
ST-RISK Update and Implementation of the USGS 2014 NSHM Seismic Source Model

August 21, 2020

We are pleased to announce the release of ST-RISK version 4.60 and the incorporation of the U.S. Geological Survey (USGS) 2014 National Seismic Hazard Maps (NSHM) seismic source model (SSM) outside of California into the ST-RISK regional data.

The ST-RISK 4.60 release includes the addition of USGS 2014 Ground Motion Models (GMMs) and refinement of the hazard logic to match the most current USGS methodology for the development of the NSHM. Additional information on the changes made can be found in the revised User's Manual.

The USGS 2014 NSHM for the Conterminous United States incorporates new methods and models from recent scientific studies which covers a wider range of seismic sources, ground motion models, and a revised earthquake catalog. In this report, probabilistic ground motions calculated by ST-RISK v. 4.60 using the updated regional data that implement the USGS 2014 NSHM SSM at test sites across the U.S. are compared to ground motions calculated by EZ-FRISK v. 8.06 also using the USGS 2014 NSHM SSM.

The California portion of the 2014 NSHM SSM, which is based on the Uniform California Earthquake Rupture Forecast version 3 (UCERF3), is currently being implemented into our software; therefore, ST-RISK and EZ-FRISK still use the UCERF2 SSM (which was used in the 2008 NSHM) for California.

The updated USGS seismic sources and ground motion models have been implemented in ST-RISK regional data preserving their logic trees and weighting. ST-RISK site analyses which include probabilistic seismic hazard analysis (PSHA) was performed for 133 test sites which covers the lower 48 contiguous United States. Ground motion values were calculated for 2-percent, 5-percent and 10-percent probability of exceedance (PE) PE in 50 years, i.e., return periods of 2,475, 975, and 475 years, respectively, for peak horizontal ground acceleration (PGA), and spectral acceleration at periods of 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 0.7, 1, 1.4, 2, 3, 4, 5, 7.5, and 10 seconds with 5-percent damping for a time-weighted average shear wave velocity in the top 30 meters (V_{s30}) of 760 m/s (NERHP B/C boundary conditions).

The ground motions calculated by ST-RISK for the considered test sites were compared to the ground motions determined using the calculated by EZ-FRISK v. 8.06. Most of the sites agreed to within $\pm 5\%$. Site-specific results for select cities and locations are provided in the table below.

ST-RISK Region: Alabama, Mississippi, and Tennessee

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Birmingham, AL	LAT 33.52 LON -86.83																
10% PE in 50 years	0.00%	0.02%	0.04%	-0.05%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.12%	-0.05%
5% PE in 50 years	0.00%	-0.02%	0.01%	0.02%	0.03%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%
2% PE in 50 years	-0.01%	-0.01%	0.00%	0.00%	0.01%	-0.02%	-0.01%	0.00%	-0.04%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%
Jackson, MS	LAT 32.29 LON -90.19																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.05%	0.09%	0.00%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.12%
2% PE in 50 years	0.00%	0.02%	0.00%	-0.03%	-0.01%	0.02%	-0.01%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%
Memphis, TN	LAT 35.17 LON -90.05																
10% PE in 50 years	0.00%	-0.01%	0.00%	0.01%	-0.01%	-0.01%	0.00%	0.02%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.05%
5% PE in 50 years	-0.01%	0.00%	0.00%	0.00%	-0.01%	-0.01%	-0.01%	0.00%	-0.02%	-0.02%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%
2% PE in 50 years	0.00%	0.03%	0.04%	0.02%	0.01%	0.00%	0.00%	0.01%	0.01%	0.02%	0.02%	-0.02%	0.05%	0.00%	0.00%	0.00%	0.00%
Mobile, AL	LAT 30.69 LON -88.05																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	0.05%	0.03%	0.04%	-0.27%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	-0.12%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	-0.06%
Nashville, TN	LAT 36.16 LON -86.79																
10% PE in 50 years	0.00%	0.01%	-0.01%	-0.02%	-0.03%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.08%	0.00%
5% PE in 50 years	0.00%	0.00%	-0.02%	0.00%	0.01%	-0.03%	0.02%	-0.01%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.06%
2% PE in 50 years	-0.01%	0.00%	-0.01%	0.00%	-0.01%	-0.01%	0.01%	0.00%	-0.03%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Arizona

Site	PGA		Period (sec)														
	0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Flagstaff, AZ	LAT 35.2	LON -111.65															
10% PE in 50 years	0.55%	0.57%	0.82%	0.95%	0.96%	1.10%	1.35%	1.89%	2.17%	1.89%	1.73%	1.94%	1.79%	2.28%	2.21%	N/A	N/A
5% PE in 50 years	0.64%	0.71%	1.08%	1.23%	1.34%	1.32%	1.52%	1.84%	2.03%	2.00%	1.81%	2.12%	2.12%	2.55%	2.62%	N/A	N/A
2% PE in 50 years	0.78%	0.76%	1.19%	1.42%	1.62%	1.60%	1.72%	2.00%	1.90%	1.92%	1.99%	2.14%	2.45%	2.90%	2.76%	N/A	N/A
Grand Canyon Village, AZ	LAT 36.05	LON -112.14															
10% PE in 50 years	0.57%	0.59%	0.87%	1.05%	1.13%	1.05%	1.45%	1.82%	2.04%	1.86%	1.69%	1.87%	1.82%	2.30%	2.29%	N/A	N/A
5% PE in 50 years	0.64%	0.67%	1.02%	1.19%	1.37%	1.40%	1.63%	1.80%	1.98%	1.96%	1.81%	2.01%	2.11%	2.51%	2.54%	N/A	N/A
2% PE in 50 years	0.82%	0.85%	1.28%	1.50%	1.60%	1.58%	1.82%	2.09%	1.96%	1.88%	1.91%	2.07%	2.27%	2.80%	2.66%	N/A	N/A
Phoenix, AZ	LAT 33.45	LON -112.08															
10% PE in 50 years	0.72%	0.68%	0.96%	1.16%	1.31%	1.44%	2.57%	3.62%	3.49%	2.84%	2.31%	2.51%	2.01%	2.48%	2.51%	N/A	N/A
5% PE in 50 years	0.78%	0.77%	1.02%	1.18%	1.44%	1.53%	2.40%	3.50%	3.69%	3.23%	2.70%	2.60%	2.61%	2.87%	2.89%	N/A	N/A
2% PE in 50 years	0.80%	0.90%	1.30%	1.54%	1.71%	1.72%	2.31%	3.25%	3.71%	3.56%	3.14%	3.15%	2.99%	3.72%	3.44%	N/A	N/A
Tucson, AZ	LAT 32.22	LON -110.98															
10% PE in 50 years	0.63%	0.59%	0.85%	1.01%	1.13%	1.20%	1.81%	2.50%	2.62%	2.25%	2.04%	2.11%	1.86%	2.28%	2.21%	N/A	N/A
5% PE in 50 years	0.67%	0.67%	1.03%	1.16%	1.25%	1.33%	1.78%	2.29%	2.60%	2.32%	2.06%	2.45%	2.19%	2.70%	2.68%	N/A	N/A
2% PE in 50 years	0.68%	0.82%	1.23%	1.43%	1.53%	1.51%	1.88%	2.15%	2.15%	2.28%	2.09%	2.31%	2.92%	3.02%	3.04%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Arkansas and Oklahoma

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
El Dorado, AR	LAT 33.2 LON -92.67																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.03%	0.06%	0.00%
5% PE in 50 years	0.00%	-0.04%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%
2% PE in 50 years	0.00%	-0.02%	-0.02%	-0.02%	0.00%	0.01%	0.01%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%
Little Rock, AR	LAT 34.74 LON -92.29																
10% PE in 50 years	0.00%	-0.02%	0.03%	-0.02%	0.03%	-0.01%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.21%
5% PE in 50 years	0.01%	0.01%	-0.02%	-0.01%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.06%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.01%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Oklahoma City, OK	LAT 35.41 LON -97.54																
10% PE in 50 years	0.00%	0.03%	0.04%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.11%	0.15%	0.29%	0.22%	0.28%	2.47%	3.42%
5% PE in 50 years	0.01%	0.01%	-0.01%	-0.02%	0.03%	0.03%	0.00%	0.00%	0.02%	0.00%	0.00%	0.05%	0.07%	0.07%	0.00%	0.24%	1.86%
2% PE in 50 years	0.03%	-0.01%	0.00%	-0.01%	0.02%	0.00%	-0.02%	-0.01%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.10%	0.11%
Tulsa, OK	LAT 36.14 LON -96.0																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.04%	0.05%	0.00%	0.13%	-0.01%	0.08%	1.20%	1.21%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.13%	0.91%
2% PE in 50 years	0.00%	0.03%	0.00%	-0.03%	0.02%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.10%
Woodward, OK	LAT 36.43 LON -99.4																
10% PE in 50 years	0.04%	0.02%	0.02%	0.02%	0.04%	0.02%	0.09%	0.14%	0.27%	0.44%	0.94%	0.96%	2.07%	1.08%	1.08%	5.71%	7.20%
5% PE in 50 years	0.03%	0.01%	0.02%	0.01%	0.01%	0.01%	0.04%	0.09%	0.18%	0.15%	0.18%	0.37%	0.37%	0.18%	0.12%	2.27%	5.04%
2% PE in 50 years	0.01%	0.00%	-0.01%	0.00%	-0.02%	-0.01%	0.03%	0.03%	0.05%	0.07%	0.09%	0.08%	0.11%	0.00%	0.00%	0.21%	1.61%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: California

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Bakersfield, CA	LAT 35.36 LON -119.04																	
10% PE in 50 years		-0.10%	-0.32%	0.49%	0.73%	1.04%	1.21%	1.05%	1.10%	1.21%	2.08%	1.98%	2.46%	3.31%	3.22%	2.28%	1.65%	0.49%
5% PE in 50 years		-0.05%	-0.29%	0.55%	0.73%	1.01%	1.18%	1.01%	1.04%	1.32%	2.22%	2.16%	2.54%	2.92%	3.75%	2.62%	1.04%	0.17%
2% PE in 50 years		-0.02%	-0.27%	0.58%	0.72%	0.95%	1.12%	1.00%	0.89%	1.25%	1.93%	2.36%	2.21%	2.92%	3.24%	3.04%	0.86%	-0.12%
Los Angeles, CA	LAT 34.04 LON -118.26																	
10% PE in 50 years		-1.33%	-1.69%	-0.51%	-0.35%	0.01%	0.12%	-0.06%	-0.07%	0.12%	0.95%	1.20%	1.70%	2.26%	2.68%	2.50%	1.11%	0.56%
5% PE in 50 years		-1.44%	-1.63%	-0.63%	-0.42%	-0.05%	0.04%	-0.16%	-0.15%	0.05%	0.98%	1.36%	1.95%	2.15%	2.72%	2.20%	1.04%	0.23%
2% PE in 50 years		-1.52%	-2.02%	-0.62%	-0.51%	-0.17%	-0.06%	-0.23%	-0.22%	0.05%	1.14%	1.48%	1.93%	2.98%	3.03%	2.30%	0.94%	-0.03%
Redding, CA	LAT 40.58 LON -122.4																	
10% PE in 50 years		-0.16%	-0.30%	0.25%	0.37%	0.58%	0.72%	0.46%	0.49%	0.63%	1.03%	1.24%	1.17%	1.36%	1.45%	1.03%	0.51%	-0.05%
5% PE in 50 years		-0.10%	-0.24%	0.29%	0.38%	0.60%	0.66%	0.47%	0.39%	0.47%	0.79%	0.69%	0.67%	0.80%	0.85%	0.63%	0.11%	-0.22%
2% PE in 50 years		-0.01%	-0.17%	0.32%	0.42%	0.57%	0.63%	0.45%	0.37%	0.37%	0.48%	0.42%	0.29%	0.33%	0.26%	0.18%	-0.03%	-0.20%
Sacramento, CA	LAT 38.57 LON -121.51																	
10% PE in 50 years		0.50%	0.34%	1.17%	1.50%	1.81%	1.97%	1.51%	1.67%	1.71%	2.04%	2.35%	2.18%	2.34%	2.17%	1.77%	0.56%	-0.26%
5% PE in 50 years		0.67%	0.40%	1.36%	1.55%	1.86%	2.03%	1.74%	1.51%	1.93%	2.23%	2.50%	2.17%	2.30%	1.82%	1.28%	0.17%	-0.29%
2% PE in 50 years		0.72%	0.42%	1.35%	1.61%	1.96%	2.15%	1.80%	1.53%	1.76%	2.45%	2.10%	1.77%	1.75%	1.42%	0.83%	0.00%	-0.42%
San Diego, CA	LAT 32.71 LON -117.17																	
10% PE in 50 years		-1.55%	-1.75%	-0.85%	-0.58%	-0.20%	0.02%	-0.22%	-0.22%	0.02%	0.76%	0.99%	1.10%	1.39%	1.91%	1.26%	0.87%	0.28%
5% PE in 50 years		-2.58%	-2.52%	-1.76%	-1.51%	-1.14%	-1.09%	-1.21%	-1.22%	-1.05%	-0.26%	0.20%	0.45%	1.03%	1.54%	1.33%	0.69%	0.33%
2% PE in 50 years		-2.62%	-2.53%	-1.87%	-1.65%	-1.31%	-1.13%	-1.61%	-1.44%	-1.34%	-0.46%	-0.05%	0.64%	1.12%	1.74%	1.45%	1.05%	0.48%
San Francisco, CA	LAT 37.76 LON -122.44																	
10% PE in 50 years		-0.61%	-0.65%	0.06%	0.23%	0.45%	0.71%	0.53%	0.60%	0.65%	1.70%	2.10%	3.12%	3.11%	4.15%	3.65%	5.72%	5.59%
5% PE in 50 years		-0.52%	-0.72%	0.13%	0.28%	0.50%	0.58%	0.50%	0.57%	0.61%	1.47%	2.10%	2.81%	3.96%	3.97%	3.18%	4.36%	5.83%
2% PE in 50 years		-0.41%	-0.81%	0.17%	0.23%	0.47%	0.58%	0.54%	0.50%	0.51%	1.48%	2.00%	3.03%	3.89%	5.26%	4.12%	3.67%	4.27%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Colorado and New Mexico

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Albuquerque, NM	LAT 35.08 LON -106.65																
10% PE in 50 years	0.99%	0.60%	0.82%	0.96%	1.05%	1.11%	1.25%	1.30%	1.15%	0.96%	0.31%	-0.59%	-1.87%	-2.99%	-5.02%	N/A	N/A
5% PE in 50 years	1.03%	0.70%	0.99%	1.19%	1.24%	1.33%	1.44%	1.53%	1.38%	1.19%	0.93%	0.60%	-0.12%	-0.33%	-0.97%	N/A	N/A
2% PE in 50 years	1.38%	0.88%	1.27%	1.48%	1.64%	1.60%	1.79%	1.79%	1.70%	1.37%	1.32%	1.28%	1.03%	1.08%	0.82%	N/A	N/A
Denver, CO	LAT 39.74 LON -105.0																
10% PE in 50 years	0.00%	0.01%	0.11%	0.18%	0.26%	0.35%	0.41%	0.54%	0.69%	0.55%	0.71%	0.80%	0.73%	0.93%	0.94%	N/A	N/A
5% PE in 50 years	-0.09%	-0.04%	0.16%	0.19%	0.44%	0.49%	0.60%	0.70%	0.92%	0.90%	0.82%	0.96%	0.80%	0.95%	1.04%	N/A	N/A
2% PE in 50 years	-0.15%	-0.05%	0.11%	0.24%	0.51%	0.72%	0.75%	0.97%	1.19%	1.31%	1.26%	1.12%	0.93%	1.33%	1.23%	N/A	N/A
Grand Junction, CO	LAT 39.07 LON -108.56																
10% PE in 50 years	0.04%	-0.05%	0.03%	0.04%	0.09%	0.13%	0.41%	0.90%	1.07%	0.86%	-0.22%	-1.69%	-3.24%	-3.52%	-4.96%	N/A	N/A
5% PE in 50 years	0.01%	0.01%	0.01%	0.01%	0.03%	0.05%	0.32%	0.73%	1.18%	0.97%	0.32%	-0.30%	-1.59%	-1.13%	-2.09%	N/A	N/A
2% PE in 50 years	0.01%	-0.01%	0.01%	0.03%	0.06%	0.06%	0.22%	0.50%	0.84%	0.97%	0.67%	0.53%	-0.13%	0.32%	-0.16%	N/A	N/A
Las Cruces, NM	LAT 32.31 LON -106.79																
10% PE in 50 years	0.62%	0.60%	0.85%	0.97%	1.04%	1.06%	1.29%	1.39%	1.34%	0.96%	0.05%	-1.56%	-3.09%	-4.90%	-7.15%	-15.38%	-20.21%
5% PE in 50 years	0.60%	0.69%	1.04%	1.17%	1.23%	1.28%	1.30%	1.62%	1.49%	1.32%	0.71%	0.40%	-0.90%	-1.46%	-3.19%	-12.28%	-18.25%
2% PE in 50 years	0.76%	0.85%	1.29%	1.50%	1.57%	1.57%	1.99%	2.04%	1.65%	1.56%	1.37%	1.17%	0.90%	0.47%	-0.09%	-6.29%	-15.11%
Pueblo, CO	LAT 38.25 LON -104.61																
10% PE in 50 years	-0.03%	-0.04%	0.08%	0.12%	0.18%	0.22%	0.39%	0.51%	0.56%	0.46%	0.50%	0.43%	0.51%	0.59%	0.42%	N/A	N/A
5% PE in 50 years	-0.22%	-0.30%	-0.14%	0.03%	0.16%	0.26%	0.42%	0.56%	0.71%	0.64%	0.54%	0.59%	0.35%	0.42%	0.41%	N/A	N/A
2% PE in 50 years	-1.00%	-0.92%	-0.62%	-0.35%	0.12%	0.41%	0.44%	0.70%	0.91%	1.00%	0.88%	0.65%	0.15%	0.59%	0.55%	N/A	N/A
Roswell, NM	LAT 33.39 LON -104.53																
10% PE in 50 years	0.73%	0.36%	0.54%	0.71%	0.84%	0.94%	1.27%	1.42%	1.17%	1.17%	0.85%	0.77%	0.69%	1.19%	1.21%	1.14%	0.74%
5% PE in 50 years	0.63%	0.38%	0.64%	0.79%	1.00%	1.12%	1.56%	1.82%	1.66%	1.24%	1.28%	1.04%	1.05%	1.45%	1.69%	1.54%	1.46%
2% PE in 50 years	0.67%	0.36%	0.64%	0.82%	0.98%	1.10%	1.72%	2.09%	2.26%	1.87%	1.50%	1.59%	1.28%	1.95%	1.98%	2.70%	2.55%

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.



ST-RISK Region: Delaware, Maryland, Virginia, and West Virginia

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Baltimore, MA	LAT 39.29 LON -76.63																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.07%	-0.02%	-0.03%	0.19%	0.34%
5% PE in 50 years	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.01%	-0.03%	0.11%	-0.07%
2% PE in 50 years	0.01%	0.03%	0.00%	0.04%	0.02%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.08%	-0.15%
Charleston, WV	LAT 38.34 LON -81.65																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.03%	0.01%	0.13%	0.24%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%
2% PE in 50 years	0.00%	-0.03%	0.03%	-0.03%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%
Georgetown, DE	LAT 38.69 LON -75.39																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.07%	-0.07%	-0.09%	0.14%	-0.30%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	-0.03%	-0.05%	0.04%	0.14%
2% PE in 50 years	0.00%	-0.04%	-0.04%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.12%
Richmond, VA	LAT 37.53 LON -77.44																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.02%	-0.04%	0.10%	0.23%	0.19%
5% PE in 50 years	0.00%	-0.04%	-0.01%	-0.01%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.02%	0.05%	-0.10%	-0.23%
2% PE in 50 years	-0.04%	-0.01%	-0.02%	0.00%	-0.02%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.06%
Virginia Beach, VA	LAT 36.85 LON -76.0																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.02%	-0.10%	-0.03%	0.00%	0.55%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.03%	-0.08%	-0.28%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.18%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Florida

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Gainesville, FL	LAT 29.65 LON -82.33																	
10% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.02%	0.02%	0.15%	0.09%
5% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.10%
2% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.05%
Jacksonville, FL	LAT 30.33 LON -81.67																	
10% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.06%	-0.06%	0.18%	-0.32%
5% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.07%	0.13%
2% PE in 50 years		0.00%	0.00%	0.00%	0.01%	-0.03%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.10%
Miami, FL	LAT 25.76 LON -80.2																	
10% PE in 50 years		-0.10%	0.01%	0.01%	-0.01%	0.00%	0.00%	0.01%	0.02%	-0.01%	-0.02%	0.10%	-0.19%	0.20%	0.00%	0.36%	-0.72%	-0.22%
5% PE in 50 years		0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.07%	-0.12%	0.12%	0.12%	-0.43%	-0.30%
2% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	-0.06%	0.00%	0.04%	0.28%
Orlando, FL	LAT 28.54 LON -81.39																	
10% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.07%	0.10%	0.14%	0.04%	0.29%	0.27%
5% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.06%	0.08%	0.24%	0.25%
2% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	-0.04%
Panama City, FL	LAT 30.17 LON -85.66																	
10% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.03%	-0.02%	-0.21%	-0.15%
5% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%
2% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.10%
Tampa, FL	LAT 27.95 LON -82.47																	
10% PE in 50 years		0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.03%	0.08%	0.11%	-0.04%	0.24%	-0.31%	-0.06%
5% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%	-0.09%	0.05%	0.16%	-0.37%
2% PE in 50 years		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	-0.14%

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Georgia, North and South Carolina

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Atlanta, GA	LAT 33.74 LON -84.39																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.05%
5% PE in 50 years	0.00%	0.01%	0.03%	0.03%	0.02%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.05%
2% PE in 50 years	0.01%	0.02%	0.01%	-0.02%	-0.01%	0.01%	-0.03%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%
Charleston, SC	LAT 32.77 LON -79.95																
10% PE in 50 years	0.01%	0.01%	0.00%	0.01%	0.01%	-0.01%	0.01%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	0.00%
5% PE in 50 years	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.00%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%
2% PE in 50 years	0.00%	-0.02%	0.02%	-0.02%	0.04%	0.01%	0.00%	0.01%	0.00%	-0.01%	0.00%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%
Charlotte, NC	LAT 35.23 LON -80.84																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	-0.26%
5% PE in 50 years	0.00%	-0.01%	-0.03%	0.01%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.08%
2% PE in 50 years	0.00%	0.00%	-0.02%	-0.01%	-0.02%	0.00%	0.02%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%
Raleigh, NC	LAT 35.77 LON -78.66																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.03%	-0.06%	0.15%	-0.20%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%
2% PE in 50 years	0.00%	0.00%	0.02%	0.00%	-0.04%	-0.04%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.04%
Savannah, GA	LAT 32.06 LON -81.11																
10% PE in 50 years	-0.02%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.01%	0.03%	0.17%
5% PE in 50 years	0.00%	-0.03%	-0.02%	-0.01%	0.02%	-0.03%	-0.01%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.06%
2% PE in 50 years	0.01%	0.00%	-0.01%	-0.02%	0.00%	0.00%	0.00%	-0.03%	-0.02%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Idaho

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Boise, ID	LAT 43.61 LON -116.21																
10% PE in 50 years	1.21%	0.74%	1.10%	1.32%	1.46%	1.51%	1.87%	2.07%	2.01%	1.77%	0.89%	0.38%	-1.43%	-2.74%	-4.56%	N/A	N/A
5% PE in 50 years	1.27%	0.88%	1.29%	1.60%	1.72%	1.79%	2.09%	2.20%	2.22%	2.14%	1.74%	1.15%	0.51%	-0.80%	-1.67%	N/A	N/A
2% PE in 50 years	1.37%	0.90%	1.41%	1.73%	1.97%	2.00%	2.25%	2.62%	2.37%	2.42%	2.35%	2.13%	1.00%	0.74%	0.62%	N/A	N/A
Grangeville, ID	LAT 45.92 LON -116.12																
10% PE in 50 years	1.15%	0.65%	0.90%	1.20%	1.38%	1.46%	1.86%	2.24%	2.14%	1.38%	0.70%	-0.40%	-2.65%	-4.19%	-6.07%	N/A	N/A
5% PE in 50 years	1.17%	0.76%	1.12%	1.35%	1.53%	1.55%	1.93%	2.33%	2.38%	2.27%	1.60%	0.61%	-0.48%	-1.75%	-2.71%	N/A	N/A
2% PE in 50 years	1.27%	0.84%	1.18%	1.45%	1.69%	1.74%	2.14%	2.41%	2.40%	2.52%	2.41%	1.88%	0.50%	0.32%	-0.05%	N/A	N/A
Pocatello, ID	LAT 42.86 LON -112.45																
10% PE in 50 years	1.26%	0.83%	1.19%	1.51%	1.68%	1.76%	2.08%	2.27%	2.18%	2.00%	1.85%	1.70%	1.44%	1.30%	1.28%	N/A	N/A
5% PE in 50 years	1.30%	0.90%	1.29%	1.65%	1.88%	1.90%	2.32%	2.52%	2.37%	2.25%	2.10%	2.08%	1.70%	1.70%	1.51%	N/A	N/A
2% PE in 50 years	1.34%	1.01%	1.46%	1.92%	2.06%	2.17%	2.36%	2.70%	2.55%	2.38%	2.30%	2.36%	1.90%	1.69%	1.54%	N/A	N/A
Twin Falls, ID	LAT 42.55 LON -114.48																
10% PE in 50 years	1.19%	0.75%	1.10%	1.36%	1.55%	1.66%	2.31%	2.72%	2.72%	2.10%	1.14%	0.69%	-0.73%	-1.80%	-3.49%	N/A	N/A
5% PE in 50 years	1.24%	0.84%	1.19%	1.48%	1.77%	1.82%	2.56%	3.05%	2.93%	2.76%	1.93%	1.49%	0.61%	-0.39%	-1.05%	N/A	N/A
2% PE in 50 years	1.36%	0.99%	1.32%	1.83%	2.03%	2.13%	2.79%	3.33%	3.27%	3.10%	2.93%	2.33%	1.47%	1.12%	0.32%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Illinois, Indiana, and Kentucky

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Bowling Green, KY	LAT 36.96 LON -86.47																	
10% PE in 50 years	0.00%	0.00%	0.01%	-0.01%	0.04%	0.04%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	
5% PE in 50 years	0.00%	0.01%	-0.01%	-0.01%	-0.02%	0.01%	-0.02%	-0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.02%	
2% PE in 50 years	-0.02%	0.01%	0.02%	0.02%	-0.01%	0.01%	-0.01%	-0.02%	0.01%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Chicago, IL	LAT 41.86 LON -87.65																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.04%	0.09%	-0.04%	-0.30%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.04%	
2% PE in 50 years	0.00%	-0.01%	-0.04%	0.00%	0.02%	-0.03%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.08%
Indianapolis, IN	LAT 39.76 LON -86.17																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	-0.09%	0.21%	
5% PE in 50 years	0.00%	0.02%	-0.02%	-0.04%	-0.03%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.15%	
2% PE in 50 years	0.00%	-0.02%	0.01%	0.02%	0.00%	0.01%	0.01%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	
Louisville, KY	LAT 38.22 LON -85.79																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.10%	-0.05%	
5% PE in 50 years	0.00%	-0.01%	0.02%	0.02%	0.00%	-0.03%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.10%	
2% PE in 50 years	0.01%	0.01%	0.00%	0.00%	0.01%	0.02%	-0.03%	-0.01%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	
Springfield, IL	LAT 39.77 LON -89.66																	
10% PE in 50 years	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.09%	0.16%	
5% PE in 50 years	0.00%	-0.02%	-0.04%	0.00%	-0.01%	0.03%	0.02%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.05%	
2% PE in 50 years	0.00%	0.00%	0.01%	-0.01%	0.00%	0.02%	0.03%	-0.01%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Iowa and Missouri

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Cedar Rapids, IA	LAT 41.97 LON -91.68																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.05%	0.08%	0.10%	0.00%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.02%	0.05%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.06%
Columbia, MO	LAT 38.95 LON -92.34																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.06%	0.03%	0.06%
5% PE in 50 years	0.00%	0.00%	-0.02%	-0.01%	-0.04%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.11%
2% PE in 50 years	0.00%	0.00%	-0.01%	0.01%	-0.01%	0.01%	-0.01%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%
Des Moines, IA	LAT 41.58 LON -93.63																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	-0.08%	0.15%	0.34%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.05%	0.00%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.11%
St. Louis, MO	LAT 38.63 LON -90.36																
10% PE in 50 years	0.00%	0.01%	0.00%	-0.03%	0.03%	0.01%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.04%
5% PE in 50 years	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.02%	-0.01%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.08%
2% PE in 50 years	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Kansas

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Dodge City, KS	LAT 37.75 LON -100.02																
10% PE in 50 years	0.20%	0.13%	0.16%	0.15%	0.16%	0.12%	0.20%	0.40%	0.86%	1.03%	1.55%	1.87%	2.85%	1.35%	1.83%	6.52%	7.56%
5% PE in 50 years	0.17%	0.15%	0.16%	0.12%	0.14%	0.14%	0.21%	0.31%	0.45%	0.35%	0.63%	0.77%	0.77%	0.30%	0.26%	2.92%	5.71%
2% PE in 50 years	0.18%	0.15%	0.16%	0.16%	0.15%	0.13%	0.17%	0.21%	0.32%	0.26%	0.25%	0.18%	0.33%	0.05%	0.07%	0.52%	2.40%
Topeka, KS	LAT 39.04 LON -95.69																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.03%	0.03%	0.04%	0.53%	0.61%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.59%
2% PE in 50 years	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.04%
Wichita, KS	LAT 37.68 LON -97.34																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.20%	0.18%	0.38%	0.24%	0.21%	2.20%	2.80%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.05%	0.00%	0.00%	-0.01%	0.52%	1.67%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.19%

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Louisiana

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Lafayette, LA	LAT 30.22 LON -92.02																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	-0.02%	-0.04%	-0.10%	0.52%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.13%	0.10%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%
Monroe, LA	LAT 32.5 LON -92.12																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%	-0.04%	-0.11%	-0.13%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.07%
2% PE in 50 years	0.00%	0.02%	0.00%	0.01%	0.03%	-0.02%	0.00%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
New Orleans, LA	LAT 29.93 LON -90.09																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.03%	0.00%	0.14%	-0.32%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.10%	0.18%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%
Shreveport, LA	LAT 32.49 LON -93.77																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.05%	0.05%	0.20%	-0.07%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.04%
2% PE in 50 years	0.00%	-0.01%	0.03%	-0.04%	0.03%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Minnesota

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Bemidji, MN	LAT 47.47 LON -94.89																	
10% PE in 50 years	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.05%	0.11%	0.10%	0.11%	0.45%	0.27%	0.41%	-0.13%	-1.67%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.06%	-0.03%	-0.28%	0.16%	0.00%	-0.45%	-0.58%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.09%	-0.05%	0.07%	0.30%	0.28%	
Duluth, MN	LAT 46.79 LON -92.11																	
10% PE in 50 years	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.02%	-0.05%	0.06%	0.13%	0.00%	-0.25%	-0.33%	0.25%	0.57%	1.59%
5% PE in 50 years	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.04%	0.06%	0.03%	-0.15%	-0.14%	0.31%	-0.17%	-1.01%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.02%	-0.06%	-0.05%	-0.06%	0.00%	-0.24%
Minneapolis, MN	LAT 44.97 LON -93.27																	
10% PE in 50 years	-0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.02%	-0.11%	0.12%	0.20%	0.09%	0.00%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.32%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	
Rochester, MN	LAT 44.01 LON -92.48																	
10% PE in 50 years	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.01%	-0.02%	0.11%	0.15%	0.00%	-0.12%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.01%	0.06%	-0.15%	0.19%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.13%	

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Montana and Wyoming

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Billings, MT	LAT 45.78 LON -108.51																
10% PE in 50 years	0.36%	0.24%	0.42%	0.57%	0.73%	0.83%	1.63%	2.08%	1.91%	1.47%	1.45%	1.24%	1.21%	1.43%	1.34%	N/A	N/A
5% PE in 50 years	0.32%	0.21%	0.39%	0.56%	0.76%	0.85%	1.70%	2.21%	2.45%	1.95%	1.56%	1.75%	1.36%	1.69%	1.67%	N/A	N/A
2% PE in 50 years	0.28%	0.17%	0.38%	0.54%	0.73%	0.84%	1.90%	2.64%	2.73%	2.59%	2.09%	1.92%	1.96%	1.72%	1.72%	N/A	N/A
Butte, MT	LAT 46.0 LON -112.54																
10% PE in 50 years	0.84%	0.93%	1.34%	1.64%	1.78%	1.78%	2.02%	2.20%	2.03%	1.81%	1.72%	1.54%	1.19%	0.93%	0.71%	N/A	N/A
5% PE in 50 years	0.91%	0.98%	1.45%	1.77%	1.92%	1.93%	2.35%	2.54%	2.20%	2.10%	1.93%	1.95%	1.43%	1.39%	1.09%	N/A	N/A
2% PE in 50 years	1.06%	1.04%	1.63%	1.98%	2.12%	2.25%	2.60%	2.72%	2.60%	2.35%	2.25%	2.25%	1.79%	1.53%	1.35%	N/A	N/A
Casper, WY	LAT 42.84 LON -106.34																
10% PE in 50 years	0.00%	-0.02%	0.03%	0.01%	-0.01%	0.01%	0.09%	0.31%	0.60%	0.70%	0.77%	0.98%	1.04%	1.16%	1.39%	N/A	N/A
5% PE in 50 years	0.01%	-0.02%	0.01%	0.01%	0.00%	0.02%	0.04%	0.17%	0.42%	0.54%	0.70%	0.94%	1.07%	1.14%	1.16%	N/A	N/A
2% PE in 50 years	-0.02%	0.00%	0.00%	0.00%	0.01%	-0.01%	0.01%	0.08%	0.20%	0.31%	0.46%	0.72%	0.87%	0.86%	0.86%	N/A	N/A
Gillette, WY	LAT 44.28 LON -105.51																
10% PE in 50 years	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.10%	0.37%	0.67%	0.73%	0.72%	0.96%	0.86%	1.24%	1.17%	N/A	N/A
5% PE in 50 years	-0.01%	-0.03%	-0.02%	0.01%	-0.03%	0.04%	0.04%	0.23%	0.50%	0.58%	0.71%	0.84%	0.95%	1.16%	1.24%	N/A	N/A
2% PE in 50 years	-0.03%	0.02%	0.01%	0.02%	0.02%	-0.02%	-0.02%	0.08%	0.27%	0.36%	0.45%	0.79%	0.89%	0.90%	0.85%	N/A	N/A
Great Falls, MT	LAT 47.5 LON -111.3																
10% PE in 50 years	0.63%	0.60%	0.84%	1.02%	1.25%	1.32%	1.75%	2.12%	2.09%	1.71%	1.33%	1.34%	0.75%	0.20%	-0.77%	N/A	N/A
5% PE in 50 years	0.74%	0.62%	0.92%	1.17%	1.43%	1.50%	2.04%	2.54%	2.27%	2.23%	1.90%	1.61%	1.22%	0.85%	0.51%	N/A	N/A
2% PE in 50 years	0.72%	0.62%	1.03%	1.37%	1.61%	1.64%	2.36%	2.92%	2.84%	2.60%	2.56%	2.32%	1.84%	1.41%	1.01%	N/A	N/A
Rock Springs, WY	LAT 41.58 LON -109.21																
10% PE in 50 years	0.08%	0.07%	0.11%	0.21%	0.28%	0.37%	1.00%	1.49%	1.76%	1.49%	1.23%	1.31%	0.98%	1.27%	1.10%	N/A	N/A
5% PE in 50 years	-0.01%	0.01%	0.05%	0.13%	0.23%	0.26%	0.87%	1.49%	1.79%	1.78%	1.45%	1.53%	1.41%	1.55%	1.60%	N/A	N/A
2% PE in 50 years	0.02%	0.01%	0.02%	0.05%	0.09%	0.14%	0.58%	1.16%	1.68%	1.76%	1.74%	1.64%	1.92%	1.49%	1.33%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Nebraska

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Holdrege, NE	LAT 40.44 LON -99.38																
10% PE in 50 years	-0.78%	1.92%	1.54%	1.19%	0.28%	-0.66%	-1.72%	-2.02%	-3.08%	-3.35%	-3.91%	-5.09%	-5.19%	-10.09%	-12.77%	-10.55%	-8.72%
5% PE in 50 years	0.73%	2.96%	2.61%	2.29%	1.63%	0.68%	-0.51%	-1.11%	-1.89%	-2.09%	-4.33%	-4.44%	-5.39%	-13.69%	-14.47%	-15.03%	-11.75%
2% PE in 50 years	1.10%	2.44%	2.34%	2.19%	2.08%	1.68%	0.96%	0.09%	-1.05%	-1.29%	-2.71%	-3.24%	-4.87%	-15.86%	-15.08%	-15.48%	-15.50%
Lincoln, NE	LAT 40.8 LON -96.72																
10% PE in 50 years	-3.00%	1.10%	0.04%	-0.63%	-2.36%	-4.04%	-4.73%	-4.63%	-6.93%	-6.40%	-6.37%	-6.61%	-6.37%	-11.13%	-12.98%	-12.22%	-10.37%
5% PE in 50 years	-1.33%	3.31%	2.17%	1.24%	-1.04%	-3.74%	-4.72%	-4.97%	-5.41%	-5.09%	-5.80%	-7.09%	-5.41%	-15.27%	-16.10%	-18.33%	-15.26%
2% PE in 50 years	0.72%	4.06%	3.45%	2.81%	1.12%	-1.30%	-3.44%	-5.40%	-6.37%	-6.10%	-6.90%	-5.44%	-7.09%	-15.20%	-19.75%	-18.95%	-21.20%
Ogallala, NE	LAT 41.13 LON -101.72																
10% PE in 50 years	0.07%	0.00%	0.10%	0.15%	0.28%	0.38%	0.33%	0.29%	0.51%	0.50%	0.48%	0.59%	0.73%	0.65%	0.76%	N/A	N/A
5% PE in 50 years	0.05%	-0.04%	0.15%	0.25%	0.47%	0.60%	0.60%	0.58%	0.62%	0.69%	0.69%	0.65%	0.63%	0.88%	1.01%	N/A	N/A
2% PE in 50 years	-0.03%	-0.11%	0.13%	0.28%	0.60%	0.83%	0.86%	0.97%	1.02%	0.94%	0.94%	0.87%	0.72%	1.06%	1.14%	N/A	N/A
Valentine, NE	LAT 42.87 LON -100.55																
10% PE in 50 years	0.05%	-0.02%	0.00%	0.02%	0.07%	0.15%	0.18%	0.18%	0.31%	0.34%	0.37%	0.36%	0.52%	0.75%	0.88%	N/A	N/A
5% PE in 50 years	0.00%	-0.01%	0.00%	0.01%	0.05%	0.10%	0.14%	0.21%	0.29%	0.34%	0.40%	0.41%	0.58%	0.81%	0.98%	N/A	N/A
2% PE in 50 years	-0.02%	0.03%	0.01%	0.00%	0.00%	0.04%	0.08%	0.14%	0.23%	0.28%	0.44%	0.45%	0.51%	0.98%	1.06%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Nevada

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Elko, NV	LAT 40.83 LON -115.77																
10% PE in 50 years	1.08%	0.74%	0.91%	1.07%	1.36%	1.36%	1.55%	1.63%	1.78%	1.80%	1.84%	1.98%	1.71%	1.98%	1.86%	N/A	N/A
5% PE in 50 years	1.18%	0.80%	1.11%	1.29%	1.52%	1.53%	1.57%	1.94%	1.73%	1.72%	1.71%	1.86%	1.53%	1.70%	1.63%	N/A	N/A
2% PE in 50 years	1.22%	0.91%	1.31%	1.57%	1.79%	1.74%	1.92%	2.15%	1.78%	1.80%	1.80%	1.79%	1.50%	1.44%	1.18%	N/A	N/A
Las Vegas, NV	LAT 36.12 LON -115.17																
10% PE in 50 years	1.24%	0.86%	1.22%	1.47%	1.62%	1.73%	2.27%	2.72%	2.80%	2.63%	2.52%	2.40%	1.97%	2.42%	2.15%	N/A	N/A
5% PE in 50 years	1.28%	0.86%	1.19%	1.54%	1.73%	1.81%	2.33%	2.78%	2.87%	2.88%	2.73%	2.92%	2.39%	2.44%	2.74%	N/A	N/A
2% PE in 50 years	1.24%	0.94%	1.29%	1.71%	1.83%	1.99%	2.22%	2.69%	2.82%	2.84%	2.95%	3.19%	2.94%	2.81%	2.61%	N/A	N/A
Reno, NV	LAT 39.52 LON -119.8																
10% PE in 50 years	8.52%	7.78%	8.73%	8.81%	8.58%	8.18%	9.32%	9.53%	10.01%	10.11%	10.71%	8.85%	10.15%	11.27%	10.22%	N/A	N/A
5% PE in 50 years	5.78%	5.27%	6.28%	6.36%	6.13%	5.75%	7.34%	6.91%	7.17%	8.04%	7.98%	8.52%	8.64%	8.85%	10.59%	N/A	N/A
2% PE in 50 years	4.36%	4.73%	4.90%	6.06%	6.35%	6.03%	5.57%	5.07%	5.72%	5.85%	6.42%	6.34%	6.76%	7.87%	7.86%	N/A	N/A
Warm Springs, NV	LAT 38.19 LON -116.37																
10% PE in 50 years	1.27%	0.80%	1.24%	1.51%	1.73%	1.82%	2.33%	2.82%	3.11%	3.10%	3.02%	2.87%	2.89%	2.80%	2.78%	N/A	N/A
5% PE in 50 years	1.27%	0.85%	1.31%	1.61%	1.79%	1.86%	2.24%	2.69%	2.63%	3.01%	2.93%	2.81%	2.43%	2.83%	2.58%	N/A	N/A
2% PE in 50 years	1.29%	0.87%	1.39%	1.67%	1.78%	1.77%	1.99%	2.19%	2.09%	2.00%	2.25%	2.36%	1.79%	1.88%	2.00%	N/A	N/A
Winnemucca, NV	LAT 40.97 LON -117.73																
10% PE in 50 years	1.22%	0.72%	1.08%	1.27%	1.42%	1.62%	1.96%	2.33%	2.55%	2.61%	2.59%	2.64%	2.30%	2.46%	2.42%	N/A	N/A
5% PE in 50 years	1.30%	0.87%	1.31%	1.53%	1.63%	1.76%	1.95%	2.34%	2.34%	2.38%	2.34%	2.36%	1.97%	1.95%	2.00%	N/A	N/A
2% PE in 50 years	1.46%	1.02%	1.57%	1.87%	2.04%	2.06%	2.23%	2.33%	2.21%	2.22%	2.07%	2.02%	1.54%	1.56%	1.46%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.



ST-RISK Region: New England

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Bangor, ME	LAT 44.8 LON -68.79																
10% PE in 50 years	0.00%	0.03%	0.00%	-0.04%	0.00%	0.01%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	-0.03%	0.04%	-0.06%	0.17%	0.38%
5% PE in 50 years	0.00%	0.00%	0.01%	0.01%	-0.02%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.09%	0.17%
2% PE in 50 years	-0.01%	0.01%	0.01%	0.01%	-0.01%	0.01%	-0.01%	0.04%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.04%
Boston, MA	LAT 42.35 LON -71.07																
10% PE in 50 years	0.00%	-0.03%	0.00%	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.02%	-0.05%	0.04%	0.00%	0.44%
5% PE in 50 years	0.00%	-0.01%	-0.01%	0.00%	0.02%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.09%	0.21%
2% PE in 50 years	-0.03%	-0.01%	-0.01%	0.02%	0.00%	0.01%	-0.01%	0.02%	-0.01%	0.00%	0.00%	0.00%	-0.07%	0.00%	0.00%	0.06%	0.00%
Burlington, VT	LAT 44.47 LON -73.21																
10% PE in 50 years	0.01%	0.00%	-0.02%	0.02%	0.03%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.01%	-0.05%	0.15%	-0.21%
5% PE in 50 years	0.02%	0.00%	0.01%	0.03%	0.02%	0.01%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.08%	0.04%
2% PE in 50 years	-0.01%	-0.01%	0.01%	-0.01%	0.02%	0.01%	0.01%	-0.01%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.06%
Concord, NH	LAT 43.2 LON -71.54																
10% PE in 50 years	0.00%	-0.03%	-0.02%	0.00%	-0.04%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.07%	0.05%	-0.17%	-0.30%
5% PE in 50 years	0.02%	0.01%	-0.01%	-0.01%	-0.01%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.10%	0.13%
2% PE in 50 years	-0.02%	0.01%	0.00%	-0.01%	0.00%	0.01%	0.02%	-0.03%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.07%
Hartford, CT	LAT 41.76 LON -72.68																
10% PE in 50 years	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.10%	-0.04%	-0.07%	-0.22%	0.09%
5% PE in 50 years	-0.02%	-0.01%	-0.01%	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	-0.04%	-0.04%	0.10%	-0.23%
2% PE in 50 years	-0.02%	-0.02%	-0.03%	-0.02%	-0.02%	-0.02%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.10%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: New Jersey, New York, and Pennsylvania

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Atlantic City, NJ	LAT 39.36 LON -74.43																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%	0.00%	0.05%	0.00%	0.11%	0.06%	-0.44%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.02%	-0.02%	0.07%	0.13%
2% PE in 50 years	0.00%	-0.03%	0.02%	0.03%	0.01%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	-0.04%
Philadelphia, PA	LAT 39.95 LON -75.18																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%	0.00%	0.00%	-0.01%	0.08%	0.07%	-0.02%	0.11%	-0.19%
5% PE in 50 years	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.05%	-0.04%	0.13%	-0.24%
2% PE in 50 years	0.00%	0.00%	0.01%	-0.01%	0.03%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	0.00%	0.00%	0.00%	0.00%	-0.14%
Pittsburgh, PA	LAT 40.44 LON -80.0																
10% PE in 50 years	-0.35%	1.61%	1.21%	0.91%	0.17%	-0.68%	-1.47%	-1.78%	-2.34%	-3.25%	-3.74%	-3.48%	-4.70%	-9.75%	-9.54%	-10.12%	-7.97%
5% PE in 50 years	0.39%	2.22%	1.85%	1.54%	0.94%	0.04%	-0.81%	-1.32%	-2.04%	-2.19%	-2.96%	-4.13%	-3.80%	-11.46%	-11.19%	-14.08%	-11.25%
2% PE in 50 years	0.93%	2.06%	1.78%	1.53%	1.17%	0.61%	0.08%	-0.65%	-1.73%	-1.87%	-3.02%	-3.13%	-4.50%	-9.51%	-13.10%	-12.04%	-14.70%
Syracuse, NY	LAT 43.04 LON -76.15																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.08%	-0.07%	-0.07%	-0.21%	0.27%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	0.00%	-0.01%	0.01%	0.03%	-0.16%	-0.29%
2% PE in 50 years	0.00%	0.03%	0.03%	-0.02%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.08%	-0.03%
The Bronx, NY	LAT 40.84 LON -73.87																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.04%	0.08%	0.07%	0.12%	0.00%
5% PE in 50 years	0.00%	-0.02%	-0.01%	0.03%	-0.02%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.02%	-0.03%	0.17%	0.00%
2% PE in 50 years	-0.01%	0.00%	-0.01%	0.00%	-0.02%	0.02%	0.00%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	-0.10%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: North Dakota

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Bismarck, ND	LAT 46.81 LON -100.79																
10% PE in 50 years	-0.01%	-0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.30%	0.31%	0.36%	0.38%	0.47%	0.68%	0.82%	1.34%	1.62%
5% PE in 50 years	0.00%	-0.04%	-0.04%	0.00%	-0.03%	0.00%	0.00%	0.05%	0.14%	0.09%	0.22%	0.36%	0.62%	0.91%	0.86%	1.32%	1.76%
2% PE in 50 years	0.00%	-0.02%	0.00%	-0.02%	0.00%	0.00%	0.03%	0.00%	0.04%	0.06%	0.07%	0.27%	0.48%	0.93%	1.04%	1.01%	1.61%
Fargo, ND	LAT 46.87 LON -96.81																
10% PE in 50 years	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	-0.03%	0.17%	0.07%	0.36%	0.36%	-0.06%	1.28%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.05%	0.05%	-0.05%	0.00%	0.16%	-0.26%	-0.02%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.07%	0.12%	-0.08%	0.03%	-0.06%	-0.39%
Grand Forks, ND	LAT 47.92 LON -97.06																
10% PE in 50 years	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.04%	0.04%	0.12%	-0.10%	0.41%	0.24%	-0.08%	0.30%	-0.86%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.04%	0.09%	-0.20%	0.19%	0.00%	-0.57%	-0.65%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	-0.05%	0.03%	0.09%	0.12%	-0.21%	-0.19%
Minot, ND	LAT 48.23 LON -101.3																
10% PE in 50 years	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.31%	0.22%	0.27%	0.37%	0.25%	0.53%	0.34%	1.41%	1.04%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.16%	0.20%	0.22%	0.25%	0.29%	0.38%	0.22%	1.08%	1.03%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.10%	0.06%	0.08%	0.22%	0.43%	0.45%	0.33%	0.94%	1.52%

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Ohio and Eastern Michigan

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Akron, OH	LAT 41.07 LON -81.53																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.07%	-0.09%	0.13%	-0.22%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	-0.09%	0.09%
2% PE in 50 years	0.00%	-0.04%	0.03%	0.00%	-0.05%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	0.02%
Columbus, OH	LAT 39.96 LON -83.0																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.02%	0.03%	-0.11%	0.13%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.19%
2% PE in 50 years	0.00%	0.03%	-0.04%	0.03%	0.02%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	0.00%
Detroit, MI	LAT 42.35 LON -83.09																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	-0.08%	0.07%	0.02%	0.10%	-0.17%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.03%	0.05%
2% PE in 50 years	0.00%	-0.01%	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.05%
Flint, MI	LAT 43.01 LON -83.69																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.03%	0.07%	-0.04%	-0.21%	0.27%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.02%	0.06%	-0.09%	0.21%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.14%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Oregon

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Baker City, OR	LAT 44.77 LON -117.84																
10% PE in 50 years	1.08%	0.62%	0.90%	1.13%	1.24%	1.28%	1.69%	1.96%	2.02%	0.79%	0.17%	-0.96%	-2.60%	-3.49%	-4.76%	N/A	N/A
5% PE in 50 years	1.19%	0.80%	1.04%	1.35%	1.48%	1.51%	1.76%	2.08%	2.17%	1.98%	1.39%	0.22%	-0.52%	-1.30%	-2.18%	N/A	N/A
2% PE in 50 years	1.28%	0.83%	1.25%	1.50%	1.62%	1.75%	1.96%	2.27%	2.23%	2.38%	2.19%	1.63%	0.21%	0.12%	0.00%	N/A	N/A
Bend, OR	LAT 44.05 LON -121.32																
10% PE in 50 years	1.33%	0.88%	1.18%	1.43%	1.58%	1.61%	1.80%	1.83%	1.92%	0.76%	0.34%	-1.35%	-1.81%	-2.36%	-3.39%	N/A	N/A
5% PE in 50 years	1.31%	0.87%	1.19%	1.46%	1.68%	1.80%	2.36%	2.34%	1.95%	1.72%	1.22%	0.77%	-0.45%	-0.45%	-0.43%	N/A	N/A
2% PE in 50 years	1.22%	0.79%	1.15%	1.48%	1.78%	1.94%	2.57%	2.49%	2.50%	1.97%	1.35%	1.01%	0.37%	0.33%	0.05%	N/A	N/A
Corvallis, OR	LAT 44.56 LON -123.27																
10% PE in 50 years	1.15%	1.08%	1.19%	1.29%	1.31%	1.53%	1.41%	1.25%	1.28%	0.58%	0.70%	0.13%	-1.86%	-1.99%	-1.46%	-1.74%	-1.35%
5% PE in 50 years	0.79%	0.65%	0.79%	0.94%	1.05%	1.09%	1.34%	1.31%	0.94%	0.83%	0.71%	0.34%	0.10%	0.08%	-0.24%	0.00%	-0.06%
2% PE in 50 years	0.34%	0.35%	0.40%	0.63%	0.77%	0.88%	1.10%	1.10%	0.81%	0.69%	0.43%	0.23%	0.05%	0.09%	0.06%	0.08%	0.11%
Medford, OR	LAT 42.32 LON -122.88																
10% PE in 50 years	1.59%	1.10%	1.56%	1.83%	2.08%	2.17%	2.54%	2.84%	2.73%	2.15%	2.14%	1.97%	1.50%	1.62%	1.52%	N/A	N/A
5% PE in 50 years	1.61%	1.06%	1.30%	1.58%	1.98%	2.04%	2.03%	2.27%	1.84%	1.72%	1.22%	0.77%	0.64%	0.71%	0.85%	N/A	N/A
2% PE in 50 years	0.70%	0.60%	0.75%	1.16%	1.41%	1.55%	1.75%	1.75%	1.49%	1.04%	0.72%	0.53%	0.21%	0.15%	0.20%	N/A	N/A
Portland, OR	LAT 45.5 LON -122.68																
10% PE in 50 years	-0.87%	0.11%	0.48%	0.50%	0.73%	0.76%	0.72%	0.42%	-0.89%	-4.65%	-2.69%	-3.76%	-6.54%	-6.17%	-5.77%	-5.34%	-5.00%
5% PE in 50 years	0.56%	0.42%	0.73%	0.90%	1.07%	1.27%	1.36%	1.32%	1.01%	0.25%	-0.18%	-0.25%	-0.57%	-0.72%	-2.12%	-1.36%	-1.92%
2% PE in 50 years	0.70%	0.53%	0.86%	1.06%	1.17%	1.23%	1.57%	1.39%	1.20%	0.94%	0.66%	0.39%	0.11%	0.09%	0.05%	-0.15%	-0.14%

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: South Dakota

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Chamberlain, SD	LAT 43.8 LON -99.34																
10% PE in 50 years	0.00%	-0.02%	0.00%	0.00%	0.00%	0.05%	0.11%	0.14%	0.20%	0.27%	0.27%	0.25%	0.23%	0.62%	0.84%	1.11%	1.55%
5% PE in 50 years	0.00%	0.00%	0.00%	-0.01%	0.00%	0.01%	0.04%	0.09%	0.12%	0.18%	0.25%	0.28%	0.37%	0.80%	0.92%	1.05%	1.15%
2% PE in 50 years	0.00%	0.03%	-0.01%	-0.01%	0.00%	-0.01%	0.01%	0.03%	0.07%	0.14%	0.25%	0.23%	0.42%	0.87%	0.89%	0.98%	1.03%
Murdo, SD	LAT 43.89 LON -100.72																
10% PE in 50 years	0.00%	-0.02%	0.00%	0.00%	0.05%	0.08%	0.11%	0.14%	0.26%	0.36%	0.37%	0.42%	0.58%	0.83%	0.94%	N/A	N/A
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.07%	0.12%	0.17%	0.24%	0.33%	0.37%	0.53%	0.86%	0.96%	N/A	N/A
2% PE in 50 years	0.02%	-0.02%	0.03%	0.04%	0.00%	0.04%	0.03%	0.07%	0.13%	0.18%	0.31%	0.39%	0.53%	0.95%	0.94%	N/A	N/A
Rapid City, SD	LAT 44.08 LON -103.23																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.02%	0.04%	0.06%	0.19%	0.41%	0.43%	0.48%	0.71%	0.80%	1.02%	0.77%	N/A	N/A
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.06%	0.13%	0.28%	0.34%	0.41%	0.68%	0.74%	1.03%	1.06%	N/A	N/A
2% PE in 50 years	0.00%	-0.03%	-0.01%	0.01%	0.03%	-0.01%	0.02%	0.06%	0.15%	0.22%	0.34%	0.46%	0.66%	0.83%	0.96%	N/A	N/A
Sioux Falls, SD	LAT 43.54 LON -96.74																
10% PE in 50 years	-0.26%	1.61%	1.31%	1.04%	0.21%	-0.73%	-1.81%	-2.63%	-3.27%	-3.75%	-5.54%	-6.66%	-7.92%	-13.03%	-13.81%	-10.56%	-12.61%
5% PE in 50 years	0.57%	1.72%	1.61%	1.45%	1.16%	0.40%	-0.73%	-1.38%	-2.24%	-3.41%	-4.62%	-4.86%	-6.74%	-15.11%	-15.41%	-15.81%	-12.65%
2% PE in 50 years	0.70%	1.23%	1.18%	1.08%	0.96%	0.73%	0.51%	-0.20%	-1.35%	-1.58%	-3.00%	-4.97%	-4.98%	-17.66%	-15.54%	-15.99%	-15.90%
Watertown, SD	LAT 44.89 LON -97.13																
10% PE in 50 years	0.00%	0.00%	-0.04%	0.00%	0.00%	0.04%	0.05%	0.07%	0.09%	0.17%	0.13%	0.33%	0.11%	0.67%	0.59%	0.58%	-0.56%
5% PE in 50 years	0.00%	-0.02%	-0.02%	0.00%	0.00%	0.00%	0.03%	0.00%	0.06%	0.08%	0.22%	0.20%	0.10%	0.75%	0.73%	0.84%	0.86%
2% PE in 50 years	0.00%	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.04%	0.05%	0.14%	0.17%	0.35%	0.78%	0.78%	0.71%	0.81%

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Texas – Eastern

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Austin, TX	LAT 30.26 LON -97.74																
10% PE in 50 years	0.02%	0.06%	0.00%	0.05%	0.05%	0.05%	0.25%	0.84%	1.52%	1.86%	4.10%	5.43%	12.22%	8.68%	8.84%	11.89%	19.52%
5% PE in 50 years	0.00%	0.00%	0.00%	0.03%	0.03%	0.03%	0.12%	0.37%	0.93%	1.09%	1.59%	1.39%	2.54%	1.30%	1.10%	6.95%	9.11%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.10%	0.27%	0.43%	0.32%	0.33%	0.62%	0.55%	0.16%	0.10%	1.83%	5.72%
Dallas, TX	LAT 32.77 LON -96.82																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.35%	0.28%	0.78%	0.45%	0.47%	3.48%	4.47%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.04%	0.11%	0.09%	0.09%	0.07%	1.23%	2.61%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.03%	0.00%	0.00%	0.00%	0.00%	0.07%	0.46%
Houston, TX	LAT 29.74 LON -95.38																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.07%	0.23%	0.38%	0.48%	0.65%	0.87%	1.69%	2.92%	4.13%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.12%	0.15%	0.13%	0.09%	0.10%	1.17%	2.00%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.04%	0.00%	0.00%	0.00%	0.00%	0.17%	0.89%
Lufkin, TX	LAT 31.34 LON -94.73																
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.10%	0.21%	0.15%	0.21%	1.03%	1.03%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.39%	0.71%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.06%	0.22%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Texas – Western

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Abilene, TX	LAT 32.45 LON -99.74																
10% PE in 50 years	-1.11%	1.15%	0.77%	0.48%	-0.28%	-1.09%	-1.93%	-2.26%	-2.58%	-2.93%	-4.22%	-4.62%	-5.36%	-10.60%	-11.27%	-8.65%	-8.21%
5% PE in 50 years	0.06%	1.71%	1.31%	1.03%	0.44%	-0.33%	-1.06%	-1.37%	-1.92%	-2.69%	-3.71%	-4.01%	-5.26%	-13.57%	-13.79%	-11.84%	-8.93%
2% PE in 50 years	0.53%	1.88%	1.51%	1.24%	0.89%	0.42%	-0.02%	-0.52%	-1.29%	-1.59%	-2.68%	-4.16%	-4.24%	-14.21%	-12.79%	-12.42%	-11.26%
Amarillo, TX	LAT 35.21 LON -101.85																
10% PE in 50 years	0.07%	-0.02%	0.09%	0.15%	0.30%	0.42%	0.48%	0.60%	0.88%	0.72%	0.70%	0.66%	0.78%	0.61%	0.62%	0.41%	1.11%
5% PE in 50 years	0.00%	-0.02%	-0.01%	0.09%	0.22%	0.36%	0.48%	0.68%	0.82%	0.82%	0.91%	0.77%	0.68%	0.85%	0.87%	1.29%	0.82%
2% PE in 50 years	0.04%	-0.02%	0.03%	0.03%	0.12%	0.19%	0.31%	0.44%	0.67%	0.83%	0.88%	0.93%	0.86%	1.06%	1.07%	1.59%	1.83%
Lubbock, TX	LAT 33.57 LON -101.87																
10% PE in 50 years	0.14%	0.00%	0.07%	0.10%	0.17%	0.28%	0.51%	0.87%	0.91%	0.81%	0.83%	0.69%	0.92%	1.08%	1.07%	0.85%	1.52%
5% PE in 50 years	0.05%	0.00%	0.02%	0.09%	0.18%	0.27%	0.49%	0.76%	0.98%	0.97%	0.89%	0.95%	0.94%	1.26%	1.30%	1.46%	1.25%
2% PE in 50 years	0.03%	-0.01%	0.01%	0.04%	0.08%	0.15%	0.33%	0.68%	0.90%	0.84%	0.94%	0.94%	0.99%	1.68%	1.67%	1.79%	1.69%
Midland, TX	LAT 32.0 LON -102.08																
10% PE in 50 years	0.12%	0.06%	0.09%	0.16%	0.27%	0.34%	0.62%	0.96%	0.98%	0.78%	0.76%	0.80%	0.70%	1.05%	1.12%	0.79%	1.07%
5% PE in 50 years	0.07%	0.03%	0.07%	0.10%	0.15%	0.24%	0.58%	0.83%	0.95%	0.93%	0.86%	0.93%	0.89%	1.52%	1.30%	1.19%	1.02%
2% PE in 50 years	0.05%	-0.01%	0.09%	0.07%	0.11%	0.15%	0.45%	0.80%	1.00%	0.91%	0.88%	1.01%	0.99%	1.69%	1.68%	1.94%	1.53%

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.

ST-RISK Region: Utah

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Logan, UT	LAT 41.73 LON -111.84																	
10% PE in 50 years		1.17%	0.74%	1.13%	1.34%	1.48%	1.45%	1.62%	1.63%	1.48%	1.30%	1.17%	1.18%	0.94%	0.88%	0.80%	N/A	N/A
5% PE in 50 years		1.23%	0.82%	1.30%	1.54%	1.60%	1.57%	1.68%	1.75%	1.58%	1.42%	1.25%	1.19%	1.20%	1.11%	1.01%	N/A	N/A
2% PE in 50 years		1.32%	0.75%	1.32%	1.52%	1.61%	1.78%	1.67%	1.83%	1.62%	1.38%	1.25%	1.31%	1.18%	1.19%	1.32%	N/A	N/A
Moab, UT	LAT 38.57 LON -109.56																	
10% PE in 50 years		0.14%	0.05%	0.12%	0.18%	0.27%	0.33%	0.81%	1.40%	1.36%	0.87%	-0.68%	-2.33%	-4.52%	-5.51%	-7.19%	N/A	N/A
5% PE in 50 years		0.10%	0.00%	0.11%	0.17%	0.24%	0.31%	0.78%	1.34%	1.74%	1.25%	0.20%	-0.62%	-2.53%	-2.59%	-4.02%	N/A	N/A
2% PE in 50 years		0.07%	0.04%	0.10%	0.12%	0.21%	0.20%	0.70%	1.28%	1.59%	1.60%	0.95%	0.43%	-0.50%	-0.39%	-1.15%	N/A	N/A
Price, UT	LAT 39.59 LON -110.81																	
10% PE in 50 years		0.67%	0.43%	0.76%	0.95%	1.04%	1.04%	1.38%	1.63%	1.61%	1.53%	0.92%	0.51%	-0.53%	-1.16%	-2.42%	N/A	N/A
5% PE in 50 years		0.65%	0.42%	0.79%	1.00%	1.17%	1.21%	1.62%	1.82%	1.91%	1.77%	1.59%	1.15%	0.87%	0.21%	-0.45%	N/A	N/A
2% PE in 50 years		0.59%	0.44%	0.81%	1.05%	1.26%	1.29%	1.74%	2.07%	2.03%	2.05%	1.98%	2.00%	1.47%	1.37%	1.00%	N/A	N/A
Salt Lake City, UT	LAT 40.76 LON -111.9																	
10% PE in 50 years		0.60%	0.18%	0.38%	0.48%	0.54%	0.54%	0.62%	0.65%	0.57%	0.51%	0.31%	0.38%	0.32%	0.44%	0.24%	N/A	N/A
5% PE in 50 years		0.65%	0.24%	0.32%	0.30%	0.47%	0.49%	0.44%	0.57%	0.52%	0.38%	0.34%	0.44%	0.34%	0.37%	0.60%	N/A	N/A
2% PE in 50 years		1.06%	0.87%	1.31%	1.49%	1.54%	1.56%	1.38%	1.16%	1.33%	1.14%	1.08%	0.92%	0.94%	1.00%	0.98%	N/A	N/A
St. George, UT	LAT 37.09 LON -113.57																	
10% PE in 50 years		1.16%	0.76%	1.09%	1.31%	1.42%	1.43%	1.65%	1.56%	0.87%	-0.31%	-3.56%	-6.41%	-10.09%	-12.17%	-14.16%	N/A	N/A
5% PE in 50 years		1.16%	0.81%	1.15%	1.35%	1.55%	1.58%	1.81%	1.95%	1.53%	1.14%	0.13%	-2.45%	-5.40%	-6.83%	-8.47%	N/A	N/A
2% PE in 50 years		1.23%	0.83%	1.30%	1.53%	1.75%	1.72%	1.90%	2.11%	1.81%	1.62%	1.49%	1.13%	-1.45%	-2.44%	-2.31%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.



ST-RISK Region: Washington

Site	PGA	Period (sec)															
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10
Bellingham, WA	LAT 48.75 LON -122.48																
10% PE in 50 years	0.42%	0.46%	0.68%	0.85%	0.86%	0.92%	0.90%	0.96%	0.92%	0.73%	0.67%	0.62%	0.57%	0.53%	0.55%	0.30%	-0.83%
5% PE in 50 years	0.50%	0.53%	0.74%	0.99%	1.03%	0.96%	0.99%	1.03%	0.90%	0.79%	0.59%	0.56%	0.49%	0.50%	0.44%	0.54%	0.36%
2% PE in 50 years	0.55%	0.63%	0.80%	1.23%	1.27%	1.18%	1.19%	1.09%	0.98%	0.73%	0.49%	0.48%	0.41%	0.36%	0.34%	0.45%	0.43%
Ellensburg, WA	LAT 47.0 LON -120.56																
10% PE in 50 years	0.45%	0.54%	0.83%	0.98%	1.05%	1.24%	1.33%	1.39%	1.12%	1.01%	0.88%	0.75%	0.63%	0.37%	0.08%	N/A	N/A
5% PE in 50 years	0.63%	0.62%	0.94%	1.14%	1.32%	1.33%	1.41%	1.61%	1.34%	1.05%	0.89%	0.78%	0.66%	0.59%	0.55%	N/A	N/A
2% PE in 50 years	0.70%	0.76%	1.14%	1.38%	1.59%	1.54%	1.63%	1.78%	1.43%	1.16%	0.86%	0.71%	0.55%	0.56%	0.46%	N/A	N/A
Olympia, WA	LAT 47.04 LON -122.9																
10% PE in 50 years	0.22%	0.25%	0.36%	0.50%	0.52%	0.48%	0.52%	0.55%	0.51%	0.42%	0.37%	0.36%	0.35%	0.34%	0.31%	0.00%	-0.92%
5% PE in 50 years	0.24%	0.27%	0.35%	0.52%	0.54%	0.50%	0.50%	0.47%	0.43%	0.34%	0.27%	0.23%	0.23%	0.21%	0.27%	0.34%	0.06%
2% PE in 50 years	0.25%	0.27%	0.48%	0.54%	0.60%	0.54%	0.51%	0.46%	0.37%	0.25%	0.18%	0.16%	0.11%	0.11%	0.13%	0.19%	0.18%
Richland, WA	LAT 46.27 LON -119.29																
10% PE in 50 years	0.56%	0.59%	0.90%	1.05%	1.16%	1.18%	1.33%	1.59%	1.41%	1.19%	0.82%	0.61%	0.24%	-0.50%	-1.16%	N/A	N/A
5% PE in 50 years	0.66%	0.69%	1.03%	1.25%	1.34%	1.37%	1.59%	1.68%	1.50%	1.20%	1.01%	0.83%	0.57%	0.45%	0.06%	N/A	N/A
2% PE in 50 years	0.79%	0.81%	1.20%	1.45%	1.64%	1.61%	1.77%	1.83%	1.63%	1.18%	0.97%	0.72%	0.61%	0.50%	0.40%	N/A	N/A
Seattle, WA	LAT 47.6 LON -122.33																
10% PE in 50 years	0.34%	0.35%	0.49%	0.66%	0.69%	0.65%	0.67%	0.70%	0.61%	0.52%	0.37%	0.38%	0.32%	0.35%	0.32%	0.15%	-0.42%
5% PE in 50 years	0.35%	0.41%	0.58%	0.79%	0.81%	0.76%	0.79%	0.73%	0.67%	0.54%	0.49%	0.36%	0.35%	0.32%	0.37%	0.40%	0.20%
2% PE in 50 years	0.49%	0.53%	0.89%	1.05%	1.06%	1.01%	1.04%	0.95%	0.81%	0.62%	0.48%	0.42%	0.43%	0.42%	0.37%	0.52%	0.45%
Spokane, WA	LAT 47.66 LON -117.43																
10% PE in 50 years	0.61%	0.63%	0.91%	1.05%	1.21%	1.29%	1.58%	1.87%	1.69%	1.43%	1.01%	0.89%	0.54%	0.27%	-0.49%	N/A	N/A
5% PE in 50 years	0.68%	0.74%	1.06%	1.30%	1.44%	1.47%	1.67%	1.93%	1.83%	1.52%	1.26%	1.05%	0.80%	0.67%	0.52%	N/A	N/A
2% PE in 50 years	0.74%	0.78%	1.18%	1.44%	1.65%	1.66%	1.87%	2.14%	1.98%	1.65%	1.36%	1.19%	0.83%	0.65%	0.52%	N/A	N/A

Values of N/A indicate that spectral acceleration values could not be interpolated for the given period without being considered suspect. These were not used for comparison.

Comparison Key



Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.
 Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.



ST-RISK Region: Wisconsin and Western Michigan

Site	PGA	Period (sec)																
		0.1	0.15	0.2	0.25	0.3	0.4	0.5	0.7	1	1.4	2	3	4	5	7.5	10	
Grand Rapids, MI	LAT 42.96 LON -85.67																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.02%	0.02%	-0.06%	0.05%	0.09%
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.09%	-0.15%
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.03%
Green Bay, WI	LAT 44.51 LON -88.02																	
10% PE in 50 years	-0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.05%	0.02%	0.04%	-0.09%	-0.34%	-0.23%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.06%	-0.03%	0.18%	-0.26%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.06%	
Kalamazoo, MI	LAT 42.28 LON -85.6																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	-0.05%	0.10%	-0.14%	0.00%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.03%	-0.05%	
2% PE in 50 years	0.00%	0.02%	0.04%	-0.01%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.07%
Madison, WI	LAT 43.07 LON -89.41																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.05%	0.05%	-0.11%	0.00%	0.18%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.09%	-0.25%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.05%	
Milwaukee, WI	LAT 43.03 LON -87.91																	
10% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.06%	-0.03%	0.00%	-0.21%	-0.44%	
5% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	-0.03%	0.20%	
2% PE in 50 years	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.12%	

Comparison Key

+/- 5%	+/- 5% - 10%	+/- 10% - 15%	+/- 15+%
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Positive values indicate that ST-RISK calculated greater ground motion relative to EZ-FRISK.

Negative values indicate that ST-RISK calculated lower ground motion relative to EZ-FRISK.