

Atmospheric moisture channels and pre-existing weather regimes for rain belt events during East Asian summer monsoon season

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Abstract

Rain belts in East Asia frequently pose threats to human societies and natural systems. Advances in a skillful forecast on heavy precipitation require a deeper understanding of the preconditioned environments and the hydrologic cycle. Here, we disentangle 15 dominant moisture channels along four corridors reaching the Somali Jet, South Asia, Bay of Bengal and Pacific basin for the warm-season rain belts. Among them, the Somali and South Asian channels were underappreciated in the literature. The results also highlight the importance of terrestrial moisture sources and the close relationship between the moisture pathways and rain belts' characteristics. Back-tracing the weather within a 2-week lead time reveals the pre-existing weather systems and circumglobal wave trains that govern the moisture channels. Findings from this work develop a better understanding of East Asian rain belts' water cycle and may offer insights into model evaluation and heavy rainfall prediction at a longer lead time.

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