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Comparative analysis of TMPA and IMERG precipitation datasets in the arid environment of El- Qaa Plain, Sinai

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The replenishment of aquifers depends mainly on precipitation rates, which is of vital 19 importance for determining water budgets in arid and semi-arid regions. El-Qaa Plain in Sinai 20 Peninsula is such a region which experiences a constant population growth. The local water budget 21 equilibrium is negatively affected by relatively frequent light rain events. This study compares the 22 performance of two sets of satellite-based data of precipitation and in situ rainfall measurements. The 23 dates selected refer to rainfall events between 2015 and 2018. For this purpose, 0.1° and 0.25° spatial 24 resolution TMPA (TRMM Multi-satellite Precipitation Analysis) and IMERG (Integrated Multi-25 satellitE Retrievals for GPM) data were retrieved and analyzed, employing appropriate statistical 26 metrics. The best-performing data set was determined as the data source capable to most accurately 27 bridge gaps in the limited rain gauge records, embracing both frequent light-intensity rain events 28 and rarer heavy-intensity events. With light-intensity events the corresponding satellite-based data 29 sets differ the least and correlate more, while the greatest differences and weakest correlations are 30 noted for the heavy-intensity events. The satellite-based records best match those of the rain gauges 31 during light-intensity events, when compared to the heaviest ones. IMERG data exhibit a superior 32 performance than TMPA, in all rainfall intensities.