

Interactive comment on “Satellite signal shows storage-unloading subsidence in North China” by J. P. Moiwo and F. Tao

Anonymous Referee #1

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The paper focuses on the detection of groundwater depletion in Northern China. Using GRACE, and GPS data, the authors try to discriminate the groundwater storage change linked to physical changes of the aquifer systems i.e. aquifer compaction. The original idea of the paper is interesting. However, the paper is difficult to read. It is not organised efficiently. For example, explanations on how the authors come to such large scale land subsidence estimations and how they interpolate GPS measurements are lacking. The paper needs more work before being published. However, the research presented here is interesting, and we should see more studies using GRACE and concordant data such as GPS in the near future. The subject is well placed inside the journal scope. I encourage the authors is pursuing their work. It could become an interesting manuscript by following the recommendations I provide.

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General comments: 1. It would be interesting to add few lines on the implication of discriminating the storage loss related to physical changes within the aquifer systems. Why does it matter for hydrogeologists? (i.e. unrecoverable storativity loss, the aquifers will never store as much if levels recover). 2. It is important to use the common language shared with other authors of the field. I also recommend restoring the terminology used by other GRACE user (e.g., SWS is Surface Water Storage, SMS is Soil Moisture Storage). There is also an overuse of new unknown acronyms (e.g., WSD, LCS, GWSA etc.). The paper should be reviewed by a native English speaker. 3. There are basically five figures showing the same results. The results are showed in monthly average, seasonal average and yearly averages. There are no needs for so many figures for the GRACE part. It is also hard to discriminate in-situ measurements from GRACE-derived observations within the figures. 4. ‘Based on GPS data analysis...’ Please show results of the analysis. Maps? Where are located these GPS measurements? How these points are represents the large scale land subsidence? At the very least, one figure should be added on GPS data location and results.

Specific comments: Fig. 1 Please add the study area shape on the map and units in the lower left caption. L16-17 p.6044: The authors are referring to an infrastructure development project in the abstract without giving any explaining on it. Maybe this is better in the discussion rather than the abstract. L3 p.6047 GLDAS is not a mission, it is a dataset. L1 p.6048: This is potential ET. L17 p.6057 ‘Since there are hardly any occurrences of earthquakes or large-scale earth-faults in the region’ and then in the conclusion: ‘Droughts, degenerated water/wetland ecosystems and earthquakes are variously associated with long-term WSD’. Please conclude for what you observe in your study area first.