profile, as obtained from current models, is a crucial parameter for our estimations. In lack of an adequate number of in situ observations from past missions, there is a general difficulty in constraining current exosphere models which are often based on very different scenarios and considerations. Indeed, models often show large discrepancy in the determination of the spatial distribution of the exosphere and its variation with time. In this work, we make a rough comparison of the existing models of Ganymede's water exosphere and discuss the derived characteristics of the neutral environment. We then use these model outputs to estimate different scenarios for the expected non-LTE emission from water molecules. Our results can be of help during the JUICE observation planning phase.