



## **What weather features produce extreme precipitation globally?**

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Extreme precipitation (defined as above the 99th percentile) has been examined previously in relation to a number of different weather events. Such events include cyclones, fronts, and thunderstorms. However, previous studies have not examined various combinations of these weather events, which highlights the potential for an improved understanding of what causes extreme precipitation. Here we make use of objective cyclone and front identification methods and a global dataset of lightning strikes, to examine different combinations of cyclone, front and thunderstorm events to provide a comprehensive climatological examination of observed extreme precipitation events throughout the world. This method allows a number of novel concepts to be explored, with results showing that the highest risk of extreme precipitation occurs for a type of “triple storm” event characterised by the simultaneous occurrence of a cyclone, front and thunderstorm. The physical properties of the various different combinations of weather systems are examined in relation to the occurrence of extreme precipitation. The results presented here are intended to lead to better preparedness for the impacts of extreme precipitation throughout the world including in relation to disaster risk reduction.