Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-53-RC2, 2018

Hydrology and Earth System Sciences
Open Access
Discussions

Interactive comment on "When is water withdrawal data enough?" *by* Benjamin L. Ruddell

Anonymous Referee #2

Received and published: 10 May 2018

Overview

The opinion paper suggests that data on water abstraction is sufficient for many questions and that it is not necessary to estimate the water consumed which is more subject to uncertainty. Although the question is interesting, I found that it is not very well treated. First, the main subject is not so obvious from the title. Indeed, I thought that the main problem was to discuss what kind of data is sufficient, i.e. with what precision on the position, the volume and the moment of the withdrawal ... This is not the case. The article focuses on the case of the United States and considers only the type of withdrawal data available in the United States. It lacks some kind of generality that I expected from an opinion paper with such a generic title. Then, I found that the arguments were sometimes confusing, mixing sometimes the water cycle and the water resource (of course, the water is not lost when it evaporates, but it is no more a water

Printer-friendly version

Discussion paper

resource...) Eventually, I didn't not found the paper to answer the question addressed, since it provides some examples for which water withdrawal is enough, but, it doesn't give any idea of which quality is required for these data to be really useful. Moreover, I found the style of writing rather tough to read, with the use of unnecessary notions, as for instance, the water balance equation (that is never provided), the simple net consumptive use, the coupled natural human system water. . .. Therefore, I suggest some major revision to the paper.

Main comments

1. Title: the title doesn't reflect the content of the article. Either the article should be completed to fit the title, or the title should be changed.

2. Abstract:

   (a) The main hypothesis, that is good-enough water withdrawal data are available should be stated.

   (b) "When a more advanced water use census is implemented, Simple Net Consumptive Use (SNCU) methods are insufficient for most common cases of human water use": This sentence is not very clear for me

3. Introduction:

   (a) P1 Lines 22-25: I'm not sure this assertion is correct, especially when the water is withdrawn to be stored several months.

   (b) P2 lines 3-8: it seems the author is already discussing about future progress while the main subject of the article is still not well presented.

Printer-friendly version

Discussion paper

(c) P2 2nd paragraph: some more information on the type of data that are collected by the US national censuses of consumptive water should be provided to the reader: what is the spatial resolution (point scale, state?), the time scale (monthly, annual, decadal?), and is the type of water (groundwater, river, lake. . .) of the source of withdrawal or rejection point is provided?

4. Section 2 and Figure 1: This part has to be improved.

   (a) P3 line 24-25 I don't understand why needing more that two measurements is not compatible with the equation C=W-R; as W can be the sum of several withdraws, as R might be the sum of several return flow. Same comment apply for the case illustrated in Figure 1f.

   (b) P3 Line 30: Of course, it is important to consider the type of water that is removed and where it returns (groundwater, river, lakes, sea ...), as this has a strong impact on the water resource, and I propose to address this point earlier in the article. However, I do not understand why this prevents the estimation of the consumptive use of water. . ..

   (c) P4 lines 1-4 Water quality is indeed a strong issue, but, again, doesn't prevents the estimation of the consumptive use of water. . ..

   (d) P4: Of course, most of the withdrawn water won't get back at the exact location it was taken nor at the exact same time. . .. But, again, why this prevents the estimations of the consumptive use of water? To make it clearer the spatial and temporal scale that are focused should be stated.

   (e) P4 2nd paragraph: "Consumptive use declines with spatial and temporal scale" I don't agree: if consumptive water is mostly the one that is taken from the water resource to be mostly evaporated, I don't see how the accumulation of evaporation could decrease in time. . . Except if you consider that this evaporation is then recycled in precipitation, but, then there is a mixture in the notions of water resources and water cycle that is misleading.

(f) Another issue is that there is few mentions of the impact that abstractions can have on the different reservoirs, in particular for groundwater, in which abstractions can be definitive (without the possibility of recharge) either because of the compaction of the aquifers or fossil water withdrawals. This might be very important for the sustainability of the water use.

5. Section 3: I mostly agree with the review of M. Heistermann on this part. So I'm only adding some few comments. My main questions are: which kind of water withdrawal data is enough to be useful? Which time step, spatial resolution, information on the reservoir source (groundwater, lakes, sea, river. . .)? And who needs what?

Minor comments

- Abstract: 1st sentence: Are you sure the water balance equation is the same for hydrologic and hydraulic science? Why empirical observations and not direct observations?
- P4 line 8: "example of summertime withdrawal and wet-season return has been known to occur" please provides some references.
- P4, line 14: which kind of boundaries are you talking? Is it administrative boundaries, or physical boundary (like surface water, groundwater. . .)?
- P4: "We know that UV for evaporative water uses is roughly 0.9 for regional river basins or US States at annual timescales, closer to 0.5 for continental scales, and close to zero during intense convective precipitation weather events (Dirmeyer and Brubaker, 2007)." Although I still think that mixing water resource and water cycle is not a good idea, stating that we know these numbers is perhaps too definitive, especially in a context of climate change. . ..

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2018-53, 2018.