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Climate damages and adaptation potential across diverse sectors of the United States

- Jeremy Martinich &
- Allison Crimmins

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Abstract

There is a growing capability to project the impacts and economic effects of climate change across multiple sectors. This information is needed to inform decisions regarding the diversity and magnitude of future climate impacts and explore how mitigation and adaptation actions might affect these risks. Here, we summarize results from sectoral impact models applied within a consistent modelling framework to project how climate change will affect 22 impact sectors of the United States, including effects on human health, infrastructure and agriculture. The results show complex patterns of projected changes across the country, with damages in some sectors (for example, labour, extreme temperature mortality and coastal property) estimated to range in the hundreds of billions of US dollars annually by the end of the century under high emissions. Inclusion of a large number of sectors shows that there are no regions that escape some mix of adverse impacts. Lower emissions, and adaptation in relevant sectors, would result in substantial economic benefits.

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Abstract

There is a growing capability to project the impacts and economic effects of climate change across multiple sectors. This information is needed to inform decisions regarding the diversity and magnitude of future climate impacts and explore how mitigation and adaptation actions might affect these risks. Here, we summarize results from sectoral impact models applied within a consistent modelling framework to project how climate change will affect 22 impact sectors of the United States, including effects on human health, infrastructure and agriculture. The results show complex patterns of projected changes across the country, with damages in some sectors (for example, labour, extreme temperature mortality and coastal property) estimated to range in the hundreds of billions of US dollars annually by the end of the century under high emissions. Inclusion of a large number of sectors shows that there are no regions that escape some mix of adverse impacts. Lower emissions, and adaptation in relevant sectors, would result in substantial economic benefits.

Data availability

Scenario and projection data used in this project are publicly available at http://loca.ucsd.edu/, https://www.snap.uaf.edu/ and https://tidesandcurrents.n oaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf. Metadata, figures and results have been posted to the Global Change Information System (https://data.globalchange.gov/), and technical documentation for the project is available on the Environmental Protection Agency's Science Inventory (https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=335095). Sectoral impact data from the CIRA2.0 modelling project have been posted (https://www.indecon.com/projects/benefits-of-global-action-on-climate-change/). Remaining data and results of this paper are available through the corresponding author on request.

Additional information

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Contributions

J.M. and A.C. developed and coordinated the study, compiled data for this paper, designed figures and tables, and wrote the manuscript.

Competing interests

The authors declare no competing interests.

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