

Interactive comment on “Characterizing ecosystem-atmosphere interactions from short to interannual time scales” by M. D. Mahecha et al.

Anonymous Referee #3

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General Comments:

The paper reports results of applying singular spectrum analysis (SSA) to study temporal variability of ecosystem time series, which is a relevant topic within the scope of BG. The challenge here is in identifying interannual variability from the 8yr long and gappy time series, which requires using advanced tools such as SSA. I find manuscript quite interesting in both how novel methods are applied and a way conclusions reached, especially plotting reconstructed components vs each other on different time scales. After revisions are made as outlined below it can be considered for publication.

Specific Comments:

p.1406, l. 20: "eddy covariance" term should be introduced.

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p. 1413. I. 15: original gap-filling method used rms criterion for the convergence of missing points, but it should not influence results a lot.

Sec. 2.3: Here more details are needed; would be very instructive to plot one or more raw time-series before gap-filling and the end result (is it 4th panel on Fig. 2?), also showing the SSA parameters that have been used. It should be made also clear that univariate gap-filling has been used, that is without using correlations with the meteorological T or P which are continuous, even though it can be done too. Not entirely clear why SSA gap-filling could not be applied w/o pre-processing. Here again showing raw data or giving more details may help.

p. 1414 I.11: Note that Ghil and Vautard (1991) deals with the hemisphere mean temperatures, while here it is a local record.

p. 1416. I 24: Fig.6 can help to explain Fig.3 in some way, so perhaps these figures should be combined. Caption of Fig.3 is not consistent with its description.

p. 1417 I. 25 Suggest to plot for Rg Fig.6 like, that may offer more insight on hysteresis vs. linear relationship.

Sec. 3.5. Should mention how much missing data is missing (see also my comments to Sec. 2.3).

p. 1422 I. 24: The local temperature record may be not representative of the global low-frequency variability mode. Also, the filled-in data typically has less amount of noise, so some caution must be taken when interpreting standard significance tests.

Technical corrections:

p. 1420. I. 3 Formula should have N instead of T.

p. 1418. I. 7: Rg-T hysteresis is not shown.

Interactive comment on Biogeosciences Discuss., 4, 1405, 2007.