



## **Structure, lifecycle and environmental conditions of Tibetan Plateau Vortices**

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The Tibetan Plateau (TP) and surrounding high mountains constitute an important forcing of the atmospheric circulation due to their height and extent, and thereby impact weather and climate in downstream regions of East Asia. Mesoscale Tibetan Plateau Vortices (TPVs) are one of the major precipitation-producing systems on the Tibetan Plateau. TPVs originate on the TP; the majority of TPVs remain on the TP throughout their lifetime, while a fraction moves east off the TP. These “moving-off” TPVs can trigger extreme precipitation and severe flooding over large parts of eastern and southern China, for example in Sichuan province and the Yangtze River valley.

Due to their potentially severe impacts downstream of the TP, it is important to understand the conditions under which TPVs can move east off the TP. In this study, we use composites of atmospheric fields to analyse the horizontal and vertical structure of “moving-off” TPVs at different stages of their lifecycle and compare it with the structure of TPVs not moving off. We examine the local (e.g. heating, moisture transport) and large-scale conditions that lead TPVs to move off in reanalysis and a high-resolution global climate model. First results suggest that the strength and position of the subtropical westerly jet influences how far TPVs can travel eastwards and therefore appears to influence the occurrence frequency and annual cycle of moving-off TPVs.

Understanding the connection between the large-scale atmospheric circulation and the behaviour and structure of the TPVs might enable us to improve forecasts of moving-off TPVs and the associated precipitation in the densely populated regions downstream of the TP.