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Oral
The GRACE and GRACE-FO missions have established a unique observational record of terrestrial water storage, enabling fundamental advances in drought science. A key foundation was the GRACE-based water storage deficit framework (Thomas et al., 2014), which provided the first objective, observation-driven quantification of drought magnitude and severity as the integrated “missing water” from the hydrological system. Subsequent research has expanded around this concept to advance understanding of drought propagation and recovery. Farahmand et al. (2021) formalized the concept of drought cascades, quantifying characteristic lags from precipitation to soil moisture to groundwater storage across major U.S. drought events. Blank et al. (2025) extended this analysis to daily satellite observations, resolving recovery times across surface, root zone, and subsurface compartments and confirming the depth-dependent damping of drought signals. Parallel studies (e.g. Singh et al., 2021) have quantified the precipitation required for drought recovery, emphasizing the role of seasonality in determining relief, while assimilation of GRACE into land surface models (Houborg et al., 2012) has provided operationally relevant drought indicators for monitoring systems. Together, these studies demonstrate the maturation of GRACE drought research—from initial deficit quantification toward a process-based understanding of onset, propagation, and recovery across the full vertical profile of the water cycle.
Presentation file
reager-jt.pdf
Meeting homepage
GRACE-FO 2025 Science Team Meeting