Spatiotemporal Modeling of Extreme Events

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Motivation

- Average behavior is important to understand, but it does not paint the whole picture.
  - e.g. When constructing river levees, engineers need to be able to estimate a 100-year or 1000-year flood levels.
- In geostatistical analysis, kriging uses spatial correlation to help inform prediction at unknown locations.
- Want to explore ways to incorporate this spatial correlation when estimating the tails of the distribution.

Introduction to extremes

- Two common methods for extremes:
  1. Block maxima
     - Only use maxima of independent blocks (e.g. yearly maxima)
     - Lose information by throwing away non-maxima
  2. Peaks over threshold
     - Use all observations over a threshold
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