



Potential relations between Caloris basin and Mercury's sodium exosphere

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We have developed a 1D thermal model of Mercury's regolith, in order to simulate the heat diffusion in the upper subsurface (first 10 meters). We assume in our model that the thermophysical properties of the Hermean regolith are similar to those of the lunar regolith. We apply our thermal model to the Caloris basin which slopes induce distortions of the surface temperature compared to results obtained for a perfect spherical planet. This thermal model is then coupled with a 3D Monte Carlo model of Mercury's sodium exosphere (Leblanc and Johnson 2003, Leblanc et al. 2003), in order to describe the signatures of Caloris basin on Mercury's sodium exosphere in term of temporal and spatial variabilities. In particular, we find a motion of the maxima of sodium density in the exosphere towards the Northern hemisphere similar to the one observed by Potter et al. (1999) but did not reproduce the observed change of the emission brightness. The main conclusion of this study is that the Caloris basin - exosphere relations might be observable from the Earth which we hope will motivate new observations of Mercury's exosphere.

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