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Project Title:
Atmospheric Circulation Drives Dry-to-Wet Abrupt Alternation in the Lancang–Mekong River Basin

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"Impacts of climate change on the water-food-energy nexus in the Lancang-Mekong River Basin"

Project Office

Professor Junguo Liu's Research Team Reveals Atmospheric Drivers of Dry-to-Wet Abrupt Alternation in the Lancang–Mekong River Basin

Dry-to-wet abrupt alternation (DWAA) threatens agriculture and water security in the Lancang–Mekong River Basin, yet its atmospheric drivers remain poorly understood. Using ERA5 reanalysis and circulation clustering, this study examined DWAA during 1961–2022. Occurrence shows a declining tendency midstream but a significant increase of 17.3% per decade in the Lower Mekong. Tropical-cyclone-related circulation configurations account for 44.0% of all DWAA events. Meanwhile, configurations coupled to the Western North Pacific Subtropical High have become more frequent, highlighting its growing influence. The weakening, displacement, or reorganization of dry-phase circulation facilitates rapid moisture convergence and wet extremes. These findings provide insights for improving early warning and water management across the basin.

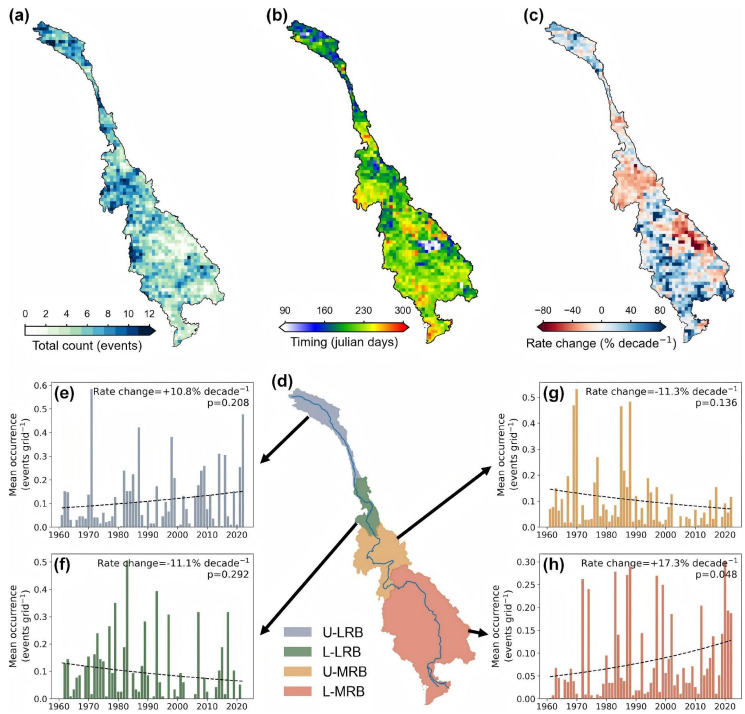


Fig. Spatiotemporal characteristics of dry-to-wet abrupt alternation in the Lancang–Mekong River Basin (1961–2022).

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