

Interactive comment on “Climate change, growing season water deficit and vegetation activity along the north-south transect of Eastern China from 1982 through 2006” by P. Sun et al.

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In general it seems a good approach to merge NDVI data with a water balance to investigate vegetation-climate relationships. I am however always astonished to see that temperature-based PET estimators are still used that are known to give very poor PET estimates. As early as 1948 did Thornthwaite himself recognize that temperature-based PET estimates are extremely unreliable particular in humid climates (as is the major part of eastern China). The importance of the contribution of aerodynamic influences (wind speed) on PET has been thoroughly demonstrated in a number of publica-

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tions for China (see the review of McVicar et al. 2012, Journal of Hydrology 416-417, 182-205). Only fully physical based PET estimators that include wind speed and solar radiation such as the Penman-Monteith equation give reliable PET estimates in all climates. If only temperature is used PET rates appear to increase as temperature generally increases while in China (and on a global scale) PET is declining! I would recommend to estimates PET based on the Penman-Monteith approach. An all-China gridded data set was described in Thomas (2008, Journal of Hydrology 358, 145-158) that in addition uses a more realistic interpolation approach than a TPS interpolation.

As a second point I would suggest to use a simple water balance rather than the parameterized Budyko approach. Using a soil map to estimate plant-available soil water and precipitation and PET as input will give far more realistic results particularly in regions with high precipitation variability and changing soil conditions. The neglect of soil water storage underestimates water availability in many sub-humid and sub-arid regions in China with a short but intense rainy season.

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