

Research Highlight

“Health effects of carbonaceous PM_{2.5} compounds from residential fuel combustion and road transport in Europe”

Summary

Exposure to fine particulate matter (PM_{2.5}) is associated with an increased risk of morbidity and mortality. In Europe, residential fuel combustion and road transport emissions contribute significantly to PM_{2.5}. Here, we study the contribution of the emissions from these sectors to long-term exposure and excess mortality in Europe. We quantified the impact of anthropogenic carbonaceous aerosols on excess mortality and performed a sensitivity analysis assuming that they are twice as toxic as inorganic particles. We find that total PM_{2.5} from residential combustion leads to 72,000 (95% confidence interval: 48,000–99,000) excess deaths per year, with about 40% attributed to carbonaceous aerosols. Similarly, road transport leads to about 35,000 (CI: 23,000–47,000) excess deaths per year, with 6,000 (CI: 4,000–9,000) due to carbonaceous particles. Assuming that carbonaceous aerosols are twice as toxic as other PM_{2.5} components, they contribute 80% and 37%, respectively, to residential fuel combustion and road transport-related deaths.

Impact

We uncover robust national variations in the contribution of each sector to excess mortality and emphasize the importance of country-specific emission reduction policies based on national characteristics and sectoral shares.

Our analysis suggests that the health benefit of the proposed emission reduction scenarios can be larger, given the higher contribution of carbonaceous aerosols to excess mortality due to their specific toxicity.

Author's bio

Niki Paisi is a PhD student at the Environmental Predictions Department of the Cyprus Institute's Climate and Atmosphere Research Center (CARE-C), where she is working on air quality modeling and the assessment of air pollution health impacts. Her research focuses on fine particulate matter and carbonaceous aerosols and their toxicity.



Reference

Paisi N., Kushta J., Pozzer A., Violaris A., Lelieveld J. Health effects of carbonaceous PM_{2.5} compounds from residential fuel combustion and road transport in Europe. Scientific Reports (2024). DOI: <https://doi.org/10.1038/s41598-024-51916-9>

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