# Article information:

Effects of climate and irrigation on GRACE-based estimates of water storage changes in major US aquifers - IOPscience  
<https://iopscience.iop.org/article/10.1088/1748-9326/ac16ff>

# Article summary:

1. The study analyzed the effects of climate and irrigation on water storage changes in major US aquifers using GRACE satellite data.

2. Results showed that long-term variability in total water storage (TWS) tracked by GRACE satellites is mainly influenced by interannual variability in most of the aquifers.

3. The study found that irrigation water use and source (surface water or groundwater) played a significant role in TWS depletion, with the semi-arid southwestern Central Valley and south-central High Plains experiencing marked storage depletion due to long-term droughts and switching from surface water to groundwater irrigation.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

The article titled "Effects of climate and irrigation on GRACE-based estimates of water storage changes in major US aquifers" provides an analysis of the factors influencing total water storage (TWS) variability in 14 major aquifers in the United States. The study utilizes data from the Gravity Recovery and Climate Experiment (GRACE) satellites to assess the impact of climate variability, drought severity, and irrigation water use on TWS.

One potential bias in this article is the focus on GRACE satellite data as the primary source for assessing TWS variability. While GRACE data has revolutionized water storage monitoring, it is important to acknowledge its limitations. GRACE data provides estimates of vertically integrated TWS changes but does not provide detailed information on individual components such as snow storage, surface water storage, soil moisture storage, and groundwater storage. This limitation should be considered when interpreting the results presented in this study.

Another potential bias is the emphasis on irrigation water use as a significant driver of TWS variability. The article states that irrigation is the dominant water user globally and accounts for a large percentage of freshwater use. However, it does not thoroughly explore other factors that may contribute to TWS variability, such as natural climate variability or changes in precipitation patterns. Additionally, while irrigation can have a significant impact on TWS depletion in certain regions, it is important to consider other human interventions such as reservoir management and managed aquifer recharge.

The article also makes unsupported claims regarding the impacts of climate and irrigation on TWS variability. For example, it states that low TWS trends in humid regions are linked to low drought intensity and that extensive streamflow capture explains the lack of TWS depletion in certain aquifers. These claims are not adequately supported by evidence or analysis.

Furthermore, there are missing points of consideration in this article. It does not discuss potential risks associated with unsustainable groundwater development or address strategies for sustainable water resources management beyond conjunctive use of surface water and groundwater. The article also does not explore potential counterarguments or alternative explanations for the observed TWS variability.

In terms of reporting, the article appears to present both sides of the argument fairly and does not contain overtly promotional content. However, there is a lack of discussion on the limitations and uncertainties associated with the data and methods used in this study.

Overall, while this article provides some valuable insights into the factors influencing TWS variability in major US aquifers, it has several biases and limitations that should be considered when interpreting its findings. Further research is needed to fully understand the complex interactions between climate, irrigation, and water storage in these aquifers.

# Topics for further research:

* Strategies for sustainable water resources management beyond conjunctive use of surface water and groundwater
* Risks associated with unsustainable groundwater development
* Alternative explanations for observed total water storage (TWS) variability in major US aquifers
* Detailed information on individual components of TWS
* such as snow storage
* surface water storage
* soil moisture storage
* and groundwater storage
* Impacts of natural climate variability and changes in precipitation patterns on TWS variability
* Limitations and uncertainties associated with Gravity Recovery and Climate Experiment (GRACE) satellite data and methods used in TWS assessment.

# Report location:

<https://www.fullpicture.app/item/be85982fdc07dc43d3eb4ec78194af83>