



USE OF USGS NATIONAL SEISMIC HAZARD MODEL (NSHM) IN CATASTROPHE MODELING: RMS PERSPECTIVE

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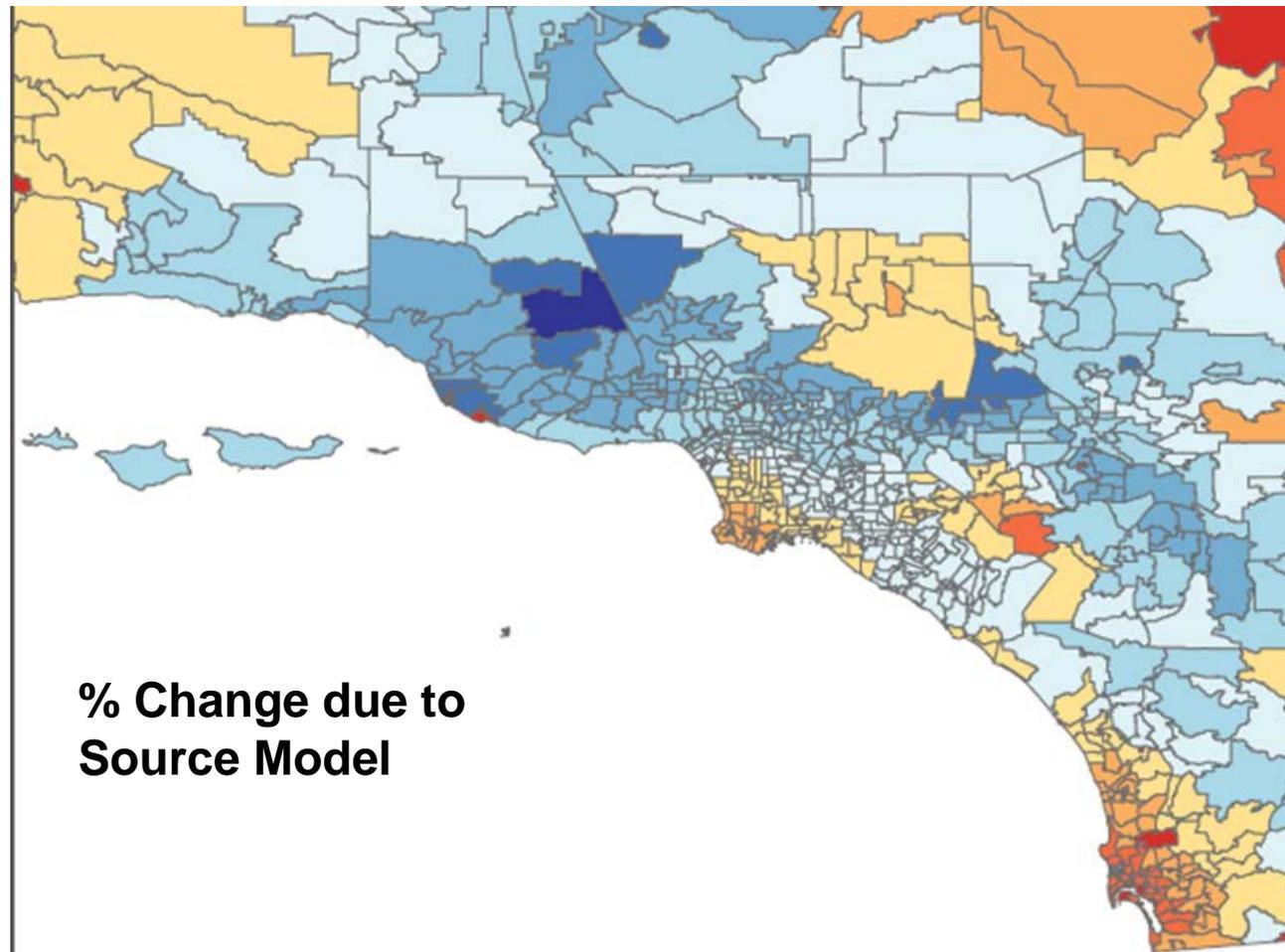
INTRODUCTION

- RMS uses USGS NSHM model for seismic risk assessment of insurance portfolios
 - Don't use the hazard results directly.
 - Use the source model (input data)
- USGS model is the industry benchmark
- Additionally consider geotechnical updates and vulnerability updates

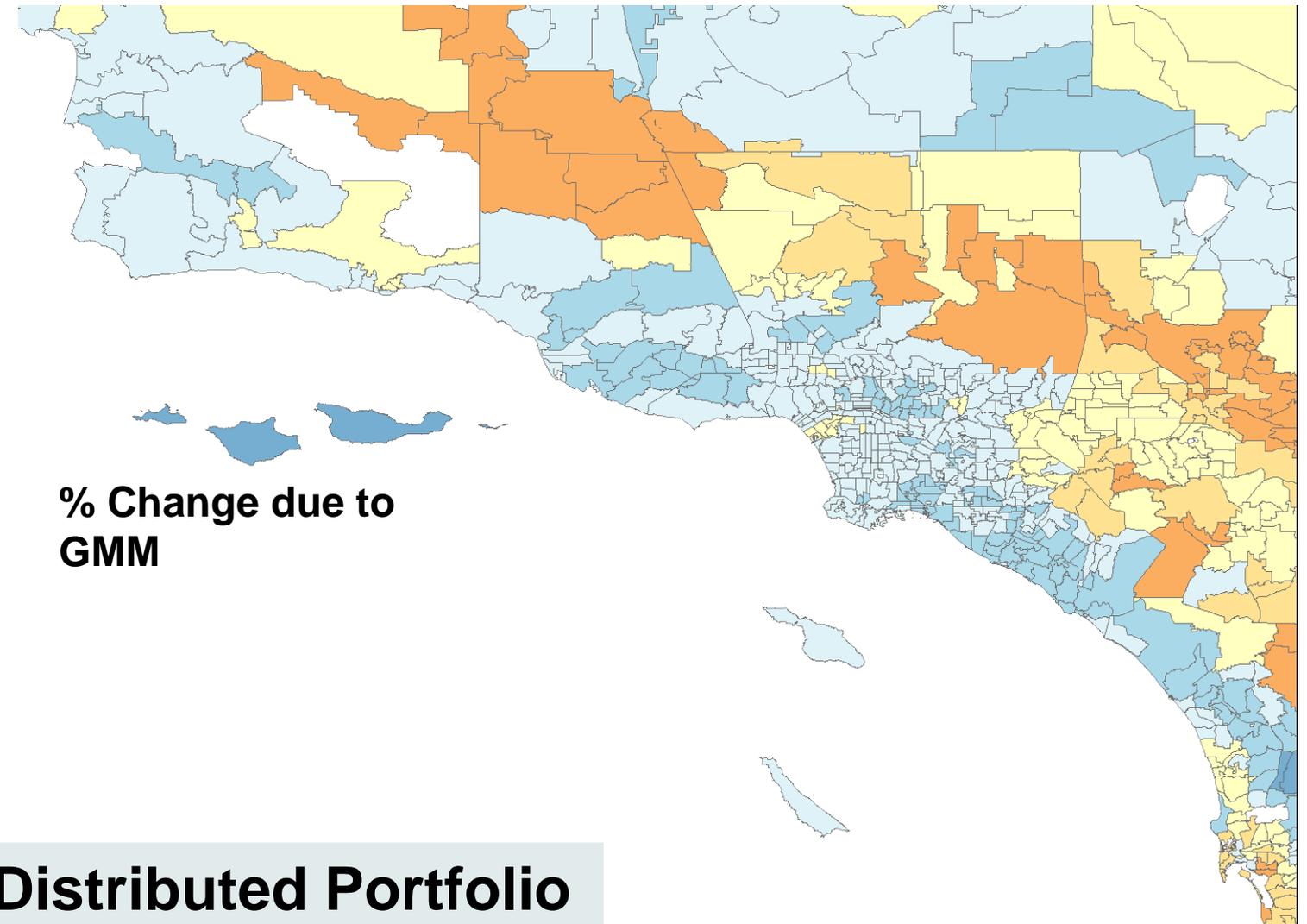
OUTLINE

- Model evaluation
- Model adjustment
- Time-dependent model
- Faster adoption of USGS update
- Uncertainty in hazard results

MODEL EVALUATION: UCERF3



% Change due to Source Model

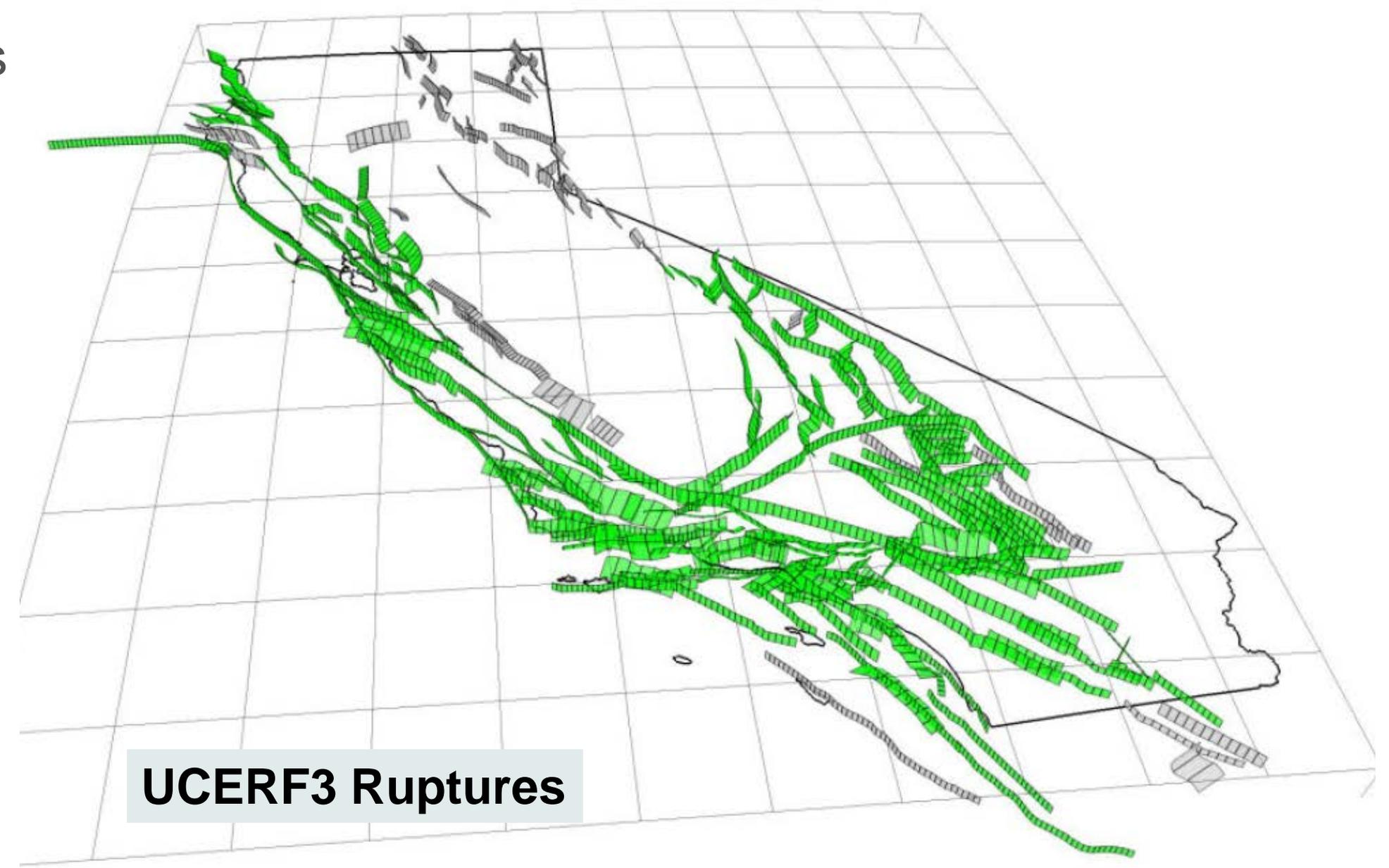


% Change due to GMM

Average Annual Loss (AAL) for a Well Distributed Portfolio

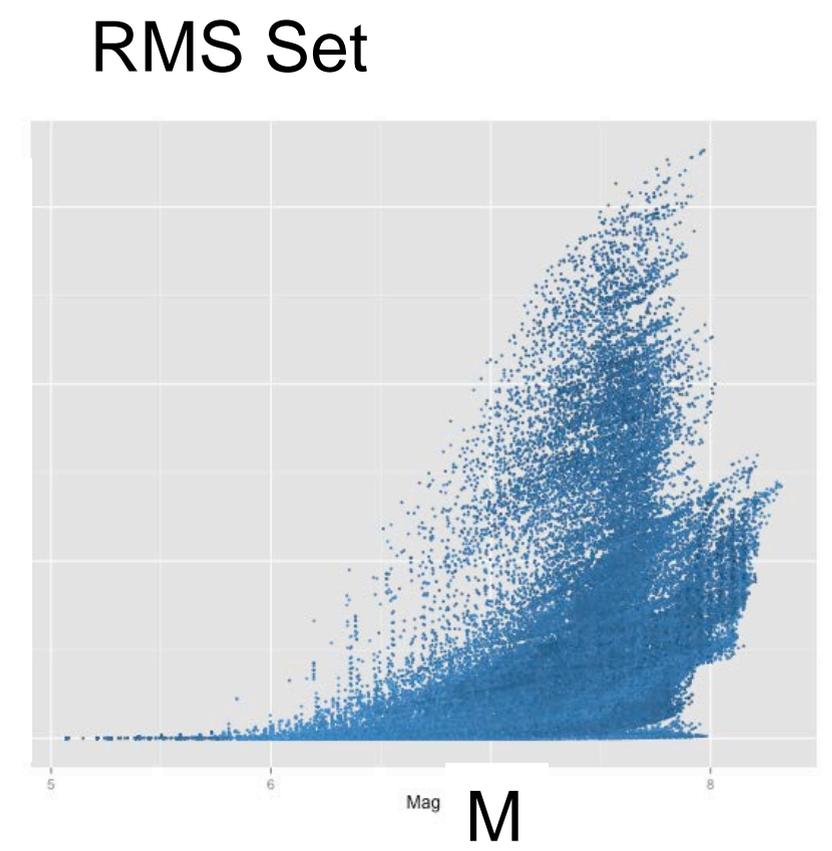
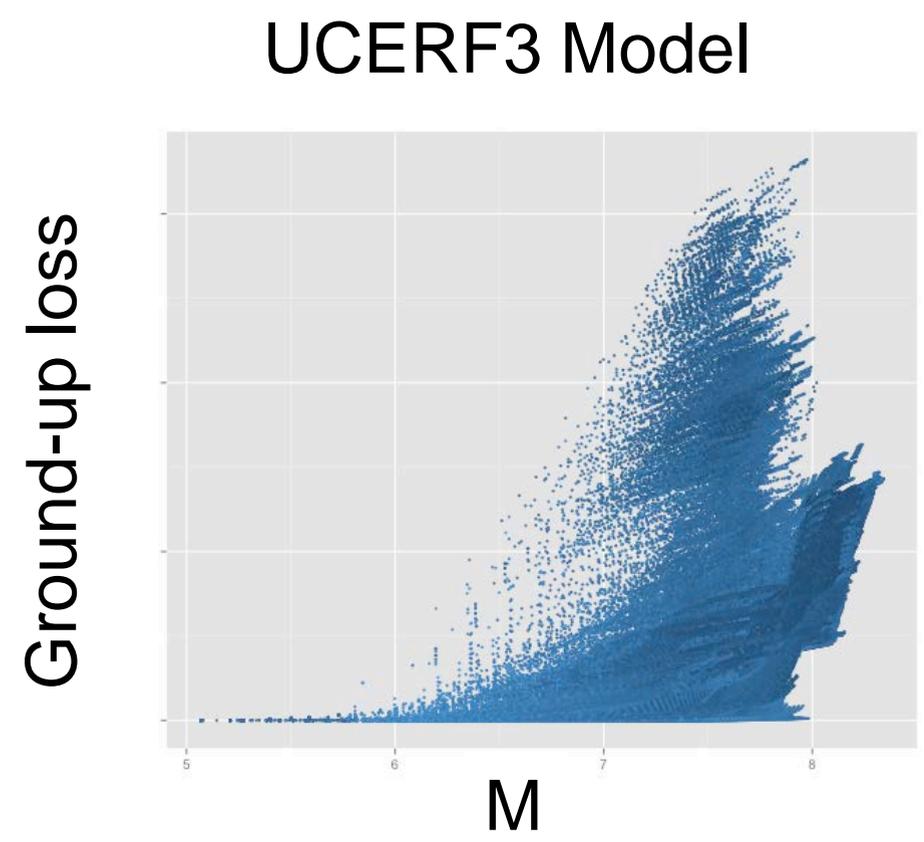
NSHM ADJUSTMENT

- Large number of ruptures
 - 254k for FM3.1
 - 306k for FM3.2
 - RMS set ~ 70k



NSHM ADJUSTMENT

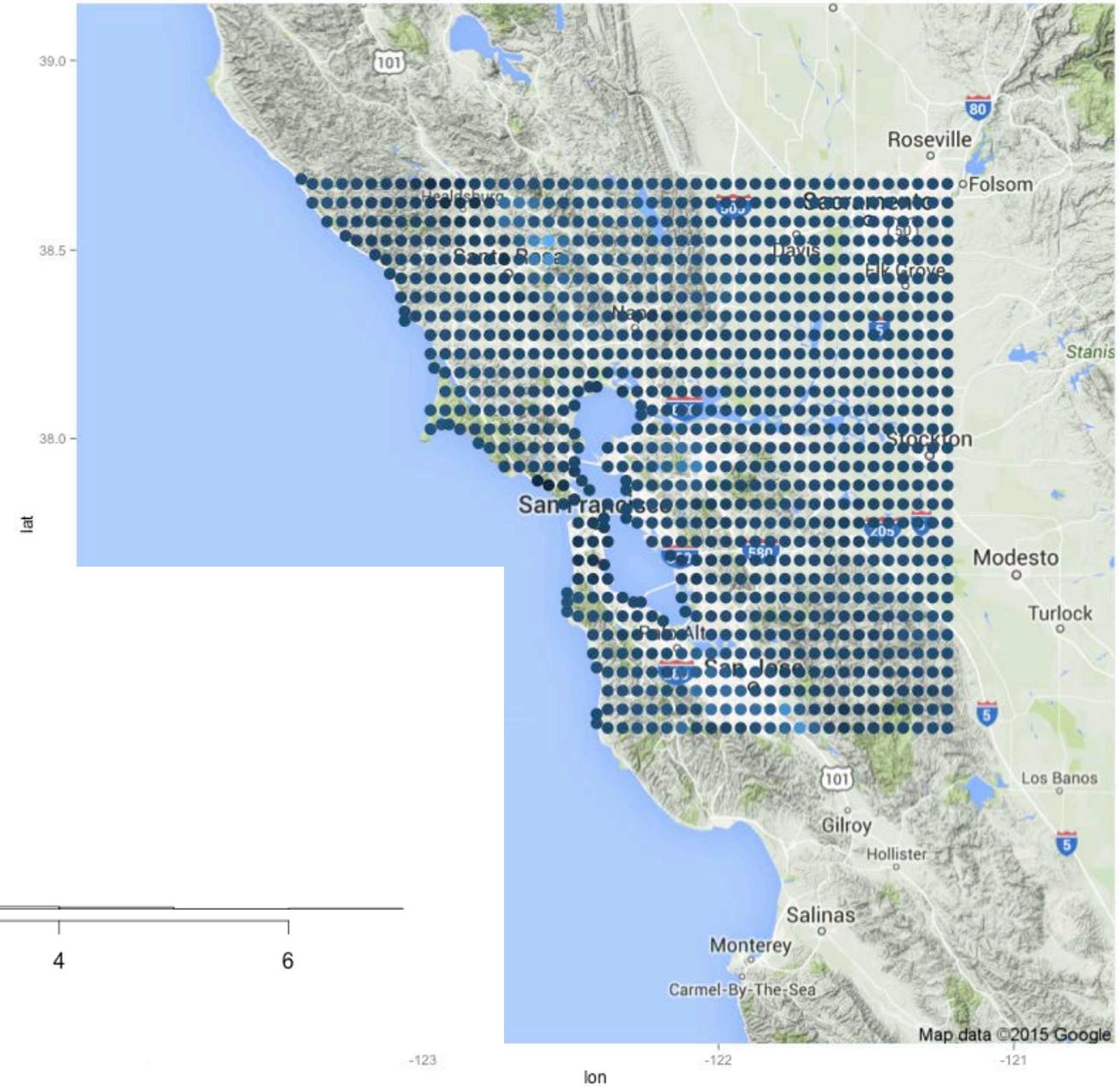
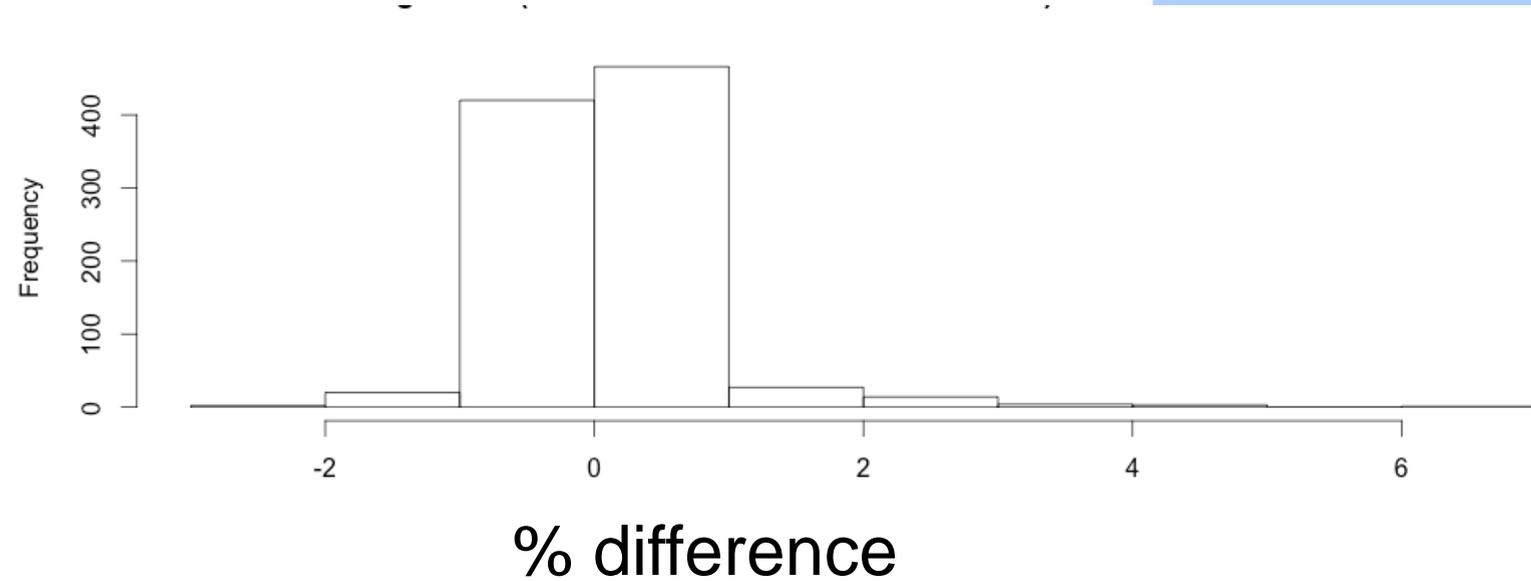
- Large number of ruptures
 - UCERF3 ~ 500k
 - RMS ~ 70k



NSHM ADJUSTMENT

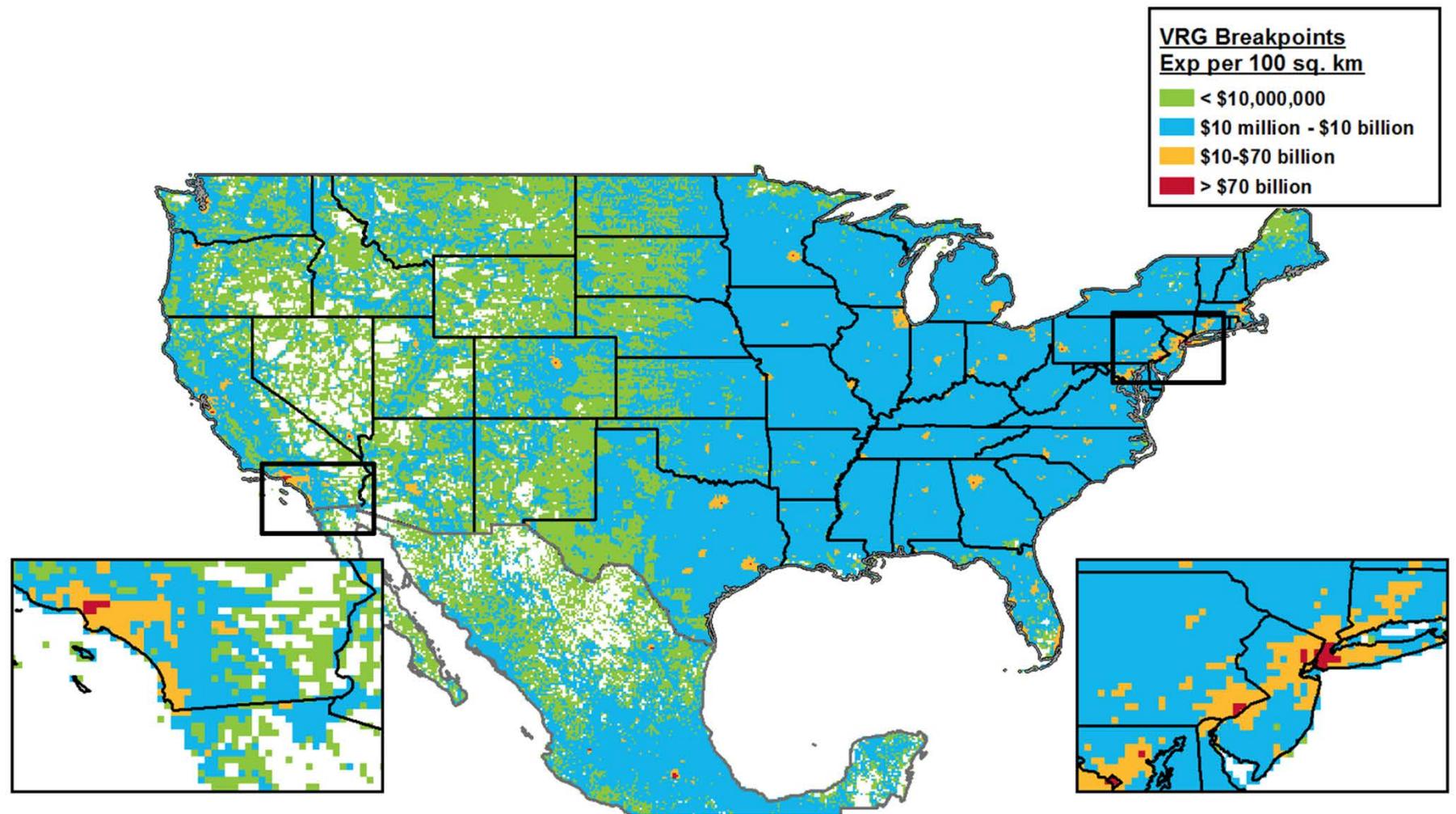
- Large number of ruptures
 - UCERF3 ~ 500k
 - RMS ~ 70k

Difference in PGA at 2475 Year Return Period



NSHM ADJUSTMENT

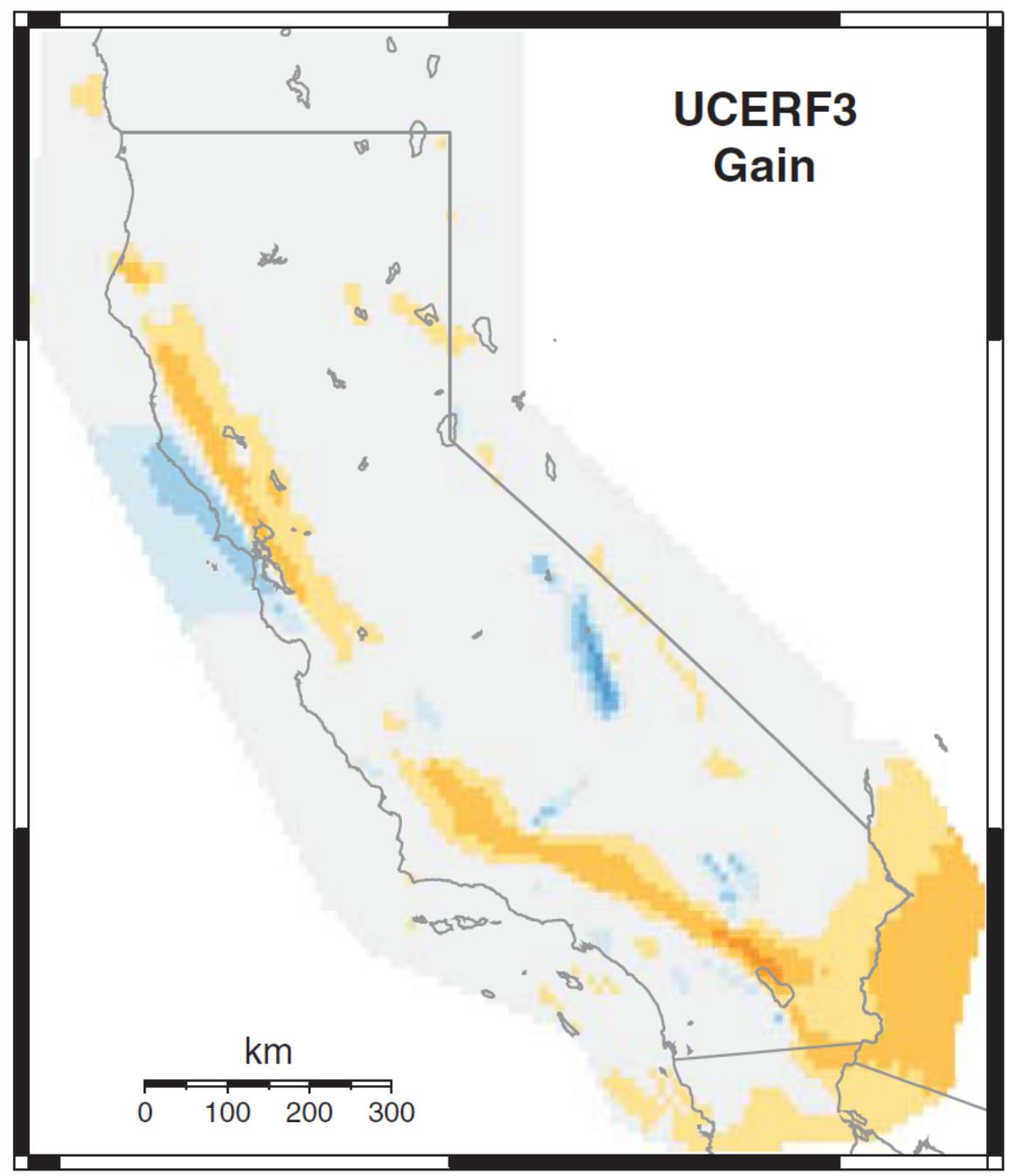
- Less dense ruptures in less exposed areas



TIME-DEPENDENT MODEL

- California – UCERF3
- Cascadia – BC Hydro
- Alaska – USGS
- Wasatch – WGUEP

Ratio of 2% in 50-year PGA

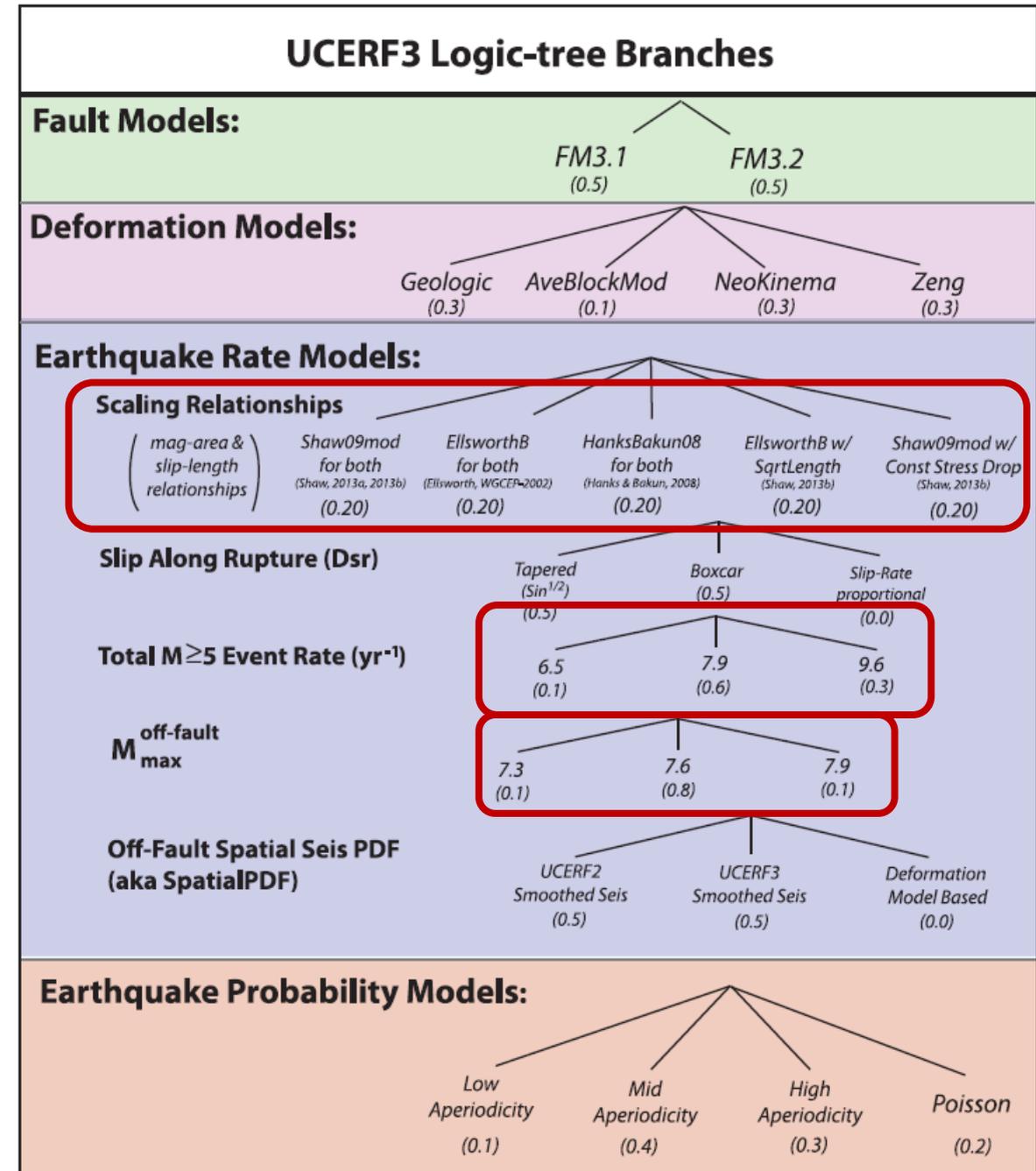


MODEL ADOPTION

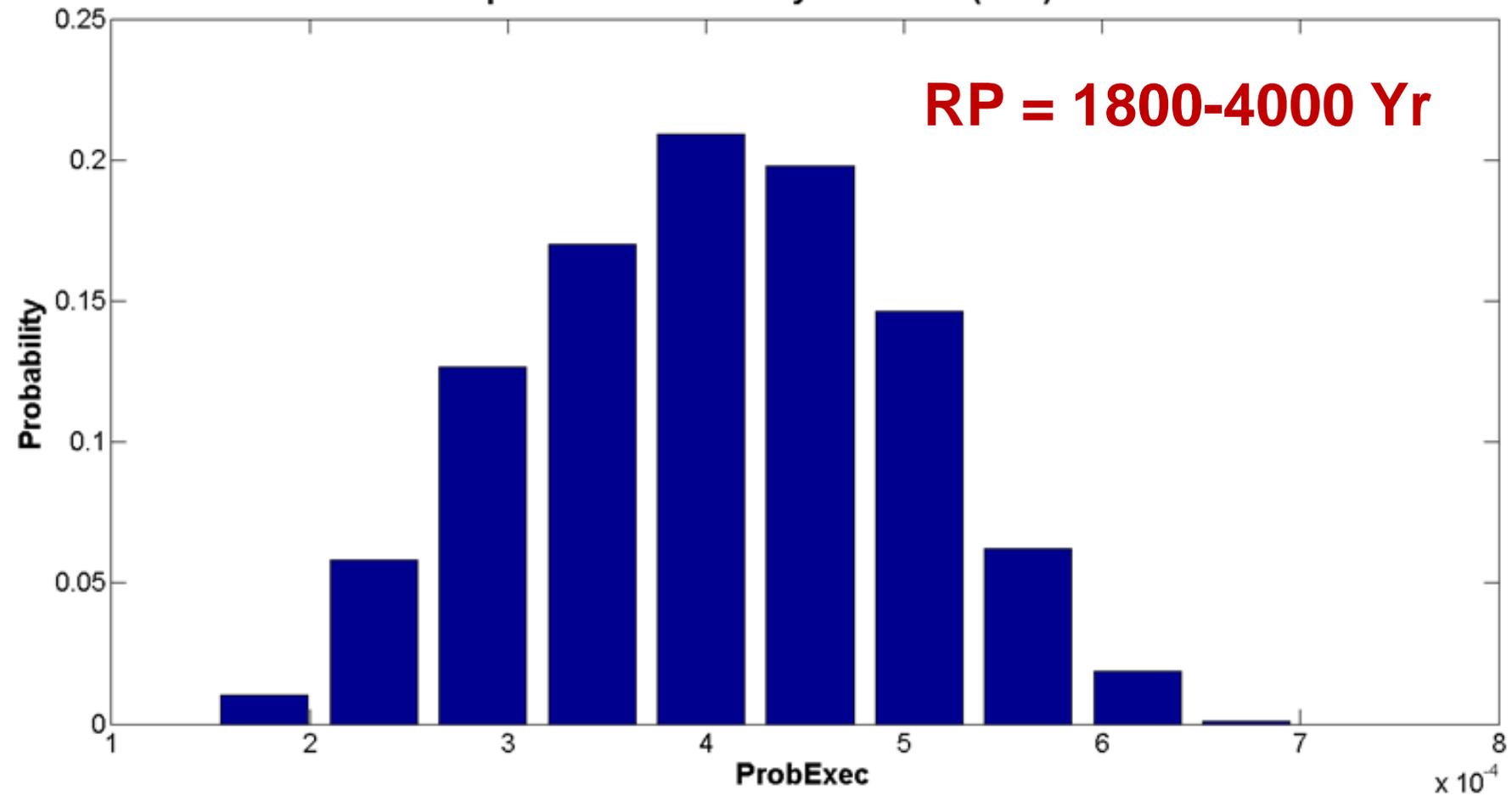
- Standardize the hazard input files
- OpenSHA code
 - Clean
 - Improved documentation
 - User group (?)

EPISTEMIC UNCERTAINTY IN MEAN HAZARD RESULTS

- Logic-tree framework
- Sources
 - Parameters (e.g., M_{max})
 - Models (e.g., magnitude scaling relationship)
 - Limited data (e.g., rate)



UNCERTAINTY IN SA(0.2S) IN LOS ANGELES AT 2500-YEAR RP



Source: Shome, Power and Petersen (2014). Epistemic Uncertainty in 2014 US National Earthquake Hazard Maps. SSA Annual meeting, Anchorage.

QUESTIONS?



ABOUT RMS

RMS is the world's leading provider of products, services, and expertise for the quantification and management of catastrophe risk. More than 400 leading insurers, reinsurers, trading companies, and other financial institutions rely on RMS models to quantify, manage, and transfer risk. As an established provider of risk modeling to companies across all market segments, RMS provides solutions that can be trusted as reliable benchmarks for strategic pricing, risk management, and risk transfer decisions.

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