Understanding the impacts of wildfires on air pollution

Laboratory:

Swiss Data Science Center

Type:

Semester Project

Description:

By increasing the severity of droughts and the dryness of the vegetated areas, climate change is expected to significantly increase wildfire risk in several parts of the globe throughout the next few years. One of the most underestimated effects of wildfire is their contribution to air pollution - especially with respect to the smaller particles that can lodge in the lungs and cause major health issues. Still, understanding the impacts of wildfires on air quality decrease and pollution is crucial to maximise health system responses and mitigate any future negative health impact.

This project aims at estimating the changes in the seasonal pattern of wildfire-induced air pollution generated by the changing climate. To this aim, students will replicate and adapt the methodology proposed in Buchholz et al. (Nature Communication, 2022) to study the local and transported contributions to air pollution in continental Europe.

Goals/benefits:

- Working with different real-world data sources, including satellite datasets, nonlinear time-series, geographical data
- Possibility to publish a research paper

Prerequisites:

- Applied statistics (advanced or intermediate skills)
- Advanced coding skills
- Interested in interdisciplinary applications, with specific focus on environmental sciences

Deliverables:

- Well-documented code
- Written report and oral presentation

References:

[1] Buchholz, Rebecca R., et al. "New seasonal pattern of pollution emerges from changing North American wildfires." Nature communications 13.1 (2022): 1-9.
[2] Liu, Xiaoxi, et al. "Airborne measurements of western US wildfire emissions: Comparison with prescribed burning and air quality implications." Journal of Geophysical Research: Atmospheres 122.11 (2017): 6108-6129.

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