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Title: Multi-Sensor Remote Sensing Evidence of Connection between Deep Aquifer Recharge in California's Central Valley and Sierra Nevada Snowmelt

Review comments

Establishing the relationship between mountain snow and deep aquifer in view of groundwater sustainability is an important topic and the authors do a very good job of establishing the relationship using multiple methods and datasets (in situ and remote sensing). The work also serves as a foundation for future work aimed at exploring MBR fluxes in same and other similar regions. The authors also appropriately acknowledge the uncertainties and limitations of the data set and methods adopted. The analysis is robust and corroborated using different data. However, the analysis is based on correlation rather than causative analysis that potentially weaken the use of the results in a meaningful way as an input for construction of hydrological models. The results also mainly focus the timing with little spatial mapping of hydraulic connection that can aid conceptual model improvement of existing groundwater models. Kang et al., 2021, Kang et., 2025 and Colleagues studied part of and the whole CV using geophysical data. Comparing results of the diffusion with the spatial distribution obtain from their study can strengthen the studies findings from pure correlation to validated results that can be of use for the objective the author's aim.

General comments

However, the conclusions drawn from the analysis are very challenging to verify and could be strengthened by comparing the diffusion analysis with geological 3D maps where data is available. Why is the analysis mainly based on correlation not causation? The current analysis only mentions the existence of fractured rocks favorable to MBR but does not provide description of the stratigraphy, potential existence of buried permeable channels, geological structures. The authors can take a small portion of the CV for validation assuming that there is readily available 3D geological map. Or use the Conceptual model used to develop Central Valley Hydrologic Model (Faunt, 2009) for validation.

Groundwater budget component analysis using GRACE TWS might be very challenging to attribute storage changes to either shallow or deep as it provides commutative for TWS in the CV. How are the authors certain that the GRACE derived TWS can be attributed to deep aquifer?

In addition, should TWS be anomaly values and the other values also converted to anomaly as opposed to using observed values (is this comparisons apple to apple)? Pinpointing the depth of the InSAR analysis of deformation is challenging, assuming that InSAR analysis can confidently be compared with the selected wells could be misleading.

The analysis is mainly focused on peak timing correlation between mountain snow and other data sources assuming that the Corcoran Clay serves as a vertical barrier between shallow and deep aquifers while acknowledging the presence of widespread clay lenses. Deeper aquifers represent regional aquifer behavior and might be difficult to rule of MFR contribution as the current study only focuses on MBR. Can the authors carry similar analysis for MFR, if not would it be better to analyze for MSR (MBR + MFR)?

Overall, the manuscript is detailed, main objective is explored using multiple data and methods. It is well written in general. The finding is important for solving water related challenges for regions with water stress, The main weakness is the validation of the results against existing maps (geological, geophysical or potential buried permeable channels). The validation is only expected for a small port of CV where data is available. Without a reasonable/appropriate validation, the application of the results obtained to address groundwater exploitation and its management is significantly diminished.