

Record Balkan floods linked to jamming of giant airstreams

April 15 2016



Flooding in Key Haven caused by hurricane Wilma on 10/24/2005. Credit: Marc Averette/Wikipedia

Disastrous floods in the Balkans two years ago are likely linked to the temporary slowdown of giant airstreams, scientists found. These wind patterns, circling the globe in the form of huge waves between the Equator and the North Pole, normally move eastwards, but practically

stopped for several days then—at the same time, a weather system got stuck over Bosnia and Herzegovina, Serbia and Croatia that poured out record amounts of rain. The study adds evidence that so-called planetary wave resonance is a key mechanism for causing extreme weather events in summer. Further, the scientists showed that extreme rainfall events are strongly increasing in the Balkans, even more than the globally observed rise.

"We were surprised to see how long the weather system that led to the flooding stayed over the region - it's like the Vb cyclone 'Yvette' was trapped there," says Lisa Stadherr from the Potsdam Institute for Climate Impact Research (PIK), lead-author of the study to be published in *Science Advances*. "Day after day the rain was soaking the soil until it was saturated, which led to the flooding that reportedly caused several dozen casualties and 3.5 billion Euro of damages."

While the mean daily [rainfall](#) in the Balkans has increased only a little since 1950, the intensity of the strongest rainfall events rose by one third, the scientists found. In May 2014, daily rainfall amounts were locally bigger than ever before in the observed period. The frequency of such potentially devastating extremes in the Balkans, though they're still rare, doubled over the past sixty years.

"We had a similar situation in 1997 in Germany, resulting in the Elbe flooding"

"This is worrying, all the more because we're seeing increasing extreme rainfall in many parts of the globe," says co-author and PIK project head Dim Coumou. "The changes over the Balkan are substantially larger than those expected from simple warming of the air." Regional temperatures rose by one degree since the middle of the past century, and the increased water holding capacity of warmer air intensifies heavy rainfall

by about 7 percent per degree of warming. "Yet the observed rainfall changes in the Balkans are roughly five times that much—hence other factors must have come into play."

The scientists detected that the unusual trapping of the [weather system](#) over the Balkans happened at the same time when so-called planetary waves of the jetstream circulation also became trapped. "This does not prove causality, but the co-occurrence is at least suspicious—particularly since we had a similar situation for instance in 1997 in Germany with cyclone 'Zoe', resulting in the devastating Elbe flooding," says Coumou. "We provide evidence that the near stationarity of the waves was linked to a subtle phenomenon we call resonance."

A mechanism for creating extreme weather events in summer in general

This mechanism has first been put forward by PIK scientist Vladimir Petoukhov only a few years ago, opening a new branch of research; he is co-author of the present study. The scientists produced a video to explain the mechanism which might be a decisive factor for creating [extreme weather events](#) in summer in general (see weblinks below).

"Our findings provide more evidence that planetary waves cause [extreme weather](#) events," says co-author Stefan Rahmstorf, chair of PIK's research domain Earth System Analysis. "When these waves start to resonate this can have serious impacts for people on the ground. I am concerned that the ongoing climate change may be creating conditions more favorable for this kind of resonance."

More information: Coumou, D., Stadtherr, L., Petoukhov, V., Petri, S., Rahmstorf, S. (2016): Record Balkan floods of 2014 linked to planetary wave resonance. *Science Advances*, [DOI](#):

[10.1126/sciadv.1501428](https://doi.org/10.1126/sciadv.1501428)

Provided by Potsdam Institute for Climate Impact Research

Citation: Record Balkan floods linked to jamming of giant airstreams (2016, April 15) retrieved 27 April 2024 from <https://phys.org/news/2016-04-balkan-linked-giant-airstreams.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.