

Interactive comment on “Does evaporation paradox exist in China?” by Z. T. Cong and D. W. Yang

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General comments

The evaporation paradox is a topic that has generated much interest. However there have been a number of publications on this topic so any new paper should precisely define what new aspects are presented. The authors stress too much the effects of temperature on evaporation (see Gifford et al., 2007: Evaporative demand: does it increase with global warming? Global Change Newsletter 69, 32-23, accessible at <http://www.rsbs.anu.edu.au/ResearchGroups/EBG/index.php> , for an excellent discussion of the topic).

Both theoretical considerations and observations point to solar radiation and wind

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speeds as the important variables for changes in evaporation rates. The major part of the paper should be devoted to analyze the effects of radiation and wind speed rather than temperature. In addition mean temperature is masking any effects of changes in diurnal temperature range so maximum and minimum temperature should be analyzed.

It would be interesting to see the spatial extent of the paradox in a map. This would be easier to understand than the general descriptive remarks like: "more in southwest and less in northeast". No effort is made to analyze the effect of vegetation and land use: evaporation of bare ground is about only 1/3rd of potential ET. Taking this into account would considerably alter the results.

Specific comments

A number of publications on evaporation in China are missing: Chen, D., Gao, G., Xu, C.-Y., Guo, J., Ren, G., 2005. Comparison of the Thornthwaite method and pan data with the standard Penman-Monteith estimates of reference evapotranspiration in China. *Climate Research* 28, 123-132.

Chen, S., Liu, Y., Thomas, A., 2006. Climatic change on the Tibetan Plateau: potential evapotranspiration trends from 1961-2000. *Climatic Change* 76, 291-319.

Gao, G., Chen, D., Ren, G., Chen, Y., Liao, Y., 2006. Spatial and temporal variations and controlling factors of potential evapotranspiration in China: 1956-2000. *Journal of Geographical Sciences* 16, 3-12.

Gong, L., Xu, C.-Y., Chen, D., Halldin, S., 2006. Sensitivity of the Penman-Monteith reference evapotranspiration to key climatic variables in the Changjiang (Yangtze River) Basin. *Journal of Hydrology* 329, 620-629.

see also:

Xu, M., C.-P. Chang, C. Fu, Y. Qi, A. Robock, D. Robinson, Zhang, H., 2006. Steady decline of east Asian monsoon winds, 1969-2000: Evidence from direct ground measurements of wind speed. *Journal of Geophysical Research - Atmospheres* 111, D24111,

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doi:10.1029/2006JD007337.

Yu, L., 2007. Global variations in oceanic evaporation (1958-2005): The role of the changing wind speed. *Journal of Climate* 20, 76-5390.

About 40% of the observed temperature change in China appears to be due to urban warming (Guoyu Ren et al.;2008;Urbanization Effects on Observed Surface Air Temperature Trends in North China.;*Journal of Climate*;21;6;1333-1348). This reduces the presumed correlation between temperature and evaporation considerably. Please include this fact in your analysis and discussion.

p2113, l11 Thomas (2000) did not analyze evaporation trends but PET trends and should be moved to l15.

p2114, l1 conversion of pan evaporation constants in Allen et al (1988) is to pot. ET not actual ET.

p2114, l12 Thomas (2002) should read Thomas (2000)

p2114, l21 almost all papers point to other variables than temperature as responsible for evaporation trends so to stress a temperature - ET- relation and devote to it the major part of the paper is certainly misleading

p2117, l1, this statement is misleading: evaporation is (not 'can') be influenced by the mentioned variables.

p2117, l5-11, the PM function is well known and the paragraph that contains the equation should be deleted

p2117, l13, change sunlight time to sunshine duration. Give the Angstroen constants that were used to estimate solar radiation from sunshine duration: did you use standard values of $a=0.25$, $b=0.5$ or individual values?

Technical comments

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p2116, l1 Table 1 lists trends rather than means
reference section: Wu (2006) and Xu (2006) not cited

Figures:

Fig.1 give maximum/minimum temperature instead of mean temperature

Figs 2-4: no data is given for the south China Sea islands so restrict figure to mainland China. Increase figure size considerably, figures are far too small to identify any of the symbols.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2111, 2008.

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