

Interactive comment on “Assessing the large-scale plant-water relations using remote sensing products in the humid subtropical Pearl River Basin in south China” by Hailong Wang et al.

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Review for hess-2020-242 Assessing the large-scale plant-water relations using remote sensing products in the humid subtropical Pearl River Basin in south China by Wang et al. This study focuses on the Pearl River Basin in south China. Water is one of the critical resources to sustain the rapid socioeconomic development. Vegetation cover is high and most of them is evergreen subtropical species, which means there could be substantial water consumption by plants throughout the year given the favorable climate. Water and ecological management faces increasing challenges because of the rapid population growth, high urbanization and industrialization, etc. Therefore,

C1

this is a timely study to investigate the intensive changes and interactions between vegetation and water. The most interesting part of this study, to me, is the identification of the ‘hotspot’ of changes and determination of water-limiting-vegetation even in this rainfall-abundant region. The m/s is well structured, the wordings are fine, and method/analysis are appropriate. In my view, this study is meaningful and worth publishing.

Having said these, I do still have a few concerns listed below for the authors to address: 1. I find the summary of the water-plant relationships in Line 61-69 is quite interesting. Vegetation consumes water and causes reduction in water resources on the one hand, and water availability will restrict vegetation establishment and growth on the other. Indeed, plant-water relations are examined mostly in arid and semi-arid regions for the purpose of water and ecological conservation. Are there such studies in humid and semi-humid regions investigating the controlling factors – energy vs. water - of vegetation growth? It is important and is the authors responsibility to ensure a thorough literature review on this subject. 2. A brief paragraph should be added before Line 74 for an introduction of relevant studies that have been carried out in the Pearl River Basin. Without this, it is a bit out of blue to see the next paragraph suddenly mentioning something in this basin. 3. Regarding the data: I see a comparison between GLDAS precipitation and the ground truth data over a number of pixels given in Fig. 11. GRACE data from different processing centers are also compared. No comparisons/discussions are given for ETp and other variables. Can you find some studies in this basin or a basin with similar vegetation cover and climate that use GPP from MODIS? If there is any, it'd provide more confidence in the results of this study. 4. The current m/s is a complete story by overlooking the water-vegetation relationships in the entire basin in space and time. It is good to locate the hotspots of changes and interactions because these areas would usually be the ‘focus’ of land/water management and for risk control, etc. I recommend the authors to take a further step to investigate the reasons behind the changes and interactions right in these hotspot areas. 5. Paragraph ends with Line 279: This is a good argument that vegetation relies on water because of

C2

the lags of vegetation parameters after water input & storage dynamic change. However, there seems a lack of support to the opposite standing, i.e. vegetation growth does not result in excessive water reduction. So this part of discussion needs a further expansion. 6. Fig. 2-5, 7: the spatial distributions of these variables/trends are shown for all pixels. How would it be like if only the ones with $p < 0.05$ are shown?

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