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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Recent evolution of China's virtual water trade: analysis of selected crops and considerations for policy" *by* J. Shi et al.

Anonymous Referee #3

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General comments:

This paper by Shi et al. focuses on China's international food trade and the associated virtual water flows. The authors first calculate the virtual water trade between China and foreign countries from 1986-2009 and then discuss some policy implications for China. This topic is of high importance, with tight links to food security, water resources conservation and agricultural sustainability. Besides, the literature in the VWT field suggests than China is an important player in the global VWT network. However, this paper's new contribution to the existing literature is only incremental. The manuscript thus needs major revisions to be considered for publication in HESS.

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This work brings some new insights on China's international virtual water trade, but the major part of the analysis is not new. Indeed, the authors are analyzing the international virtual water trade network from 1986 -2009, which has already been built and analyzed by Dalin et al (2012), for the 1986-2007 period. The authors are not analyzing a new network (the " virtual water trade network of China") but are actually looking at a specific node (China) of the global virtual water trade network, a previously studied network (as in references cited by the authors, e.g. Chapagain et al 2005, Dalin et al 2012, etc.). Moreover, Dalin et al. had focused some of their analysis on China. Thus, previous findings are repeated by the authors in this manuscript (e.g. l.11-15 in the abstract is a previously drawn conclusion).

A few new results can have some significance: in section 3.1, the dominance of grain crops (Figure 2), in section 3.2, the location of countries importing from China (Figure 3b) and in section 3.3. the "super fat tail" node strength distribution. However, some new results, such as structure of China's connections (section 3.3 - network properties), are not analyzed to show their potential impact or significance.

Section 4.2 presents an interesting review of policy implications, but the base for this discussion seems to have been brought up by other publications rather than by this work. The paper could be presented as a discussion rather than a new piece of evidence for discussion.

Finally, the methods used for calculation of VWC need to be clarified.

Specific comments:

âŰł Abstract and section 4.1 (last paragraph): Water savings are not formally analyzed here, and thus should not be presented as a new finding in the abstract.

âŰł Section 2.3 Please explain methods in more details. Liu et al (2007) refer to CWR calculations in Chen 1995. But this last reference seems to be unavailable online (using the english reference as cited in Liu et al. 2007). It is of high importance to

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describe and specify the authors' methods and data sources for CWR calculations; more specifically: please include equation 1 from Liu et al 2007, cite data sources for CWR, A and TA. The authors should also specify the temporal and spatial resolutions of each variable used to estimate VWC in this manuscript. Crop cultivated areas used in Liu et al. 2007 are from several China Statistical Yearbook (NBSC). However, more spatially detailed datasets are now available for the globe (e.g. Monfreda et al 2008, Ramankutty, etc). Thus, the authors should justify their choice of using these specific datasets from NBSC.

âŰł p.11621, l.6 Please justify why the average of reports from China and from the other partner is not used, instead of ignoring trade partners' reports.

âŰł Sections 3.1 and 4.1: The way partners are counted is misleading in comparing the importance of connections between China and different world regions (e.g. since there are only 3 countries in North America, versus 25 or more in Europe). The authors should look at the percentage of countries in a region that trade with China rather than at absolute number of trade partners per region.

âŰł p. 11623 l.17 What does this scale-free property means for the network? Please justify here the analysis of the s-k relationship, and interpret findings.

âŰł Section 3.4 This entire section can be found in a previous study, cited in other sections of this paper (Dalin et al. 2012), in which Chinese imports of soybean and VWT are discussed in Fig 4A and in text of page 4. On the same note, Figure 7 of this manuscript is practically identical to Figure 4A in Dalin et al. 2012.

âŰł Table 1: Discuss assumptions made to obtain CWR of rice as in Liu et al. 2007. The significant difference between percolation and no percolation (8000 vs. 4550) may change the results importantly. Please discuss as necessary.

Technical corrections:

p.11615 l. 22 : contributes p. 11616 l. 21 A study l. 29 China, which p. 11617 l.1

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fluctuations, has l.12 because there are more l. 17 Is the "wastewater" in Guan and Hubacek 2007 coming from agricultural sector only? This study also includes industrial commodities. l. 18 impacts water quality p. 11619 l.5 it is calculated l.7 such as in . . .(references) l.14 based on Equations 1 and 2: add an index for country in VWC. p. 11622 l.13 46% of all VWE (typo?) l.28 even p. 11624 I think the authors meant to refer to the "fat tail" characteristic of the distribution, usually mentioned in the literature (not "flat tail"). p. 11626 l.13 heterogeneity p. 11627 l.20 cite reference p.11628 l.25 need to be adjusted p. 11631 l.11 and l.13 Rodriguez-Iturbe Fig 1: panel a: Again, show percentage of countries per region rather than absolute numbers. Fig 4: cite Software used (i.e. CIRCOS) Fig 5: Usually shown in log-log scale rather than semi-log like here.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 11613, 2013.