



The role of planetary waves in weather extremes

Stefan Rahmstorf, Dim Coumou, and Vladimir Petoukhov
Potsdam Institute for Climate Impact Research

The recent decade has seen an exceptional number of high-impact weather extremes in the Northern Hemisphere mid-latitudes, such as the European heat wave 2003, the Russian heat wave and the Indus river flood in Pakistan in 2010, the heat waves in the United States and southern Europe and catastrophic floods in China and Japan in 2012, the heat wave in the United States and the severe flooding in central Europe in 2013. Many of these events were associated with anomalous jet stream circulation patterns. Recently, a novel mechanism, involving the amplification of quasi-stationary Rossby waves by resonance with thermal and orographic forcing patterns, has been proposed that could explain many of these boreal summer extremes (1).

We discuss the evidence linking planetary wave resonance to extreme weather events and present new analysis on temporal changes in the occurrence of wave resonance events.

1. Petoukhov, V., S. Rahmstorf, S. Petri, and H. J. Schellnhuber, 2013: Quasiresonant amplification of planetary waves and recent Northern Hemisphere weather extremes. *Proceedings of the National Academy of Sciences of the United States of America*, 110, 5336-5341