VIEWpoint 新观点

How will extreme cold events change over Southeast China?

Nanjing city after snow Image: Kenneth Yang, Unsplash

Explainer

Accessible research from Climate Science for Service Partnership (CSSP) China, for decision-makers No.17

Focus

Extreme cold events have significant socioeconomic impacts on transport, energy, agriculture and human health over the heavily populated region of Southeast China, while their causes remain uncertain. Exploring the causes, by investigating their past characteristics and the prediction of their future evolution, will inform adaption strategies.

Importance

Having caused great socioeconomic losses, extreme cold events have drawn more attention in recent years and with greater population exposure, Southeast China is particularly vulnerable. During 21-25 January, 2016, a record-breaking cold event swept most areas of China, with the snowline reaching Guangzhou and the Pearl River Delta in Southeast China for the first time since 1951; a record low temperature since 1960 caused widespread transport disruption, power outages, agricultural losses and impacts on people with increased hospital admission related to respiratory issues (CMA, 2017).

While it is certain that anthropogenic global warming has driven increasing extreme heatwaves, it is still controversial whether cold events are related to the warming climate and how they are expected to change in the future. Given their devasting socioeconomic impact and large uncertainties, it has become more important than ever to understand the trend and the drivers of extreme cold events for climate change adaptation strategies.

Approach

As part of the CSSP China project, scientists investigated the historical trend and causes of the extreme cold events over Southeast China in the past six decades by using observations and model simulations (Freychet et al., 2021). A decreasing trend is observed in that period although the year-to-year variability remains large, and the increasing average winter temperatures under climate change is found to be the main driver.

Furthermore, the long-term trend of extreme cold events in the region is projected to strongly reduce under medium-emission scenarios by the end of 21st century, due to the overriding greenhouse gas warming effect along with a weakening impact of aerosols (Freychet et al., 2021) thanks to air pollution control policies (Zheng et al., 2018).

Next steps

Although cold events are expected to become less frequent and weaker in warmer winters over Southeast China in most studies (Freychet et al., 2021; Qian. et al., 2018; Sun. et al., 2018), they could still occur occasionally due to unchanged large scale weather patterns associated with them, e.g., Arctic Oscillation. Also, it is still worth investigating the driving mechanism of the changes as some studies indicate otherwise (Kug et al., 2015). Meanwhile, people in Southeast China usually experience mild winter temperatures and so are not well prepared for such extreme cold events.

References

CMA. (2017) China Climate Bulletin 2016. China Meteorological Administration.
Freychet, N. et al. (2021) https://doi.org/10.1029/2020JD033447
Kug, JS. et al. (2015). https://doi.org/10.1038/ngeo251
Qian, C. et al. (2018) https://doi.org/10.1175/BAMS-D-17-0095.1
Sun, Y. et al. (2018) https://doi.org/10.1175/BAMS-D-17-0092.1
Zheng, B. et al (2018)https://doi.org/10.5194/acp-18-14095-2018

www.viewpoint-cssp.org

VIEWpoint 新观点

Produced by VIEWpoint, a CSSP China project from the Institute for Environmental Analytics, highlighting research and improving the uptake of climate services developed in the partnership, through accessible resources.

Institute for Environmental Analytics

SUSTAINABLE DEVELOPMENT GOALS