



European high-impact weather caused by the downstream response to the extratropical transition of North Atlantic Hurricane Katia (2011)

Sandro R. Blumer (1,2) and Christian M. Grams (3)

(1) University of Bern, Physics Institute, Bern, Switzerland, (2) Oeschger Centre for Climate Change Research, Bern, Switzerland, (3) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland

Tropical cyclones undergoing extratropical transition (ET) are thought to cause high-impact weather (HIW) close to the transitioning tropical cyclone and in remote regions. However, no study so far clearly attributed European HIW to the downstream impact of North Atlantic ET. When Hurricane Katia underwent ET in September 2011, severe thunderstorms occurred downstream in Central Europe. We quantify the role of Katia in the European HIW, using numerical sensitivity experiments. Results show that Katia was crucial for the evolution of a narrow downstream trough. Large-scale forcing for ascent ahead of this trough triggered deep convection. In the absence of ET, no trough was present over Europe and no HIW occurred. This study is the first unambiguous documentation that European HIW is caused by the downstream impact of North Atlantic ET and would not occur otherwise. It likewise corroborates the crucial role of ET in altering the large-scale midlatitude flow in downstream regions.