VIEWpoint 新观点

Urgent attention needed for shift towards increasing flash droughts over China

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Explainer

Accessible research from Climate Science for Service Partnership (CSSP) China, for decision-makers No.16

Focus

Compared to conventional droughts over seasons or years, flash droughts usually last for a few weeks but have destructive impacts on agriculture, water and ecosystems. A remarkable feature of flash droughts is the rapid intensification, making them challenging to address. A better understanding of its risks, drivers and impacts is key to taking precautions and designing mitigation strategies in the changing climate.

Importance

Flash droughts are rapidly developing drought events that are usually accompanied by heatwaves. In recent years, flash droughts have been more frequent in China, posing a great threat to food and water security. In 2013, a flash drought in the middle and lower reaches of the Yangtze River affected thousands of hectares of crops and led to severe water supply shortages in many provinces and cities (Huanqiu.com, 2020).

Compared to conventional drought events that occur at longer time scales (seasonal, annual, or even longer), flash droughts develop in only a few weeks, bringing severe damage. A better understanding of flash droughts and their underlying drivers is urgently needed to be able to issue meteorological warnings and therefore allow for preparation and precautions.

Approach

As part of the CSSP China project, Wang et al. (2016) investigated trends and drivers of flash droughts in China during 1979-2010 using observed surface air temperatures from >2,000 meteorological stations, and simulated soil moisture and evapotranspiration products from global models. The result indicated the observed flash droughts in China more than doubled from 1979 to 2010 and most of them occurred over humid and semi-humid regions (i.e., southern and north-eastern China). The increasing trend mainly resulted from temperature rise (50.1%). Furthermore, Yuan et al. (2019) developed a new method to identify flash drought events and assess the causes and trend quantitatively, taking into account both rapid intensification and its profound impact.

Based on this new method, it is projected the risk of flash droughts will increase by around 40% in some southern wet provinces in China. Anthropogenic climate change accounts for 77% of the increasing frequency while the growing population will also enhance the exposure risk.

Next steps

It is expected that human-induced warming will exacerbate future flash drought conditions in China and the drought-prone regions will expand as the flash drought risk intensifies (Wang et al. 2016; Yuan et al. 2019). This shift will be prominent in a warming climate in the next few decades and will have more severe impacts on agriculture, water, and ecosystems.

Unlike conventional drought events, flash droughts mostly take place in humid and semi-humid regions in China, with high population exposure, where people are less vigilant and under-prepared. This new phenomenon requires more urgent attention to manage the risk while development of early warning system is in need for mitigation and solutions.

References

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