Hydrol. Earth Syst. Sci. Discuss., 12, C3492–C3494, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C3492/2015/


Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Multiscale evaluation of the standardized precipitation index as a groundwater drought indicator" *by* R. Kumar et al.

**Anonymous Referee #3**

Received and published: 8 September 2015

Review:

"Multiscale evaluation of the standardized precipitation index as a groundwater drought indicator" by R. Kumar et al.

General comments:

The authors investigate the connection between groundwater levels expressed through the standardized groundwater level index (SGI) and the standardized precipitation index (SPI) in Southern Germany and the Netherlands. The study aims to characterize the relationship on different accumulation time scales of both the SPI and the SGI as



well as via evaluating the skill of the SPI in predicting groundwater droughts using hit rates and false alarm rates. The general message of the manuscript is that the SPI is a poor indicator for groundwater droughts in the given areas.

The manuscript is well written, clearly structured and the figures are suitable. The science questions are clearly stated and I recommend publication in HESS after considering some recommendations listed below. I also appreciate the publication of mainly "negative" results which is unfortunately often avoided, although there may be potential to learn even more from negative results than from positive ones.

Specific comments:

P7407, L22-23: Aren't there other reasons than "non-linearity" of the transformation of a precipitation signal to a groundwater drought? What about the role of evapotranspiration as a key process in the terrestrial water cycle? Some comments and references on that issue should be added here.

P7408, L12: years in the reference of Peters et al. should be 2003, 2005, 2006.

P7409, L15: The climate of Southern Germany is not "continental". It is not as close to the sea as the Netherlands and therefore less maritime, but the wording continental is not appropriate in this respect. Suggestion: "...a region with hilly to mountainous terrain, less oceanic influence on climate and a wide range..."

P7410, L19-21: These lines are not clear to me. What do you mean by filtering the precipitation time series? Are missing groundwater dates set missing in the precipitation time series? If yes, how does this affect the accumulation on different time periods? Please clarify.

Section 4: I think the manuscript would benefit if there is a more in depth discussion on why the SPI is not a proper groundwater drought identifier. Particularly the role of the demand-side of the water balance seams a critical point, as well as the underlying geology. Please add some discussion and reference dealing with these issues. See

for example: Natural Hazards and Earth System Sciences, 15, 1381–1397; Journal of Hydrology 477, 175-188, Water Resources Research 50, doi:10.1002/2013WR015051

P7421, L12: should be: "...on the basis of this data-based..."

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 7405, 2015.