Untangling spatial confounding in environmental data

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Abstract:

Studies of climate and environmental phenomena often involve data collected across geographical regions: crop yields across a field, pollution across a city or defoliation across a forest. Statistical models for such data are typically complex, but computational advances over recent decades have made them easier to fit using readily available software. When these models are used to understand relationships between variables, however, open questions remain. One problem that has received considerable attention in recent years is spatial confounding, where unmeasured or unknown geographical factors can lead to seriously biased estimates of these relationships. Understanding this problem is essential for reliably identifying the drivers of environmental behaviour and change. Do traffic restrictions reduce air pollution? Do temperature extremes affect crop yields or forest health? I will give an accessible introduction to spatial confounding, discuss what can go wrong and why, and outline some recent ideas for addressing it.