

Interactive comment on “The El Niño event of 2015–16: Climate anomalies and their impact on groundwater resources in East and Southern Africa” by Seshagiri Rao Kolusu et al.

Anonymous Referee #3

Received and published: 4 January 2019

Overall its a good paper. I am happy that they treated the 2015-16 drought in context of the dryness of the previous year, this was one of the points I was looking for.

However, given one of their introductory lines: "Few studies have investigated the hydrological impacts of ENSO events on groundwater despite its vital role in sustaining ecosystem function as well as agricultural and domestic water supplies" (line 60-62), I thought they would proceed to do that very investigation which as they mentioned is lacking. I think this statement (line 60-62) should either be removed, or they should explicitly mention that they also do not do this investigation.

Also, a brief background on how the GRACE estimates are derived would be helpful for

C1

the readers who are less knowledgeable on climate issues, as this paper could have considerable interest from hydrologists

Line 59: Are not other phenomenon like QBO, MJO etc also major drivers. The way it is written suggest ENSO is the only major driver. Line 65: "strongest" rather than "biggest", perhaps? Line 91: "temporally", rather than "temporarily"? Line 221-222: the grammar needs to be corrected, perhaps: "this 2 year drought event [is] remarkably unlikely" (ie, add the word: "is") Line 315-316: It is not clear whether the r of 0.62 is for annual or seasonal? It may be instructive to calculate separate r values for Makutapora and Limpopo, since they are dealing with only 2 sites. Scatter plots would also be a helpful addition. Line 319: remove the word "least"? Line 328-329: the phrase "shows little interannual variability" should perhaps be replaced by "shows a limited interannual cyclicity" Line 339: The colour scheme on Figure S1 d is a little unusual, in most color schemes red is warmer and blue is colder, this can confuse readers. Line 387-388 need to be revised gramatically. Line 402-403: further analysis is required to support this sentence: "although as our results at Limpopo show, consecutive dry years lead to marked storage reduction"; this can be achieved by for example, by comparing with the storage after another dry year that was in contrast preceded by wet conditions. Line 420-432: A mention of the use of seasonal climate forecasts along with climate drivers would be helpful, as these seasonal forecast tend to try to bring together the effects of various parameters including climate modes like ENSO, IOD etc.(such forecasts as the ones here: http://www.cpc.ncep.noaa.gov/products/international/nmme/nmme_seasonal_body.html) Line 639; Fig 5b and 5c. The authors can potentially answer the question of whether GRACE GWS better estimates abstraction rates + borehole GWS by adding the two

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-516>, 2018.

C2