

Interactive comment on “Complementary Relationship for Estimating Evapotranspiration Using the Granger-Gray Model: Improvements and Comparison with a Remote Sensing Method” by Homin Kim and Jagath J. Kaluarachchi

Anonymous Referee #3

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I am not sure what to make of this paper. The authors aim to show that a previously developed method based on a modified Granger-Gray model (by the same authors published in 2017 in the Journal of Water and Climate Change) fits well with flux data and can be further improved by taking account of the a-symmetry of the complementary relationship at higher land surface wetness. But there are a number of fundamental issues that remain.

1) Why did they include the comparison with the remote sensing method? It serves no purpose. It certainly does not reveal what is wrong with the GG-NDVI method for

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wetter circumstances? This can solely be derived from comparison with the flux data.

2) It seems that the only incremental advance in the paper is the $f(G)$ function that corrects for wetter circumstances. This seems to warrant a technical note only, whereby many parts of the paper (derivation of the GG-NDVI method, all the remote sensing stuff, as well as the review of methods in the introduction) are unnecessary.

3) The $f(G)$ function itself is not based on sound physical reasoning. In Phase 1, changing NDVI values over time are said to cause the larger errors, while in Phase 2 it is said that even at saturation E will remain smaller than EW and EW is increased. i.e. by multiplying with a function $f(G)$ that is empirically determined and thus necessary includes many effects.

One small issue: - The authors state that the GG model is not suitable for drier circumstance because it was only tested for wetter circumstances in Canada. But that is not what is said in the Granger-Gray 1989 paper. In fact, the opposite! First, they refer to the data coming from the semi-arid climate zone of Western Canada. Second, if one looks at Figure 2 in that paper we see that the relationship is fitted to G values smaller than 0.6, which means it is most suitable for dry circumstances.

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