Day-to-day temperature variability reduces economic growth

Maximilian Kotz, Leonie Wenz, Annika Stechemesser, Matthias Kalkuhl, Anders Levermann

Economic assessments of climate change need an empirical basis for damages...

\[
\text{Social cost of carbon} = \sum_{t=0}^{\infty} \frac{\delta \text{Damage}}{\delta \text{Temp}_t} \frac{\delta \text{Temp}_t}{\delta \text{CO}_2_t}
\]

…to provide a more comprehensive analysis of the social cost of carbon.

We combine...

- Sub-national economic output, for:
  - 1,537 sub-national regions,
  - across 77 countries and
  - 40 years

High resolution historical climate data.

Approach

\[
\text{Change in growth rates per extra degree of day-to-day temperature variability (\%-points)}
\]