

***Interactive comment on* “Can we predict groundwater discharge from terrestrial ecosystems using eco-hydrological principals?”**
by A. P. O’Grady et al.

T. Graf (Referee)

graf@hydromech.uni-hannover.de

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The present manuscript (ms) attempts to establish a relationship between groundwater discharge and actual evapotranspiration represented by leaf area index of terrestrial ecosystems in Australia, for which eco-hydrological field data exists. That relationship is then meant to be applied to field sites, for which eco-hydrological data does not exist.

General Comments

I find the general idea adopted by this ms interesting and worth being researched. That being said, I also find that methods, eco-hydrological principles, the various water

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fluxes (evapotranspiration etc.), results, and discussion are not as clearly being presented as they should be. The ms is lacking clarity. I am under the impression that most of what is relevant is actually in the text. However, there is no clear line of thought along which the reader is being lead through the ms. The ms should be re-structured to add clarity. Recommendations to do so are given below.

1. Title. The title is misleading. Readers will not know and will not be informed by the ms what eco-hydrological principles are. The title should be adapted such that it clearly describes what the overall topic of this ms is.

2. Abstract. First ~10 lines of the abstract are mostly clear. What follows, however, is a list of seemingly random phrases that follow one another without clear line of thought. For example, the Budyko framework is mentioned without being explained. This confuses the readership. Lines 13 to 21 is a list of illogical phrases. Please change the abstract and put very clear key findings in your abstract where results are clearly being articulated in logical terms.

3. Introduction. At the end of an introduction, the reader should (i) know what the area of research is, (ii) understand which research results already exist, and (iii) be told quite clearly, which research gap the present ms is trying to fill. As it stands, this is not the case and should be changed. The introduction introduces many eco-hydrological terms but the reader does not know which are relevant to the present ms and which are not. Different “frameworks” are being discussed individually without discussing each in context of the others. The introduction therefore creates a very incoherent picture of eco-hydrological frameworks and associated modeling approaches. However, the introduction should draw a clear picture of the ecological background. Budyko’s framework is often being mentioned and the reader picks up bits and pieces of this framework here and there. The reader does not understand whether this framework is essential to understanding the ms. It probably is, so defining the Budyko framework ONCE in detail is the way to go.

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4. Methods. It may be worthwhile to discuss the different ecological frameworks in this section. At the end, however, it should be clearly articulated which framework is being used here.

5. Results. The role of groundwater discharge within the eco-hydrological balance should come out much more fully in this section. I understand that estimating groundwater discharge is the heart of this ms. Therefore, HOW groundwater discharge is estimated and what this means physically should be explained in more detail.

6. Discussion. The discussion section should typically refer to findings reported in the previous section. However, it does contain much introductory material and partially presents other papers and frameworks. This is dissatisfactory. If my previous recommendation is being realized, and if the results section is more detailed and longer, the discussion section actual has material to discuss. This section should be concluded by some sort of outlook, which is largely missing.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8231, 2011.

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