



Gap-filling of Solar Wind Parameters by Singular Spectrum Analysis

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Global magnetospheric magnetic field models are crucial for many space weather applications, including radiation belt modelling. The latest empirical magnetic field models require time-continuous solar wind and interplanetary magnetic field (IMF) data, which both have large gaps before the launch of the WIND spacecraft in 1994. Here we demonstrate how singular spectrum analysis (Kondrashov and Ghil, 2006) can be applied to fill-in missing data with smooth information from an iteratively inferred “signal” that represents coherent spatio-temporal modes. We apply singular spectrum analysis to multivariate data composed of continuously available inner- magnetospheric indices, such as Kp and Dst, combined with the gappy solar wind & IMF data. The accuracy of the reconstruction is examined by applying synthetic gaps on continuous solar wind parameters and IMF available in 2000.