

Ensemble forecasts of geomagnetic indexes

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Abstract:

Solar activity can affect the dynamics of the Earth's magnetosphere and ionosphere, in what is called “the sun - solar wind – magnetosphere – ionosphere interaction [1]. In particular, during a geomagnetic storm the ring current of the the Earth's magnetosphere can produce large perturbations of the horizontal component of the magnetic field observed at the ground at low latitudes. These variations are usually quantified using the storm weather disturbance index (Dst) that estimates the intensity of the ring current and is used to monitor the severity of the storm.

In this work we propose and study an ensemble of linear evolution models of Dst, properly weighted through a “skill measure”, driven by solar wind variables [2] as a convenient and flexible strategy to model and forecast the behavior of Dst and its uncertainty over time. It also allows us to determine how the distribution of coupling parameters to the solar wind variables vary over time and solar and storm conditions. The data is taken from the OMNI dataset.

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References:

[1] Gosling, J. T. (1993), The solar flare myth, *J. Geophys. Res.*, 98(A11), 18937– 18949, doi:[10.1029/93JA01896](https://doi.org/10.1029/93JA01896).

[2] Burton, R. K., McPherron, R. L., and Russell, C. T. (1975), An empirical relationship between interplanetary conditions and Dst, *J. Geophys. Res.*, 80(31), 4204– 4214, doi:[10.1029/JA080i031p04204](https://doi.org/10.1029/JA080i031p04204).

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