

# Spatiotemporal Modeling of Extreme Events

**Brian Reich and Samuel Morris**

North Carolina State University

August 7, 2014

# 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
    - ▶