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Causal methods for climate extremes

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The talk discusses a critical topic in climate science: understanding how interventions on our climate system influence the likelihood of extreme events. The focus is on methodologies that enable causal attribution of such events to specific drivers, rather than merely predicting their occurrence. We discuss common practices and highlight the use of recent statistical methods that are applicable when only observational data is available, as opposed to model-based data. The talk defines the concept of a causal effect of a treatment (such as changes in flood infrastructure or increased CO₂ emissions) on extreme outcomes (like a one in 100 year flood). We also cover the estimation of these effects amidst confounding factors and the assessment of associated uncertainties. Finally, we discuss the inherent challenges of applying causal inference to extreme climate events.