Towards implementing particle chemical composition in health impact assessments

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Atmospheric particulate matter is responsible for seven million premature deaths annually and incurs 5% of the global GDP. In 2021, the World Health Organization (WHO) updated their regulations, imposing a stringent limit of 5 µg m-3 for PM concentration. However, this limit is rarely met, and more than 97% of the global population lives above these limits. Current WHO regulations oversimplify PM as a uniform entity based solely on total mass concentrations, despite its complex composition and variable toxicity. Identifying the most harmful PM component has remained the Holy Grail of air quality research. With the availability of detailed atmospheric data, there is an opportunity to shift our focus towards understanding the specific health effects of individual PM components. Our research aims to determine concentration maps for individual PM components at resolutions as fine as 100m for the entire European domain, which is crucial for establishing the health impacts of PM components.