**Global investigation of hydrologic risks from consecutive events of dry and wet extremes**

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**Abstract**

In hydrologic risk assessments and water resources management (e.g., dam operations operations for flood protections and drought mitigation) dry and wet extremes are often considered separately while they are the extremes of the same hydrologic cycle and can occur in close succession without leaving reasonable recovery time for critical infrastructure (e.g., dams, levees, dikes, or reservoirs). Ignoring this aspect can lead to the underestimation of hydrologic risk and challenge infrastructure resilience, as happened in Oroville dam in 2017, among others. Besides, if infrastructure is affected severely by one extreme (e.g., drought) cascading effects of the consecutive extreme (e.g., flood) can be devastating. We investigate the consecutive dry and wet (CDW) extremes at global scale using the Standardized Precipitation-Evapotranspiration Index (SPEI) and estimate their hydrologic risks. Study finds hotspots of CDW (frequency and severity) spread across North America, Europe, and Australia. We estimate that the exceedance probabilities of the occurrence of dry and wet extremes are higher when CDW events and their associated dependence are considered compared to their independent and isolated counterpart. This reveals the importance of integrating CDW with appropriate dependence structure for quantifying hydrologic infrastructure risk.