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Geotechnical Engineering

Title

Sea Level Rise effects on Earthquake-induced Soil Liquefaction at NHERI Computational Conference

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NHERI



NSF Natural Hazards Engineering Research Infrastructure

**20
25**

NHERI Computational Symposium

February 5-7

Los Angeles, California

Sea Level Rise effects on Earthquake-induced Soil Liquefaction

NHERI resources used:

DesignSafe and TACC Clusters (for
groundwater modeling and future work)

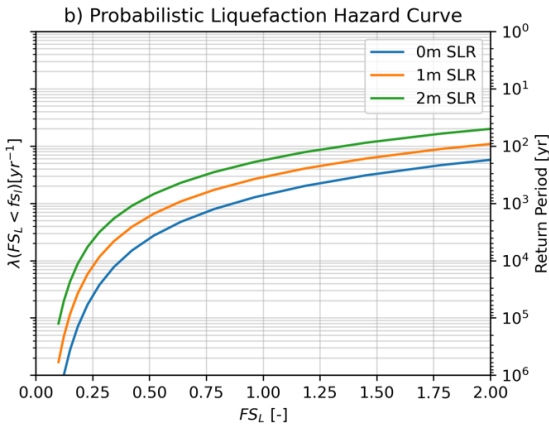
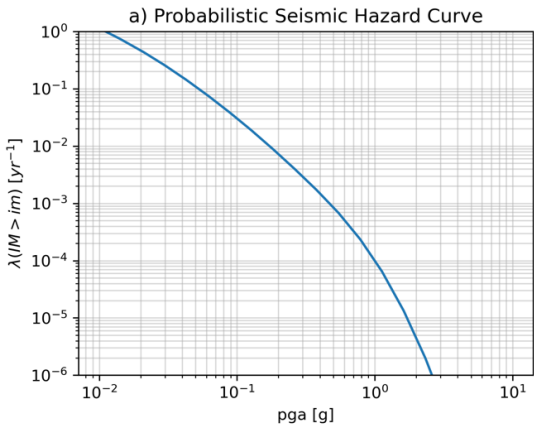
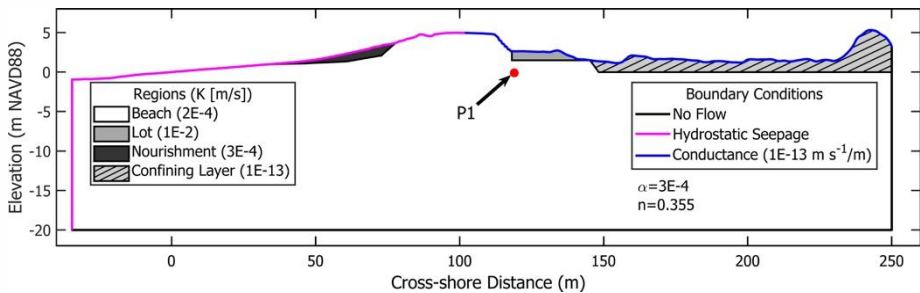
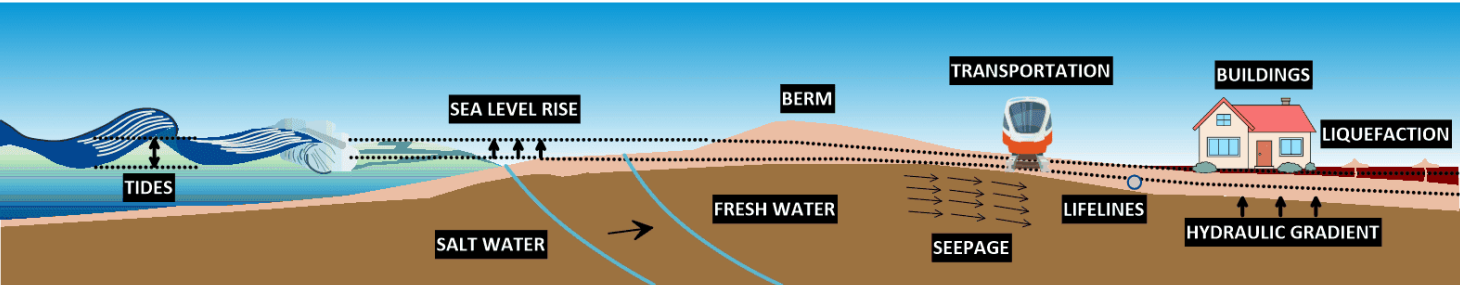
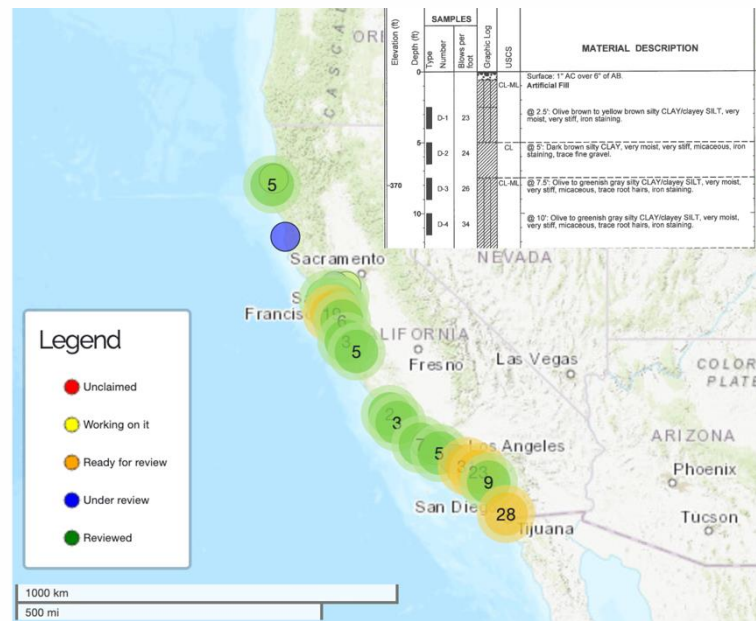
Meera Kota

University of California, Los Angeles

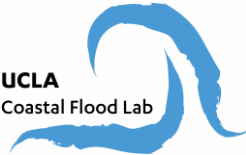
Scott Brandenburg, Margit Maple, and Timu Gallien

University of California, Los Angeles

Project Overview

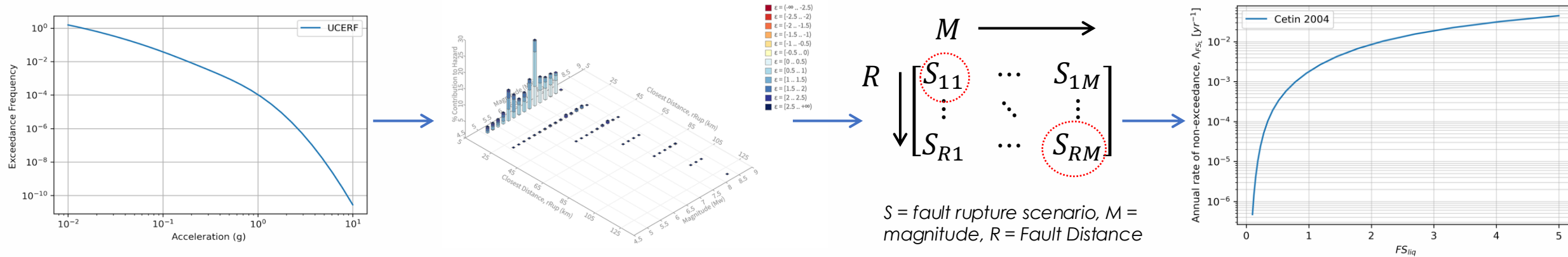


Collaborators

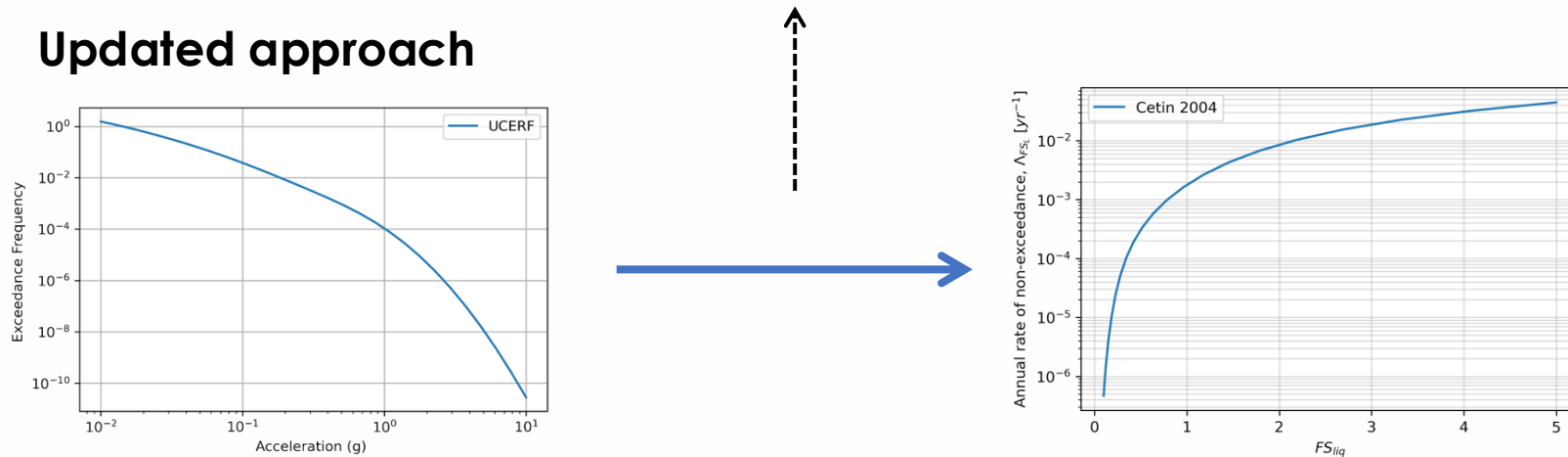


PLHA approaches

Traditional approach (Kramer and Mayfield 2007, Makdisi)



Updated approach



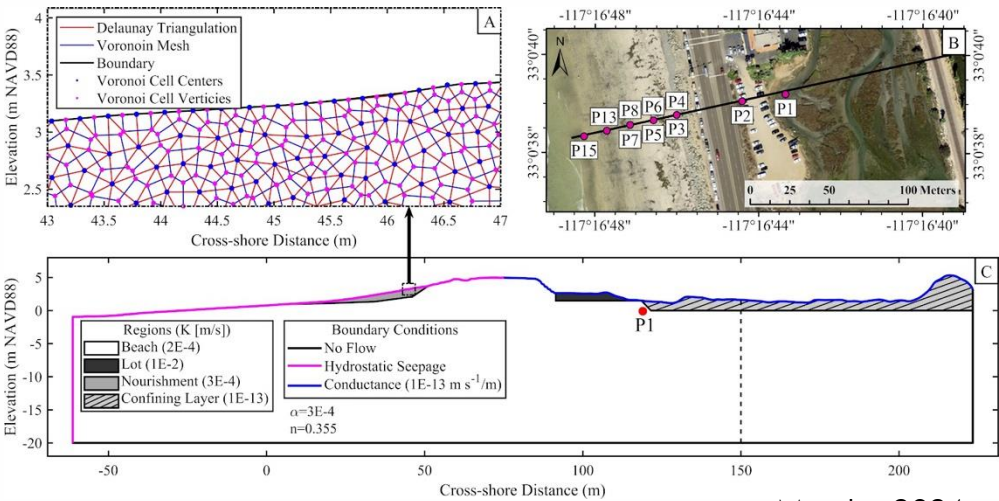
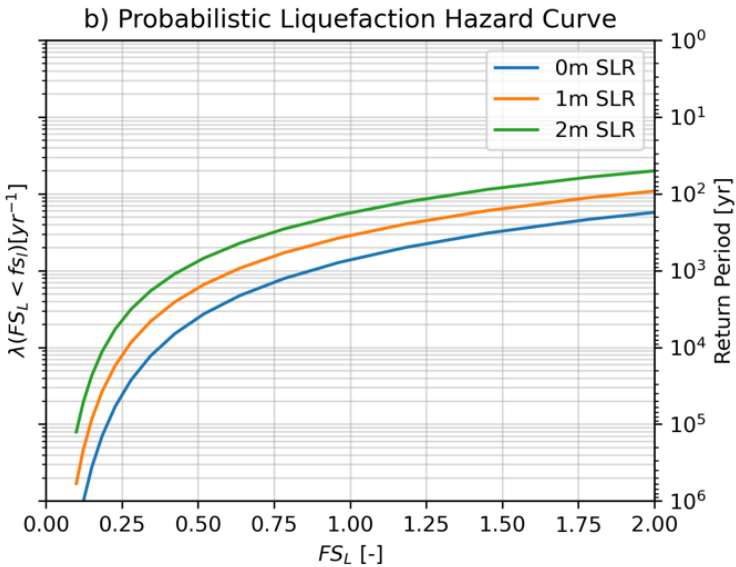
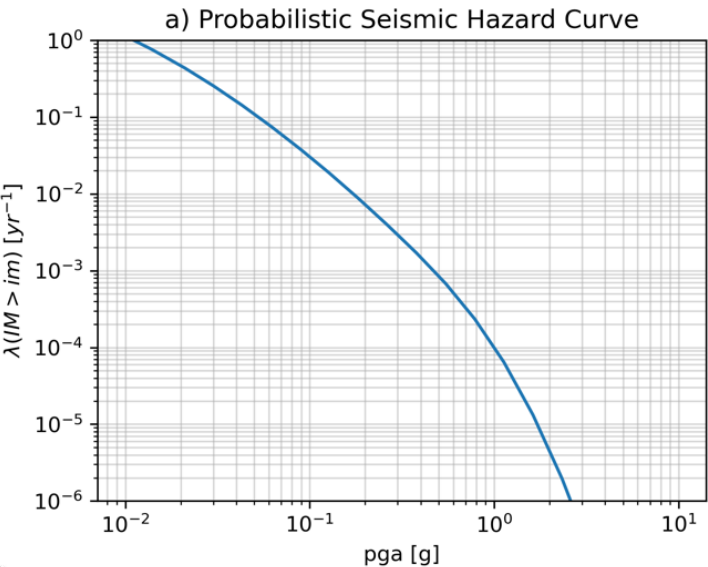
Traditional :

- *Judgement* required and does not consider all scenarios

Updated:

- Efficient and no disaggregation required
- PLHA integrated *directly* with PSHA
- Can disaggregate liquefaction hazard *itself*

Results



Sea Level Rise (meters)	Λ for $FS_L = 1$ (yr^{-1})	Return Period (years)
0	0.0014	714
1	0.0029	345
2	0.0057	175

Maple, 2024

Future work

- To effectively and efficiently run many sites (and ground motion/liquefaction models)
 - Parallelize the code for use with HPC clusters (e.g., Frontera @ TACC)
 - Create an app within DesignSafe for people to use (via a Docker image or a GUI)
- Integrate through Sim center R2D (Regional Resilience Determination) package to help individuals perform probabilistic liquefaction assessment and better understand its uncertainties
- *Funding for this project was provided by the UC Climate Action Seed Grant under Grant #R02CP7031*