MSWEP: 3-hourly 0.1° fully global precipitation (1979–present) by merging gauge, satellite, and weather model data

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Multi-Source Weighted-Ensemble Precipitation (MSWEP) is a new fully global precipitation (P) dataset for the period 1979–2016 with a 3-hourly temporal and 0.1° spatial resolution. The dataset is unique in that it optimally merges a wide range of data sources based on gauges (GPCC, CPC Unified, and CHPclim), remote sensing (CMORPH, GSMaP-MVK, and TMPA 3B42RT), and weather models (ERA-Interim, JRA-55, and NCEP-CFSR) to provide the best possible P estimates at global scale. Since its initial release in May 2016, MSWEP has undergone some major changes, such as (i) increasing the spatial resolution from 0.25° to 0.1°, (ii) the correction of distributional P biases, (iii) the inclusion of ocean areas, (iv) the addition of NCEP-CFSR P data, (v) the addition of infrared-based P data (only for the pre-TRMM era), and (vi) the inclusion of more gauge data. The effect of these changes on the performance has been assessed at global scale in two ways, using hydrological modeling for 9011 catchments ($< 50\,000$ km^2) and using independent precipitation data from 125 FLUXNET stations. We also developed a near real-time (NRT) product, called MSWEP-NRT, which can be used to extend the retrospective MSWEP until the present. To account for latency differences among data sources and potential disruptions in data availability, MSWEP-NRT data less than seven days old are progressively upgraded to include any new data as they become available. To ensure the reliability necessary for operational use, the product is produced at two independent locations and distributed using two independent data providers. MSWEP is available via www.gloh2o.org.