

Applying Atmospheric Chemistry to Bridge Knowledge Gaps in Sustainability



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[Zoom Link](#) (Mixed-mode)

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Climate and global environmental change are among the biggest threats to human society in the 21st century. As we explore new ways to reduce greenhouse gas emissions, we also have to be aware of the climate and air quality nuances that cannot be captured by simply measuring the resulting changes in greenhouse gas emissions. I will illustrate how atmospheric chemistry, biogeochemistry and machine learning models can bridge such knowledge gaps, thus help us evaluate and choose sustainability solutions wisely through 3 examples: 1) evaluating the climate and air quality impacts of alternative fuels, where we find how technology and policy choices leads to huge range in air quality impacts (-66,500 to +668,100 global annual premature deaths) when the shipping sector transitions from using fossil fuels to ammonia as energy source; 2) democratizing air quality modelling by building an accurate machine learning emulator that only takes <10 CPU seconds to run, compared to the thousands CPU hours required by the parent model; 3) probing temperature sensitivity of pollutant emissions, and associated impacts on air quality.



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