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Modelled Solar Wind and Magnetospheric Ion Impact on Mercury's Surface in response to elevated, prolonged, solar activity in December, 2006.

S.M.P. McKenna-Lawlor (1), E. Kallio (2), H. Lammer (3), W. Schmidt (2) and P. Janhunen (2)

(1) Space Technology Ireland, Maynooth, Co. Kildare, Ireland, (2) Finnish Meteorological Institute, Helsinki, Finland, (3) Space Research Institute, Graz, Austria (stil@nuim.ie)

During the late declining phase of Solar Cycle 23 the disk transit of Active Region 930 (5-17 December, 2006) was characterized by the production of several very large flares. In the present study the response of Mercury to the extreme solar wind conditions pertaining during this solar sequence was studied using a self-consistent, 3-dimensional, quasi-neutral hybrid model. The input solar wind speed pertaining during the extreme events concerned ($>$ 1000 km.s) was about twice higher and the solar wind density ($>$ 380 cm^3) about five times higher than was considered in previous runs of the code (Kallio *et al.*, 2003). The grid size used in the present simulations was 305 km (that is 0.125 times the radius of Mercury) and the Hermean intrinsic magnetic field was represented by a magnetic dipole aligned with the –z axis.

The field line tracings were started at 1.05 R_M in the circumstances that the magnetosheath plasma was found to be pushed very close to the surface of Mercury near the sub-solar point during extreme events. It is surmised that the cases presented represent situations when circumstances were approached, maybe even already reached, where the conductivity of Mercury (which affects the strength of the current inside the planet) and temporal variations in the solar wind (which affect the strength of the induced magnetic field and, thereby, also that of the induced electric currents inside the planet) play a significant role in the overall outcome.

Further, the estimated impact flux of H^+ ions on the surface during extreme events provides an input for planned Hermean sputter simulations (Lammer *et al.*, 2006) based on a geochemical model.