

Annual maximum river flow is changing across Europe, probably due to climate change

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The changing climate is already changing the frequency of river sbods across Europe. This was concluded from an analysis based on river discharge observations from 3,738 gauging stations across Europe for the period 1960-2010. The authors looked at the highest peak discharge recorded in each calendar year, and quantified trends in this annual maximum peak sbw.

Patterns across Europe

They demonstrate clear regional patterns of both increases and decreases in observed annual maximum peak sow in the past five decades in Europe. They distinguish three main regions. In northwestern Europe, about 69% of the stations show an increasing trend: annual maximum peak sow on average has increased by 2.3% per decade. In southern Europe, around 74% of the stations show a decreasing trend: annual maximum peak sow on average has decreased by 5% per decade. In eastern Europe, about 78% of the stations show a decreasing sood trend with an average decrease of 6% per decade. In northern Scandinavia and northwestern Russia, trends are less pronounced.

Signal of climate change

The authors relate these trends to the changing climate. According to them, increasing autumn and winter rainfall has resulted in increasing sbods in northwestern Europe; decreasing precipitation and increasing evaporation have led to decreasing sbods in southern Europe; and decreasing snow cover and snowmelt, resulting from warmer temperatures, have led to decreasing sbods in eastern Europe.

They stress that their results for southern Europe hold for medium and large catchments, but not necessarily for small catchments. In small catchments, local short-duration convective storms with high intensities are more relevant for *s*bod generation than the long-duration storms that produce *s*bods in medium and large catchments. These local convective storms are expected to increase in a warmer climate, which means that *s*bods in small catchments may have actually increased in southern Europe.

From annual to extreme floods

The sbod changes that have been identified are broadly consistent with climate model projections for future decades, suggesting, according to the authors, that climate-driven changes are already happening. They stress that observed trends for mean annual sbod discharge may restect changes in more extreme sbods as well, such as the 100-year sbod discharge, which is often the key design criterion in sbod risk management. Thus, the need is growing to account for climate-induced changes in sbod risk management.

Source: Blöschl et al., 2019. Nature 573: 108-111.