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Biogeosciences
Discussions

Interactive comment on "Comparative analysis of trade-offs and synergies in ecosystem services between Guanzhong Basin and Hanzhong Basin in China" *by* Bo-Yan Li et al.

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We thank the reviewer for the constructive comments. The following are our point by point response to these comments.

Major issues:

1. This analysis relied heavily on models to quantify different ES, and therefore each model will have its own uncertainty. The authors have acknowledged this in the manuscript. However, a formal uncertainly analysis for each model and how uncertainty of each model will propagate to the main results will help reader understand the

results better.

Author's response: Thank you very much for your comment. In this study, many models were used to evaluate ecosystem services, including LRGO & NDVI, RUSLE, and CASA. In these models there might exist some uncertainties about data collection or index selection. Unfortunately, there are currently no effective ways to solve these problems, and these methods are still widely used (Li and Zhou, 2016). The present study uses CASA model to simulate NPP. When selecting the data, error in land use interpretation, resolution ratio of remote sensing image, different precisions of auxiliary data and cut of pixel by vector data can cause data uncertainty.

Li, J. and Zhou, Z. X.: Natural and human impacts on ecosystem services in Guanzhong - Tianshui economic region of China, 6803–6815, https://doi.org/10.1007/s11356-015-5867-7, 2016.

2. The trade-off (negative) relationship between FP and NPP is a little bit hard to understand since both FP and NPP is a function of NDVI. Some more explanation on this will help reader to understand the result better.

Author's response: Thank you very much for your comment. Many models were used in this study, including NPP (CASA model) and FP (LRGO & NDVI model) based on NDVI. Unfortunately, there are currently no effective ways to solve these problems, and these methods are still widely used (Peng et al., 2017). Peng, J., Tian, L. and Liu, Y., et al.: Ecosystem services response to urbanization in metropolitan areas: Thresholds identification, Science of The Total Environment, 608, 706–714, https://doi.org/10.1016/j.scitotenv.2017.06.218, 2017.

3. P7L10: rxyïijd0 indicates positive (synergetic) relationship, and rxy< 0 indicates negaitve (tradeoff) relationship. Do you have a significant level here? For example, rxyïijd0 and p < 0.01 indicates positive (synergetic) relationship, and rxy< 0 Âŕand p < 0.01 indicates negative (tradeoff) relationship. While p> 0.01 is no relationship.

Author's response: Thank you very much for your comment. We have significant levels in the Results section (See table 3 and Figure 5). Based on your suggestion, We've added a significant level here (**Correlation were all significant at the 0.01 level; *Correlation were all significant at the 0.05 level; other correlations were weak or not significant.")

4. This manuscript need a language edits by native speaker.

Author's response: We have had the manuscript polished by hiring a professional editing agency.

Some other observations:

1. P7 table: how WR was calculated for different layers?

Author's response: Thank you very much. At present, the main method of estimating forest water retention is to decompose the water retention effect of different forest function layers, followed by canopy interception, litter water holding and soil water storage. The total capacity is the sum of the above mentioned three parameters. This model of water retention was modified by vegetation coverage. The formula is calculated by the following (Wang et al., 2017): Q_i=Q_if+Q_il+Q_is Q_if=α_Li$\times\beta$_Ci Q_il=ε_Ci$\times\beta$_Ci Q_is=θ_i$\times\varphi$_i where Q_i is the ith grid of the water retention (mm), Q_ifis the ith grid of the canopy interception (mm), Q_il is the ith grid of the litter water holding (mm), Q_is is the ith grid of the soil water storage (mm), α_Li is the ith grid of the maximum intercept in the canopy and understory shrubs times of the process of precipitation (mm), β_Ci is ith grid of the forest coverage (%), ε_Ci is the ith grid of the litter grid maximum water holding capacity (mm), θ_i is the ith grid of the soil non capillary porosity (%), and φ_i is the ith grid of the thickness of the soil (mm).

2.P8 line 3-5, P8 line 20-22, P8 line 11-15: these sentences belong to method section

Author's response: Thank you very much. We've moved these sentences (e.g. P8 line 3-5, P8 line 20-22, P8 line 11-15) to the method section

3.Figure 3 can be in an appendix. Author's response: Thank you very much. We have moved Figure 3 into appendix A.

Please also note the supplement to this comment:
https://www.biogeosciences-discuss.net/bg-2018-33/bg-2018-33-AC1-supplement.pdf

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