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Space weather at Mercury

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The magnetic field of Mercury is just about sufficient to form a magnetosphere, as discovered during the Mariner 10 flybys of the planet in 1974-75. Relatively little hard information on Mercury's interaction with the solar wind has emerged since then, although there have been numerous studies aiming to model different aspects of the hermean magnetosphere based on the small set of observations. From the perspective of space weather, the rapid and probably global response of the small magnetosphere to dynamic changes in the solar wind input is likely to be the dominant factor. In addition, it is expected that the solar wind is able, at least some of the time, to impact directly on the surface of Mercury. At such times, the very concept of magnetosphere may need to be rethought for this planet. The role of the planetary surface in supplying some of the plasma in the Mercury environment at least some of the time is also a part of space weather conditions. Given that there is no atmosphere on Mercury but only a tenuous exosphere, it is likely that space weather is the only weather on this small planet. This paper re-examines the available knowledge of Mercury's magnetosphere and solar wind interaction phenomena from the perspective of space weather effects.