Glo3DHydroClimEventSet(v1.0) : A global‐scale event set of hydroclimatic extremes detected with the 3D DBSCAN ‐based workflow (1951–2022)

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The emergency of global‐scale hydroclimatic extremes (i.e., meteorological droughts, extreme precipitations, heat waves and cold surges) and associated compound events has recently drawn much attention. A global‐scale unified and comprehensive event set with accurate information on spatiotemporal evolutions is necessary for better mechanism understanding and reliable predictions in sequential studies. Accordingly, this manuscript describes the first‐generation global event‐based database of hydroclimatic extremes produced with the newly proposed 3D (longitude–latitude–time) DBSCAN‐based workflow of event detection. The short name of this database is $Glo3DHydroClimEventSet$(v1.0) , which is obtained from the FigsharePlus webpage (https://doi.org/10.25452/figshare.plus.23564517). The 1951–2022 ERA5‐based multiscale and multi‐threshold daily running datasets of precipitation and near‐surface air temperature are calculated and employed as the input data. A comprehensive event set of hydroclimate extremes is the output of the 3D DBSCAN‐based workflow. From perspectives of spatiotemporal evolutions, this event‐based database is also measured and attached with metric information. For case‐based validation, some recently reported hydroclimatic extremes (e.g., the 2020 summertime flood‐inducing Yangtze River extreme precipitation event) are employed and accurately detected in the $Glo3DHydroClimEventSet$(v1.0) database. Meanwhile, global‐scale spatiotemporal distributions are preliminarily analysed. For example, global‐scale event counts of extreme heatwaves displayed an increasing tendency since 2005, with a rapid increase after 2010. To sum up, this $Glo3DHydroClimEventSet$(v1.0) database may facilitate new scientific achievements concerning event‐based hydroclimatic extremes, especially in communities of atmosphere, hydrology, natural hazards and associated socioeconomics. The DOI-based linkage is https://doi.org/10.1002/joc.8289 .