



Potential relation between Caloris basin and the sodium exosphere of Mercury

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In order to investigate the putative and debated role of Caloris basin on Mercury's exosphere, we developed an accurate model of Mercury's thermal surface [1]. Such thermal model describes the surface temperature but also the first meters below. The variation of such a temperature with respect to the position at the surface of Mercury, the diurnal cycle and Mercury distance to the Sun are taken into account and compared to known measurements of Mercury's surface temperature but also discussed with respect to previous models. The direct coupling of this thermal model with a 3D Monte Carlo of Mercury's sodium exosphere [2] allows us to describe in details the different expected effects of Caloris particular thermal surface structure (due its important slope) on the formation of Mercury's sodium exosphere. We also underlined what could be the features in previous observations [3] that could be directly due to Caloris basin. We conclude that new observations of the sodium exosphere when Caloris basin is in the morning side of Mercury could lead to very useful identifications on what drives the formation of Mercury's sodium exosphere.

[1] Yan N., Chassefière E., Sarkissian A. and F. Leblanc, Thermal model of Mercury's surface and subsurface: Impact of subsurface physical heterogeneities on the surface temperature, Submitted to *Advances in Space Research*, 2005. [2] Leblanc F., and Johnson R.E., Mercury's sodium exosphere, *Icarus*, 164, 261-281, 2003; Leblanc F., Delcourt D. and Johnson R.E, Mercury's sodium exosphere: Magnetospheric ion recycling, *JGR-Planets*, 108, E12, 5136, doi: 10.1029/2003JE002151, 2003. [3] Potter, A.E., Morgan, T.H., and R.M. Killen, Rapid changes in the sodium exosphere of Mercury, *Planet. Space Sci.*, 47, 1441-1449, 1999.