

Response of Solar Irradiance to Solar Proxies: Is it instantaneous?

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Most models for reconstructing solar irradiance from solar proxies do so by assuming the existence of some instantaneous (but possibly nonlinear) relationship between the two. This assumption often turns out to be wrong because the relationship is convolutional. The proper approach for handling such processes involves transfer functions. Here, we 1) Show by how much linear transfer functions improve the reconstruction of solar irradiance variations; 2) What such transfer functions tell us about the underlying physics; 3) Investigate whether long-term variability (i.e., on timescales of years and beyond) can be reconstructed by means of models that describe short-term variability using as input solar proxies such as the daily sunspot number.