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Discussions

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Interactive comment on "Ecohydrological Optimality in Northeast China Transect" *by* Zhentao Cong et al.

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The authors present a study where they apply the Eagleson ecohydrological optimality method to a North-East transect in China. The paper is well written and structured while some language issues should be solved. Furthermore, the paper needs some clarification on the definition of some hydrological terms and the units should be checked. Since I reviewed an earlier version of this manuscript before, I don't have many comments on the scientific methodology. Nonetheless, I think, the study remains poor in its added value/novelty. Mainly it's an application of Eaglesons theory and shows a comparison between existing canopy cover versus optimal canopy cover. On the other hand, the sensitivity analysis of several climate and plant physiological parameters does provide new insights.

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[Discussion paper](#)

Specific comments:
- P1L8: Explain why "it's interesting to understand vegetation distribution..". That something is interesting is not a 'knowledge gap'. Maybe the last sentence of the abstract is the answer.
- P1L17: ".. the increas of LAI, stem fraction, AND temperature...."
- P1L22: "Transect stud**ies play** an important..."
- P2L22: too much =>many
- P2L24: ".. Eagleson present**s** a theory.." (also skip terms like 'smart')
- P2L29: ".. which IS partly due..."
- P2L32: "Mo applIED this method..."
- P3L7: unit of annual rainfall is mm/year
- P3L15: "... on THE NASSA website.."
- P3L25: Why is it so difficult to define barren soil and forest? This has nothing to do with the period 2000-2013, does it?
- P3L29: Why is canopy cover set as 1 the the NDVI is above it's max value? NDVI is related to the greenness and in principle has not much to do with canopy coverage, right?
- P4L4: Rn should be in italic
- P4L5: Max and min temperature are not required for Penman (-Monteith).
- P4L10: ".. He considered THAT climate and vegetation.."
- P4L23-32: Please don't use calories as a unit. Please check official SI units (so Joule)
- P5L9: Why can the resistance ratio be fixed once the plant species is known? r_a is dependent on wind and thus will change, right?
- P5L11: ".. M can also be described by THE water balance equation. In THE growing season.... of the soil column ARE:"
- P5L13:Eq 6 is not clear to me. What is meant by storm surface retention. What is $E_{T\tau}$? And how does this relate to the water balance components of Table 2? Furthermore, the E of expected value should not be in italic

- P5L26: Units don't match. ve/mtEps = [mm]/[h][mm/d]. Assuming that the unit hours should be days, the still the outcome is then days, which is not equivalent to Mk_v. Please verify and correct
- P5L30: remove line break.
- P6L16: ".. simulation resultS are..."
- P6L22: small=> poor
- P6L30: Would it be possible to add irrigation into Eaglesons theory? That would e.g. be an added values for this paper.
- P7L16: ".. the RESEARCH STUDIES conducted before..."
- P7L18: area => areas
- P7L22: area => areas
- P7L31: β and hs and h are not explained
- P10L10-29: Some of these explanations should go in the main text. For example the definition of Er, and Et.
- P10L28: Please keep your units consistent. Here Epd has unit [mm/day] while E(Er) is in mm.
- Table 2: how is interception, runoff and evaporation calculated and what is the relation with Equation 6?
- Fig 1: unit of annual rainfall is [mm/y]
- Fig 3: Add in legend that $\Delta M = M * -M$
- Fig 5 6: lower right figure is not alligned well.

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