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Oral
Intense precipitation events, including cyclones, are projected to become more frequent and severe across many arid and semi-arid regions in the 21st century due to global warming. In these regions, groundwater serves as the primary source of freshwater. However, many aquifers in such areas are formed mainly of fossil water recharged during wetter climatic periods in the Pleistocene. Extreme precipitation events may offer rare opportunities for episodic recharge of these largely non-renewable groundwater reserves. To investigate this potential, we develop and calibrate continuous rainfall-runoff models for selected regions. Model calibration is conducted using independent estimates of groundwater recharge derived from temporal variations in terrestrial water storage observed by GRACE and GRACE-FO satellites, as well as complementary remote sensing data. The calibrated models are then driven by outputs from climate models to project the partitioning of precipitation—among runoff, evapotranspiration, and groundwater recharge—under future climate scenarios throughout the 21st century.
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