Methods for Estimating Joint Probabilities of Coincident and Correlated Flooding Mechanisms for Nuclear Power Plant Flood Hazard Assessments

4th Annual NRC Probabilistic Flood Hazard Assessment (PFHA) Research Workshop
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Project Overview

Project Context

- NRC Probabilistic Flood Hazard Assessment (PFHA) Research Program will aid development of guidance on use of probabilistic approaches to assess flood hazards
- Guidance must address occurrence of flooding due to a single mechanism as well as **flooding due to the occurrence of multiple mechanisms**

Project Objective

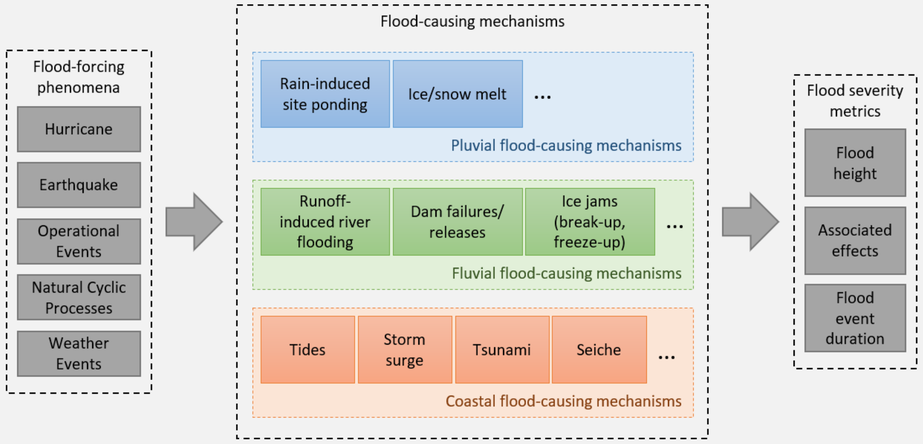
Develop technical basis for guidance on developing flood hazard curves for multi-mechanism floods (MMFs)

Project Tasks

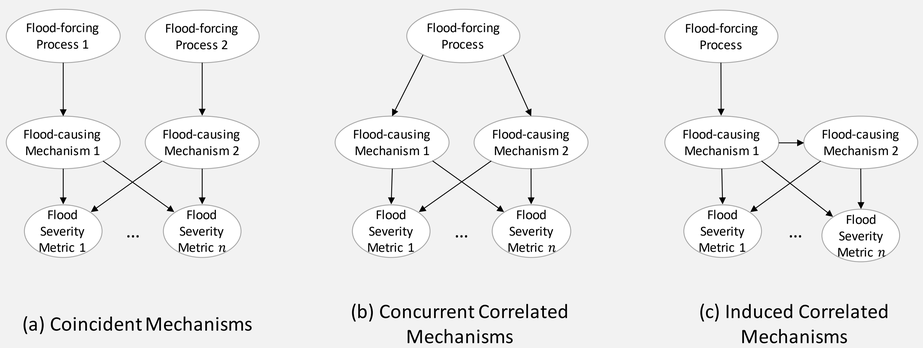
Task	Task Description	Status
1	Survey of current concepts and methods in MMF hazards	Draft report complete
2	Critical assessment of selected methods and approaches for probabilistic quantification of MMF hazards	In Progress
3	Develop example cases to illustrate best practices for probabilistic quantification of MMF hazards	

Primary Task 1 Outcomes

1. Structure & Terminology for Addressing MMFs

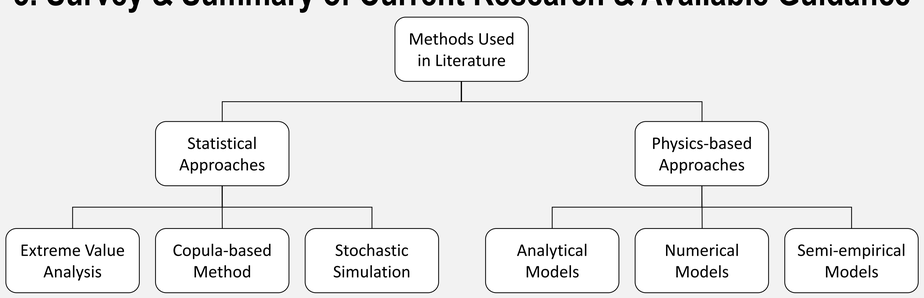


2. Multi-Mechanism Flood Hazard Framework and Summary of Available Methods



(a) Coincident Mechanisms | (b) Concurrent Correlated Mechanisms | (c) Induced Correlated Mechanisms

3. Survey & Summary of Current Research & Available Guidance



Note: This diagram classifies the primary methods found in current research & available guidance. Methods may not be mutually exclusive.

Primary Topics Addressed in Literature

- General compound event frameworks
- Coastal flooding
  - Tsunami and tidal processes
  - Interaction of stillwater and wave effects/characteristics
- Fluvial flooding
  - Precipitation and snow melt
  - Flooding at river confluences
  - Multiple flood severity metrics for riverine flooding
- Coastal and fluvial flooding
  - Surge and river discharge (precipitation-runoff)
- Coastal and pluvial flooding
  - Storm surge and precipitation
  - Characteristics of tropical cyclone rainfall

Project Team

NRC Leads:
Meredith Carr
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