Nonlinear Processes
in Geophysics
Discussions

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Interactive
comment

Interactive comment on "On the intrinsic time-scales of temporal variability in measurements of the surface solar radiation" *by* M. Bengulescu et al.

Anonymous Referee #1

In this paper the authors consider the variability in the surface solar irradiance, using the empirical mode decomposition associated with the Hilbert-Huang transform. Globally I have no problem with this analysis, which is relevant and well described.

Only a major point needs to be explained and justified more clearly, or modified. This concerns a discrimination method between "signal" and "noise", first expressed lines 31-33 of page 2. The authors oppose deterministic information and stochastic variability, which is here considered as noisy background. This needs to receive a much more precise definition of terms, because it seems that, for the authors, something stochastic is purely noisy and not relevant for the physics of the problem studied. If this is correctly understood by the reader, it is not correct, since stochastic variability

possesses of course in general much more rich information than a pure noise. And second, because physical processes can generate stochasticity, such as e.g. turbulence. To oppose information and stochastic variability is not possible. The terms "weather noise" found in line 10, page 2, need to be renamed, since a noise has not correlation and weather have some. The procedure which is applied here to separate what is assumed to be "noisy" and deterministic information, is explained in section 3.2. The main idea is to state that "noisy" parts of the signal generate dyadic filtering in the EMD method, and a detection method based on this property is applied here. This is problematic because if white noise or fractional Brownian motion have been shown to generate EMD modes which are dyadic, the reciprocal is wrong, many studies have found the dyadic property for stochastic processes and also for observed data, that are not noises. The problem seems here the confusion by the authors between noise and random processes. The same confusion is visible in section 5.3, lines 17-19 and line 25. All this methodology and the discussion in section 5.3 must be changed or suppressed.

Another comment: the Hilbert-Huang marginal power spectrum of the data given by equation (8) should be displayed, for some locations and also globally.

Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-38, 2016.