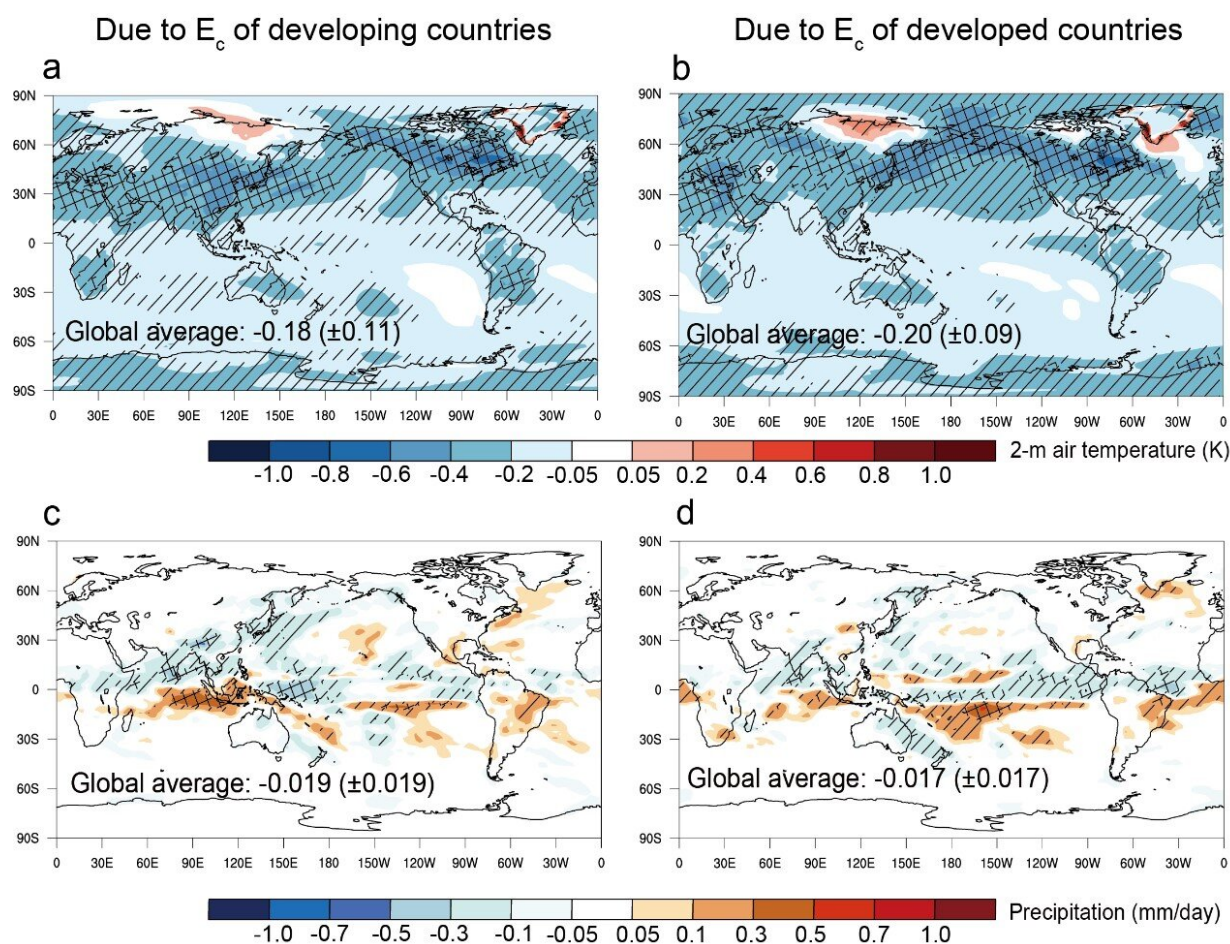


Consumption-related sulfate in countries with different incomes exerts similar climate impact

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Global temperature response (top) and precipitation response (bottom) to sulfur dioxide emissions associated with consumption in developing (left) and developed countries (right). Credit: Lin et al.

Aerosols are produced in large quantities during human activity and have a short life cycle. As a result, the significant pollution and climate effects of aerosol emissions are largely determined by where they occur.

Increasingly developed [international trade](#) has led to a separation between where products are produced and where they are consumed, leading to a large difference in pollution emissions associated with production and consumption in a region.

A collaborative research team led by Peking University and the Chinese Academy of Sciences (CAS) has quantified the impacts of consumption-related sulfate aerosols by developed and developing countries on global temperature and precipitation.

According to the team, although sulfur emissions associated with consumption activity in developed countries in 2014 were only 60% of those in developing countries, emissions from the two source regions had very similar effects on global mean near-surface air temperature and precipitation (about -0.2 degrees Celsius and -0.02 mm/day).

Their findings were published in *Nature Geoscience* on Feb. 17.

"This is because the [climate system](#) is sensitive to forcing from both the magnitude and spatial pattern of aerosols," said first author Lin Jintai of Peking University.

Consumption-related sulfate by developing countries is concentrated at low and mid-latitudes in Asia, while consumption-related sulfate by developed countries is more evenly distributed zonally in the Northern Hemisphere and at higher latitudes overall. The effective radiative forcing and climate effects per unit of consumption-related sulfur emissions are stronger for developed countries.

Professor Lin noted that studies on the extent of climate impacts by different regions "differ markedly" depending on whether a consumption perspective or a traditional production perspective is being used.

"Most of the past studies have focused on the aerosol climate effects caused by production activities, but in fact, consumption activities are just as important as production activities, and their impact remains unclear," said co-corresponding author Huang Gang from the Institute of Atmospheric Physics (IAP) of CAS.

Clarifying consumption-related emissions and their [climate effects](#) is therefore an important means of understanding the causes of climate change, promoting [climate](#) equity, and developing [effective strategy](#) for Climate Action and Responsible Consumption and Production, two of the UN's Sustainable Development Goals.

More information: Jintai Lin, Sulfur emissions from consumption by developed and developing countries produce comparable climate impacts, *Nature Geoscience* (2022). [DOI: 10.1038/s41561-022-00898-2](https://doi.org/10.1038/s41561-022-00898-2). www.nature.com/articles/s41561-022-00898-2

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