Emerging applications with CoSMoS

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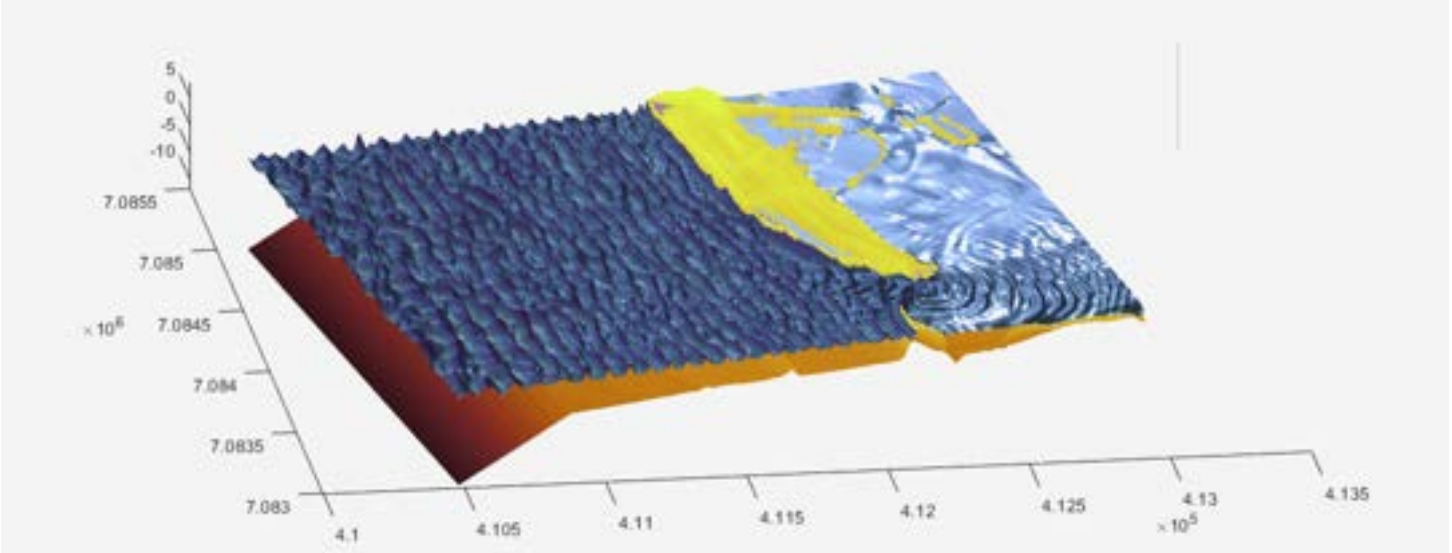
Coastal Conditions Symposium| May 12, 2026

2D XBeach for detailed hazards in complex areas

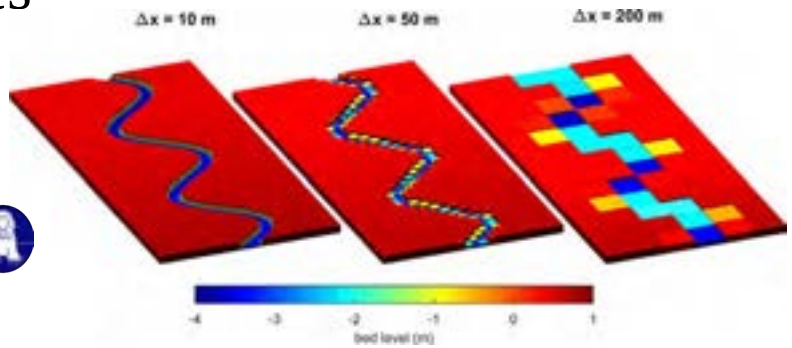
- Surfbeat and NH
- Better capture erosion and resulting impacts
- Flood depth/water elevation and velocity-depth hazards
  - Critical information to at-risk communities
- High computational cost



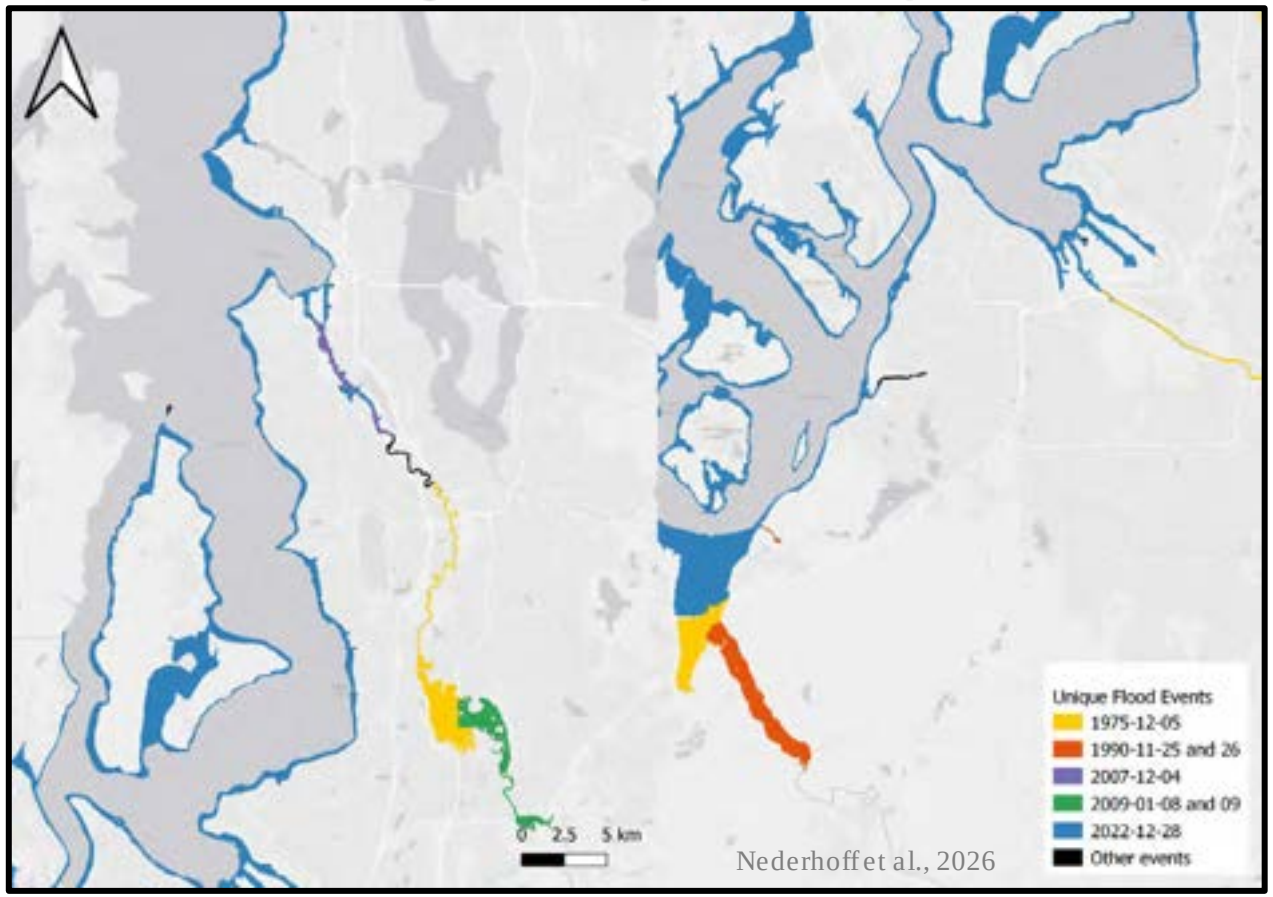
Response-based flood modeling

- Reduced-physics model designed to efficiently compute coastal compound flooding over long periods
- From a long timeseries, calculate specific RP events at each spatial point based on the "response" to forcing.
  - Better characterization of extremes
  - Avoids having to select design-events

SFINCS



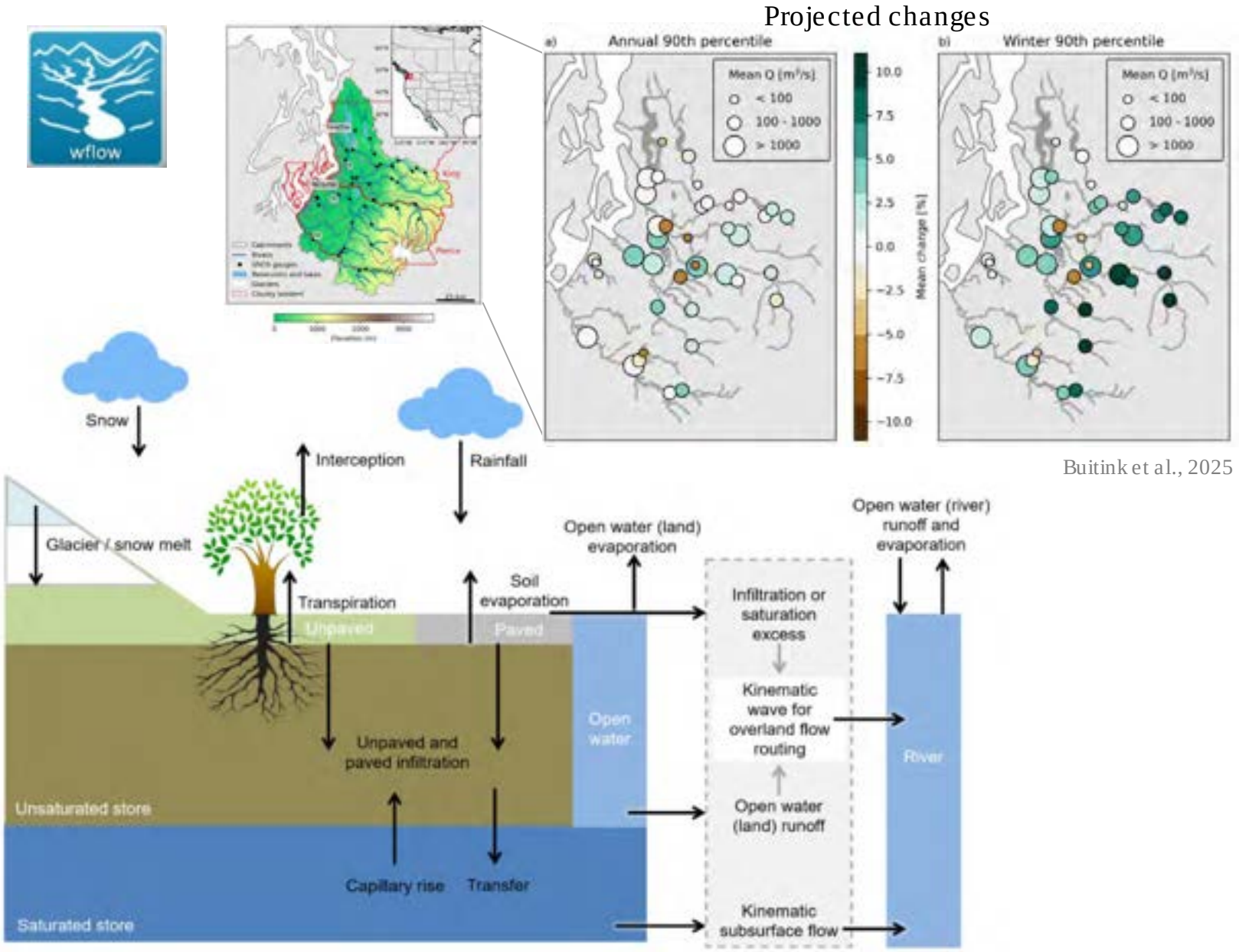
Events Causing the 100-year return period hazard



Nederhoff et al., 2026

WFLOW for inclusion of discharge

- Balance between resolution and complexity for fast simulations
- Quantified hydrological change in all major river basins
- Uniform workflows to provide timeseries inputs for compound flood modeling

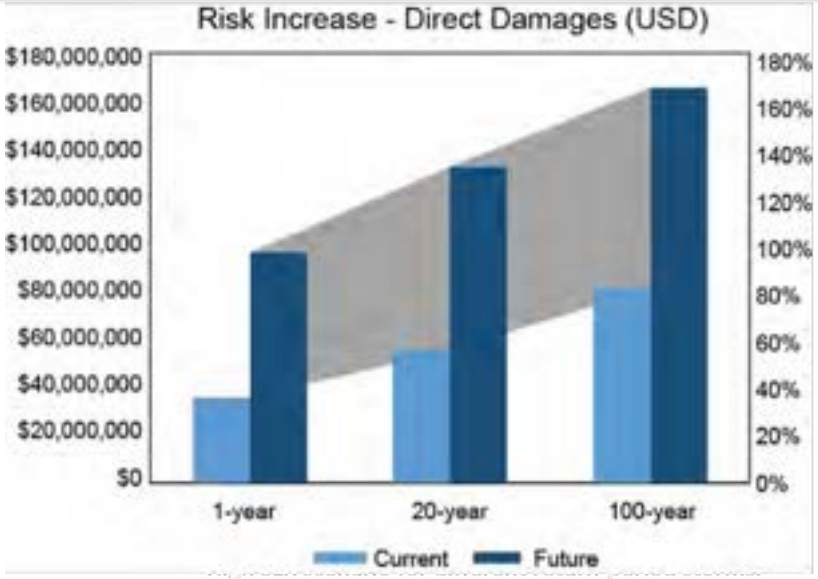


Quantifying risk-reduction benefits and tradeoffs

- Framing results and developing models to address risk and better support risk mitigation and reduction
  - Annualized damages
  - Research and collaboration with partners on accurately incorporating risk re into model developn

for example:

CoSMoS-Adapt partnership



Risk-based integration across different return-period