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Historical analysis of large reservoir storage resilience and vulnerabilities in CONUS

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There are over 2,000 large reservoirs with a storage capacity greater than 1 million cubic meters (MCM) in the contiguous United States (CONUS). While many of these structures are documented in static datasets that include spatial locations and general characteristics (such as maximum storage capacity), there has previously been no comprehensive dataset of historical reservoir operations. To remedy this gap, we have assembled ResOpsUS, the first national dataset of historical reservoir operations. ResOpsUS contains historical time-series of storage, inflow, outflow, elevation, and evaporation data for 679 large reservoirs in CONUS. Here we use the unique ResOpsUS dataset to analyze storage trends over the last 40 years, identify potential causes of regional differences in reservoir variance and evaluate the relationship between meteorological drought and reservoir storage. Our preliminary analysis demonstrates that reservoir storage capacity in CONUS hit a limit in the early 1980s and no longer increased. Additionally, reservoir storage has decreased over the past 20 years with the magnitude of decrease greater in more arid regions. Finally, correlations between precipitation and reservoir storage depict more direct relationships in wetter climates compared to drier climates where reservoirs are a necessary water supply during dry periods and thus storage in drier years may be higher than in wetter years.