

Case Studies for Hurricane Risk

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Benefits of a Case Study

- Test methods \rightarrow Different solutions for full-scale
- Focus pieces of project → Consistent assumptions
- Ensure links among pieces
- Confirm required inputs; Illustrate outputs
- Ground models in reality
- Facilitates work with practitioners
- Tell story of contribution \rightarrow Translation to practice

Downsides: Data is messy, generalizability? 2



Ex. 1. Long-term Mitigation, Insurance, Buyout Policy Analysis





Ex. 1. Case Study

- Hurricane
 - Wind
 - Coastal flooding
- 932,000 single-family wood-frame homes
- Physical retrofit strategies
- Multiple excess of loss cat. insurers













Hazard Input

All historical or synthetic events



Reduced set of events with adjusted annual frequencies



97 probabilistic hurricane scenarios, each with:

- Annual occurrence probability
- Wind map
- Coastal flooding map



Building Inventory Input

Num. SFDs by Census tract (portion) *i*, Building type *m*, Building resistance type *c*



- Inventory
 - Structural details based on codes, common practice, age distribution
 - New data sources...Zillow, Microsoft
- Damage model
- Retrofit represented as change from *c* to *c*'
- Survey-based homeowner decision models based on same retrofit choices



Ex. 2. Short-term Evacuation Decision Support





Population, Infrastructure Input

- Evacuation zones
- Road network, shelters, exits
- Population





100 km

coastal area

inland zip codes



Hazard Input

- Hurricane ensembles
 - Wind
 - Coastal, inland flooding
- WRF-CREST-ADCIRC links
- Isabel, Matthew, Florence







Study Area Choice

Pluses

- Region at risk
- Recent experience →
 Data, interest
- Practitioner partners
- Variability
- Size
- Path dependence!

Minuses

- Evacuation
 - No dense population at coast
 - Little public transit at coast
- Risk mgmt policy
 - No multi-family
- Big events in Florida, Houston, Caribbean
- Generalizability?



Test Beds for SimCenter

Potential Benefits

- Efficiency in data collection and maintenance
- Lower barriers to entry for some analyses
- Allows direct comparison among alternate methods

Challenges

- Different studies often differ in input required operationalization, format
- If possible, allow users to pick and choose, build over time





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