

# ***Interactive comment on “Empirical and model-based estimates of spatial and temporal variations in net primary productivity in semi-arid grasslands of Northern China” by Shengwei Zhang et al.***

**Anonymous Referee #1**

Received and published: 12 February 2017

The authors used a light use efficient model (LUE model, the CASA model) to estimate the net primary productivity (NPP) in grasslands over northern China from 2001-2013. Then they examined the precipitation and temperature influences on the modeled NPP in different seasons. While this study has been carried out with great efforts, some issues have remained in the paper as described below.

1. There are quite a few studies on the NPP distribution over China at regional and national scales, using LUE models or process-based models. However, the literature review on these previous studies is not thorough. It seems that this study has not

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made much advance from the earlier studies. The authors used the CASA model for a regional NPP estimation for a number of years. This is not scientifically and technically novel and challenging. Such a regional application may not have broad implications so the authors may submit their paper to a journal more for regional applications.

2. The discussion on the precipitation and temperature influences are reasonable but these influences are commonly known and are available in literatures.
3. There are many critical descriptions missing in the paper that hampers the reader from understanding how NPP is derived. For example, in Equation 1, how is  $\varepsilon$  derived? Does it depend on vegetation type? If so, how? Scientists have improved the expression of  $\varepsilon$  since the LUE idea was first proposed and thus  $\varepsilon$  can depend on several environmental variables. Is this also the case for this study? If so, how? How is soil moisture considered in the model? Or has the model not considered soil moisture in this application? The authors only provided the source for NDVI in the model. How about SOL and FPAR?

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-631, 2017.

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