

Na emission in the Hermean Exosphere as a tracer for particle precipitation dynamics

Stefano Orsini (1), Valeria Mangano (1), Christina Plainaki (2), Alessandro Mura (1), Anna Milillo (1), Stefano Massetti (1), Elisabetta De Angelis (1), Rosanna Rispoli (1), Francesco Lazzarotto (1), and Alessandro Aronica (1)

(1) INAF - IAPS, Roma, Italy (stefano.orsini@iaps.inaf.it), (2) ASI, Roma, Italy

In this presentation, we speculate on the Hermean exosphere Na hourly average distributions, as observed by the ground-based Themis solar telescope, and published by Mangano et al. ,2015 (*). From 2009 to 2013, we have selected 26 different days, when the Na signal was observed for 3 or more hours within each selected observation day, in good seeing conditions ($\sigma < 2$).

We notice the occurrence of basically opposite configurations, i.e. i) when the sodium signal is localized above the poles, or ii) when it is diffused above the sub-solar region. Some time periods show also the existence of a transition phase between the two configurations.

In order to identify these Na observations as possible tracers of particle precipitation patterns at Mercury, we compare these different Na emission configurations with the time profiles of particle and magnetic field data, as measured in-situ by MESSENGER, when such data were available.

Within the analyzed time sequences, localized Na signals are more frequent (~67% of cases), mostly linked to quiet IMF conditions. When the signal is more diffused, IMF data seem to indicate the occurrence of significant solar perturbations. The possible relationship between these events and the hermean magnetosphere general configuration is briefly discussed.

(*) Mangano, V., Massetti, S., Milillo, A., Plainaki, C., Orsini, S., Rispoli, S. and Leblanc, F.: THEMIS Na exosphere observations of Mercury and their correlation with in-situ magnetic field measurements by MESSENGER. PSS, 115, 102-109, doi: 10.1016/j.pss.2015.04.001, 2015.