Geophysical Research Abstracts
Vol. 18, EGU2016-429, 2016
EGU General Assembly 2016

The waviness of the extratropical jet and daily weather extremes

Matthias Röthlisberger (1), Olivia Martius (1,2), and Stephan Pfahl (3)

(1) University of Bern, Oeschger Centre for Climate Change Research and Institute of Geography, Bern, Switzerland (matthias.roethlisberger@giub.unibe.ch), (2) Mobiliar Lab for Natural Risks, University of Bern, Switzerland, (3) Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland

In recent years the Northern Hemisphere mid-latitudes have experienced a large number of weather extremes with substantial socio-economic impact, such as the European and Russian heat waves in 2003 and 2010, severe winter floods in the United Kingdom in 2013/2014 and devastating winter storms such as Lothar (1999) and Xynthia (2010) in Central Europe. These have triggered an engaged debate within the scientific community on the role of human induced climate change in the occurrence of such extremes. A key element of this debate is the hypothesis that the waviness of the extratropical jet is linked to the occurrence of weather extremes, with a wavier jet stream favouring more extremes.

Previous work on this topic is expanded in this study by analyzing the linkage between a regional measure of jet waviness and daily temperature, precipitation and wind gust extremes. We show that indeed such a linkage exists in many regions of the world, however this waviness-extremes linkage varies spatially in strength and sign. Locally, it is strong only where the relevant weather systems, in which the extremes occur, are affected by the jet waviness. Its sign depends on how the frequency of occurrence of the relevant weather systems is correlated with the occurrence of high and low jet waviness. These results go beyond previous studies by noting that also a decrease in waviness could be associated with an enhanced number of some weather extremes, especially wind gust and precipitation extremes over western Europe.