

Interactive comment on “Monitoring Groundwater Storage Depletion Using Gravity Recovery and Climate Experiment (GRACE) Data in the Semi-Arid Catchments” by Nizar Abou Zaki et al.

Nizar Abou Zaki et al.

nizar.abouzaki@oulu.fi

Received and published: 15 February 2019

We want to thank our referee for his review and the insightful and comprehensive comments. Below is an answer for the reviewer comments:

* How did the smaller study area affect the GRACE derived results:

The paper tends to discuss the usage of GRACE data in catchments smaller than the recommended area of 200,000 km² suggested by (Longuevergne et al., 2010). Results (Figure 4B) showed that GRACE data proved the groundwater level depletion in the catchment. Still as the catchment area is considered small, around 16 percent of

[Printer-friendly version](#)

[Discussion paper](#)



the recommended area, the GRACE data was not totally fit with the in-situ collected data. In the discussion section (page 17 – line 7 till 18) we discuss more about this issue

* How does the geology of the catchment interrupt with the water mass variation:

The aquifer system found in the catchment are shallow alluvial aquifers. Deeper confined aquifers can be found lying beneath those alluvial aquifers. As groundwater level increase in depth, farmers are tending to dig dipper wells. The pressure stabilization in this cases are leading to a big drop in groundwater level. This is discussed more on (Page 14 Line 18 till Page 15 Line 2)

* How does the water mass change in the catchment indicates the groundwater recharge and depletion:

The water mass derived from the GRACE data shows the total monthly water change. This includes the groundwater volume variation, surface water, snow melt, soil moisture. . . Referring to equation 5 page 7, and as suggested by (Rodell and Famigliett 2002), the surface water volume and the soil moisture variation was removed from the water mass variation. (GWMI) is now the monthly groundwater variation by GRACE data

* What are other factors interrupting the water mass variation, other than discussed in the paper:

Most important factor that is the transboundary groundwater from other catchments. At smaller scale this might have an effects on the results obtained. Other than that we have discussed all the water balance components in the catchment

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-471>, 2018.

Printer-friendly version

Discussion paper

