

Comparison of GMMs with TDIs for Crustal Earthquake

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Taipei, Taiwan**

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List of GMMs with TDIs for Crustal Source

■ Adjusted Foreign Model for Taiwan

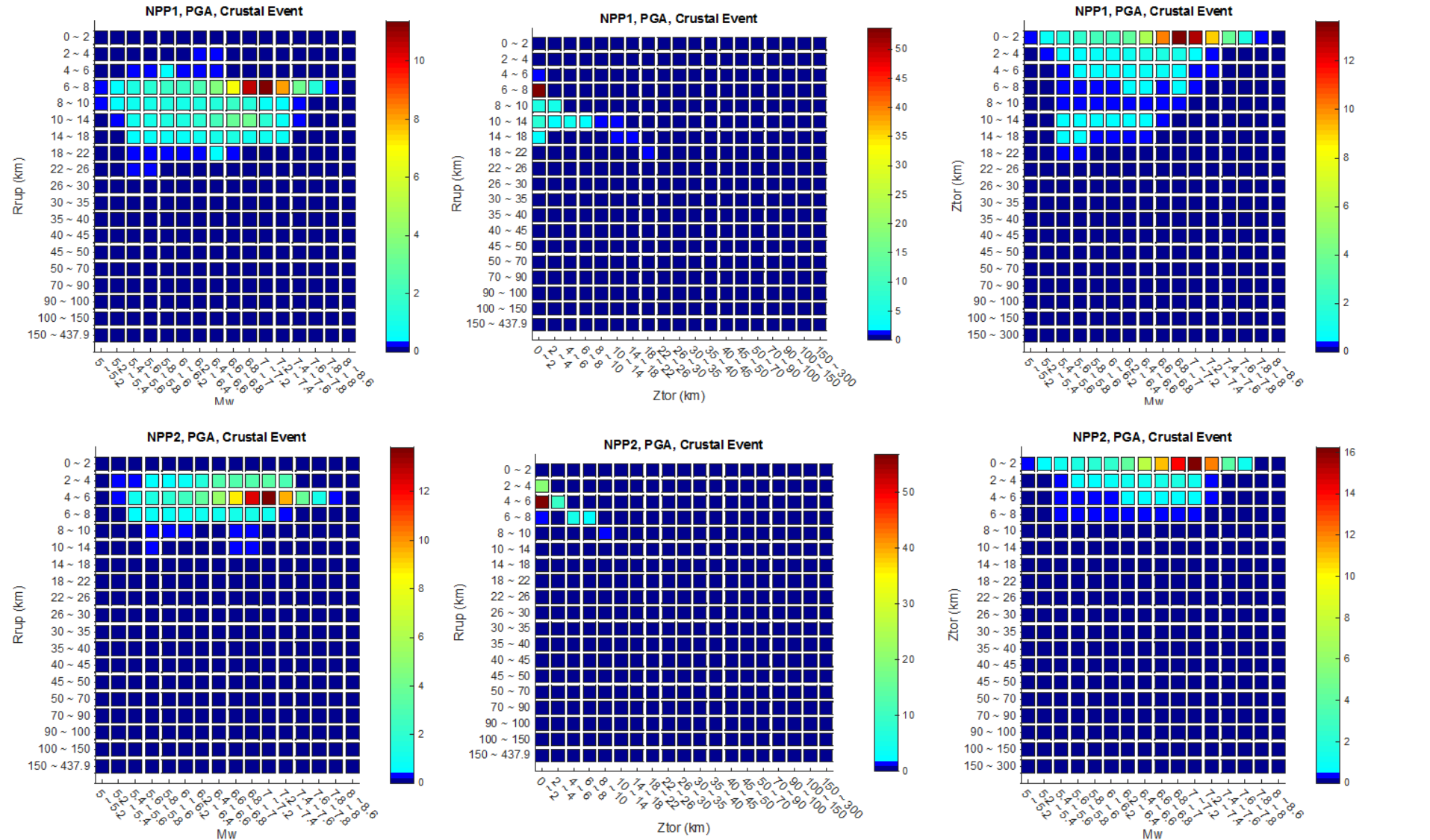
- Adjusted Abrahamson et. al. 2014 (ASK14adj)
- Adjusted Boore et. al. 2014 (BSSA14adj)
- Adjusted Campbell and Bozorgnia 2014 (CB14adj)
- Adjusted Chiou and Youngs 2014 (CY14adj)
- Adjusted Idriss 2014 (Idriss14adj)
- Adjusted Akkar et. al. 2014 (ASB14adj)
- Adjusted Bindi et. al. 2014 (Bindi14adj)

■ Taiwan

- Phung et. al. 2017 (Phung17)
- Chao et. al. 2017 (Chao17)

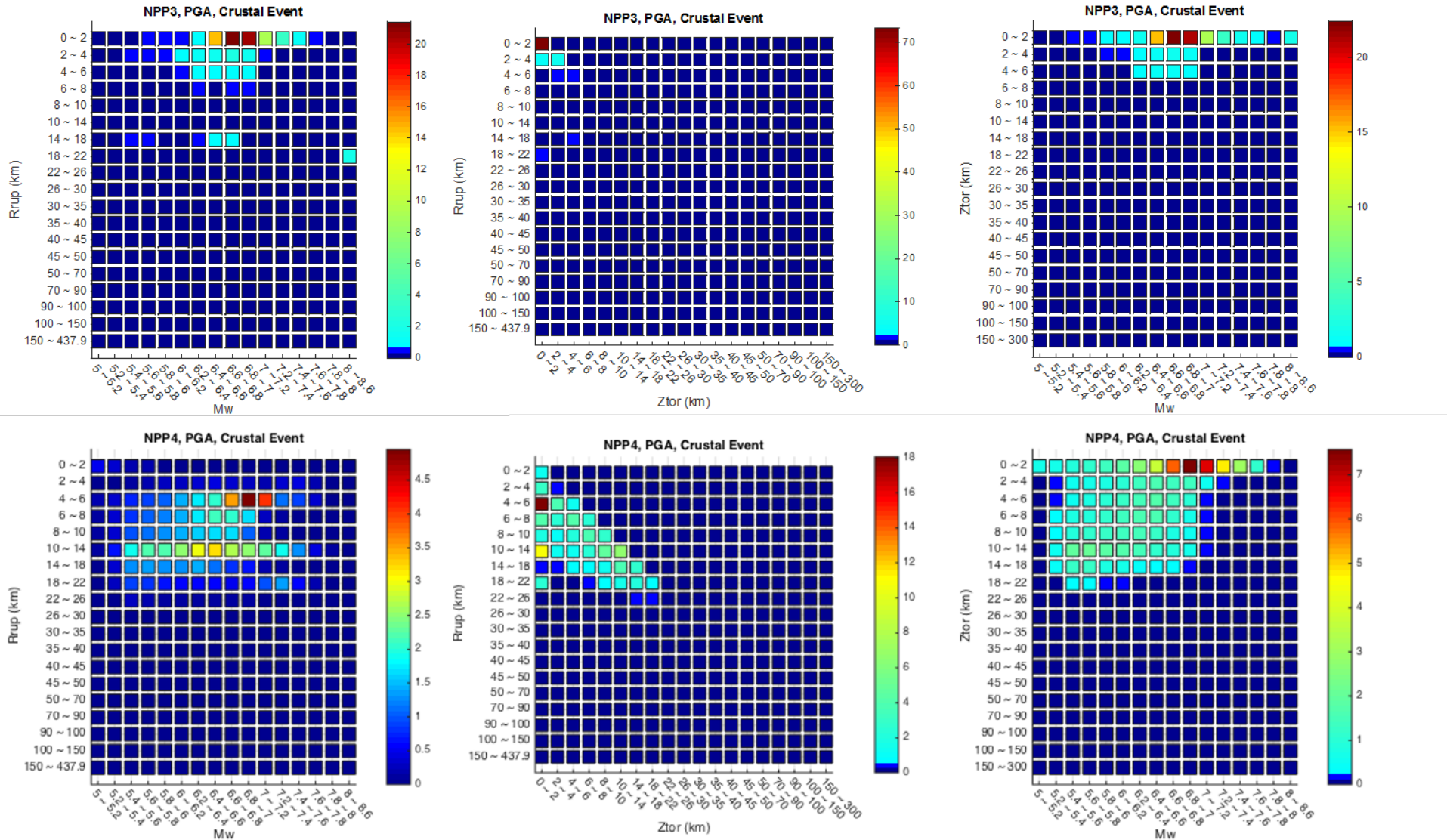
Hazard Disaggregation of Crustal Source

- NPP1 and NPP2



Hazard Disaggregation of Crustal Source

- NPP3 and NPP4



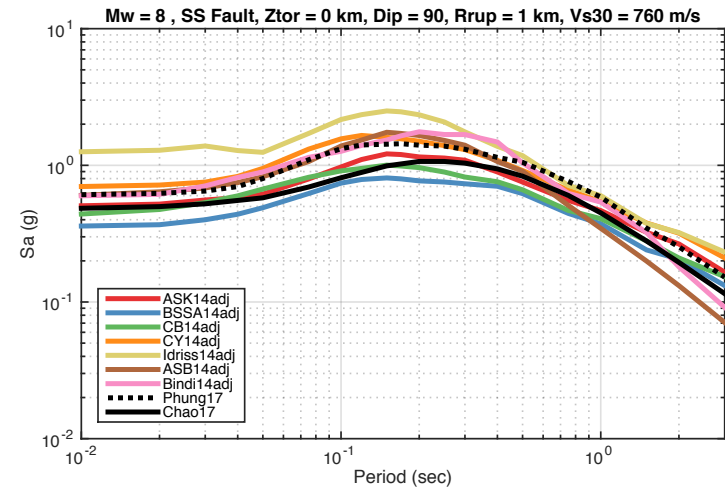
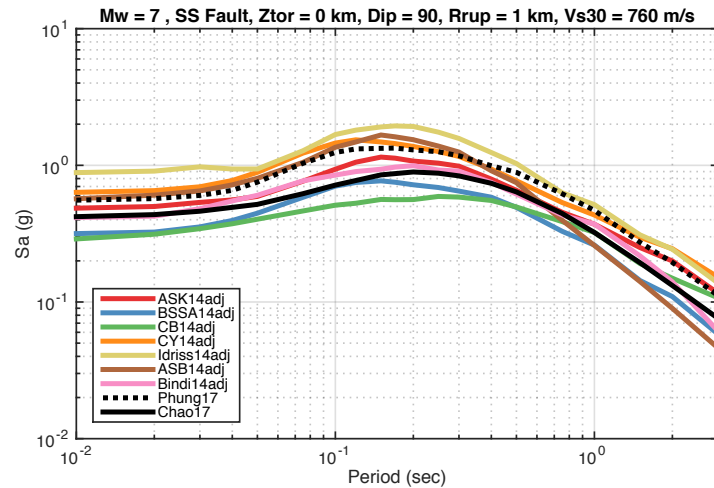
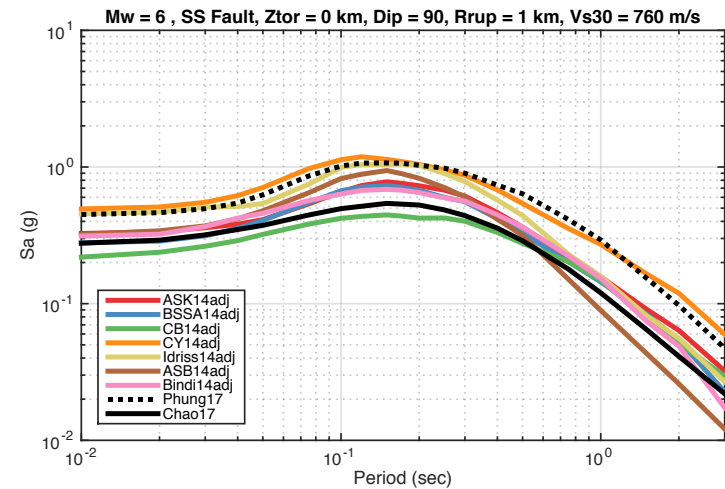
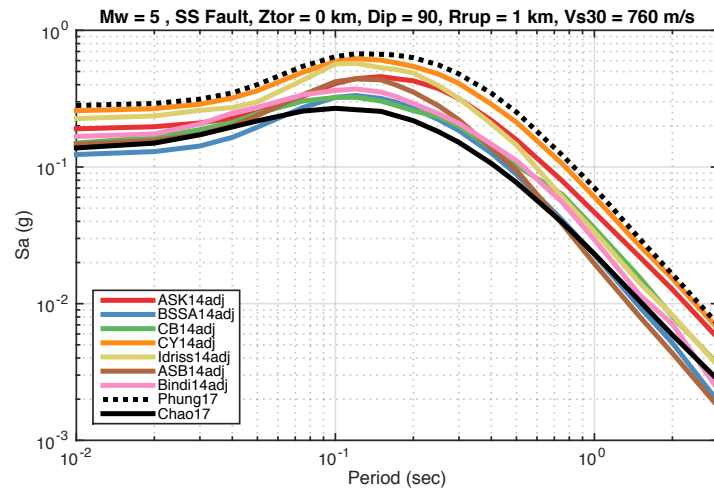
Selection of GM Scenarios for Comparison

- GM Scenarios which is significant to hazard of target sites are selected
- Rupture width is calculated by using empirical equation (Wells and Coppersmith, 1994), and hypocenter is assumed at the center of the rupture plan **to calculate hypocenter depth H_{hypo} for CB14adj**
- $Z_{1.0}$ is calculated by using empirical equation (Kuo et. al. 2017) with $V_{s30} = 760$ m/s, and $Z_{2.5}$ is assumed as 2 km

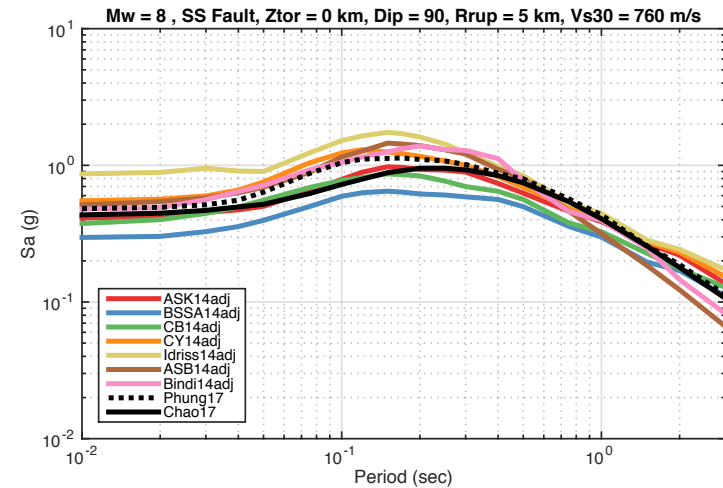
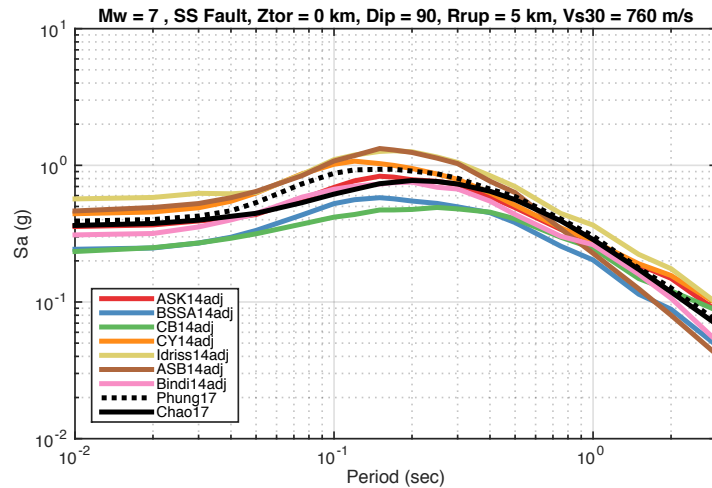
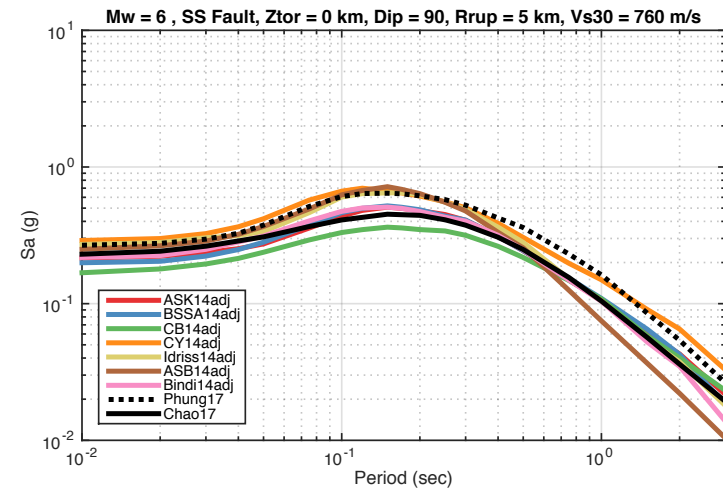
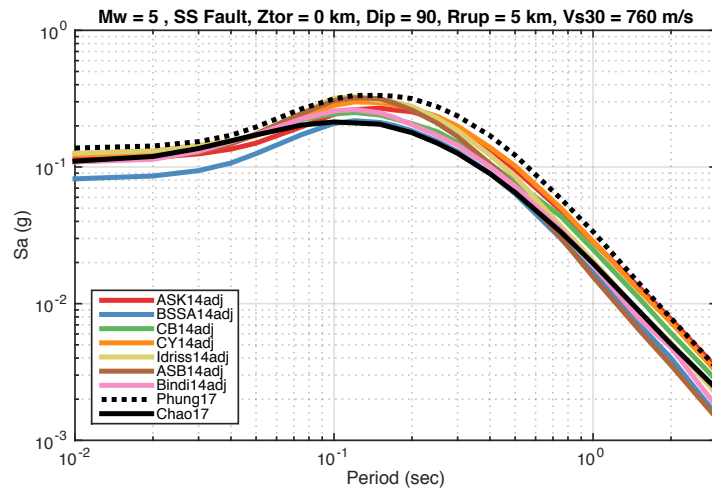
Comparison of the GMMs with TDIs

No.	Source Type	Mw	Dip (deg)	SOF	Rrup (km)	Ztor (km)	Vs30 (m/s)	Z1.0 (m)
1	Crustal	5 – 8	90	SS	1	0	760	21.8
2	Crustal	5 – 8	90	SS	5	0	760	21.8
3	Crustal	5 – 8	90	SS	10	0	760	21.8
4	Crustal	5 – 8	90	SS	10	10	760	21.8
5	Crustal	5 – 8	90	SS	20	0	760	21.8
6	Crustal	5 – 8	90	SS	20	20	760	21.8

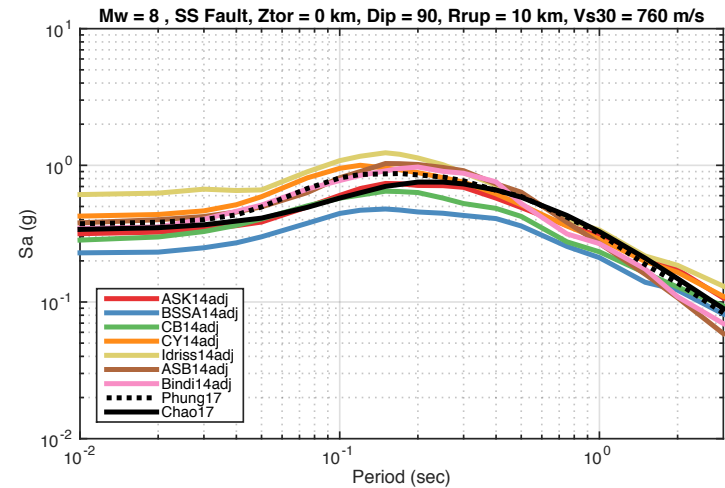
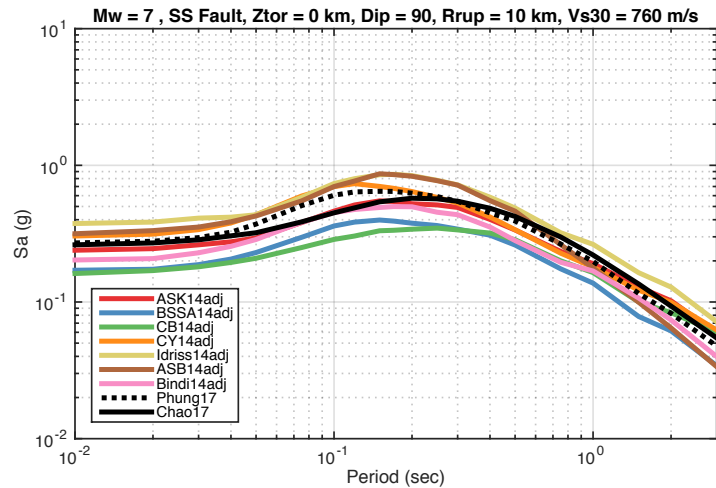
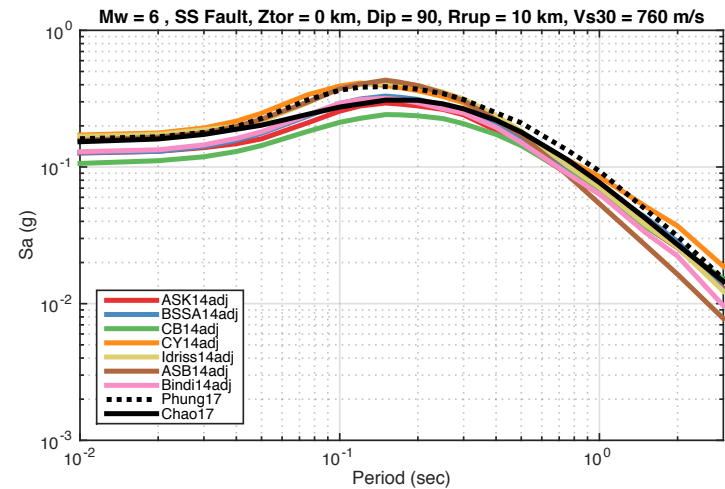
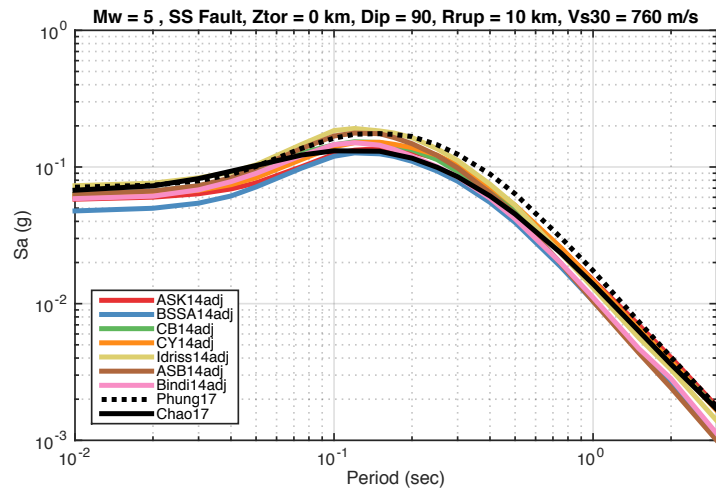
Comparison of the Response Spectrum – Scenario 1



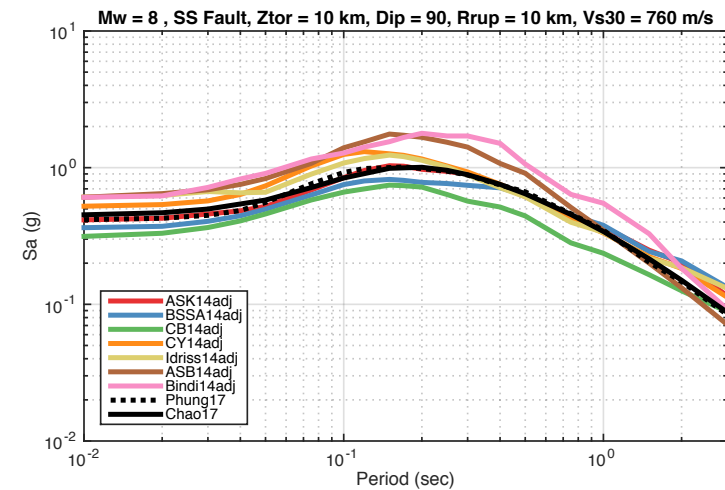
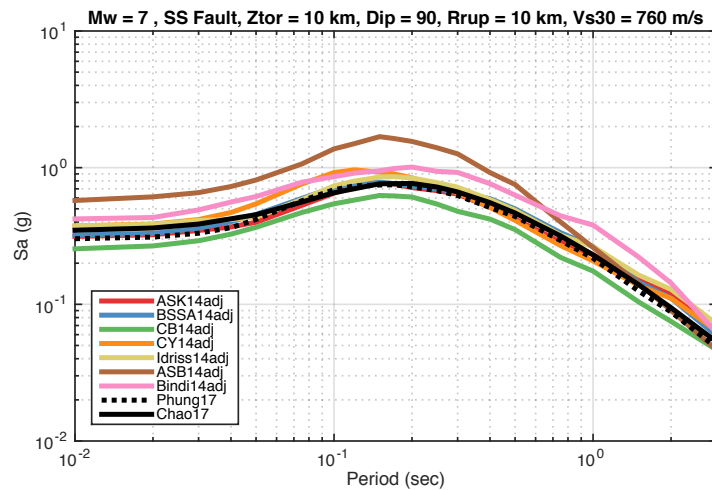
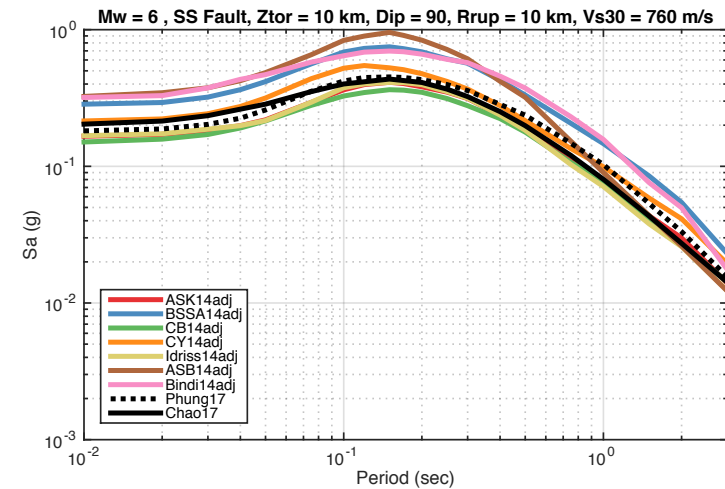
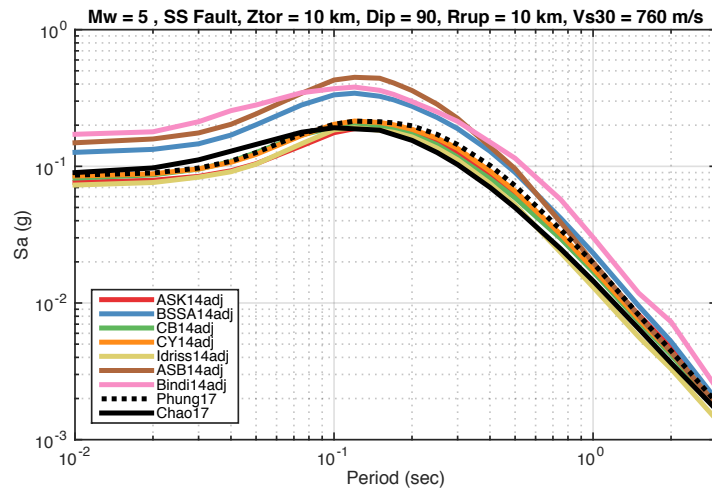
Comparison of the Response Spectrum – Scenario 2



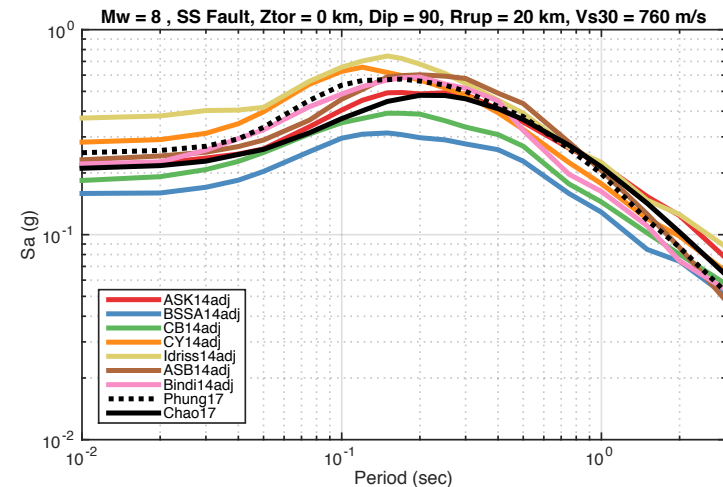
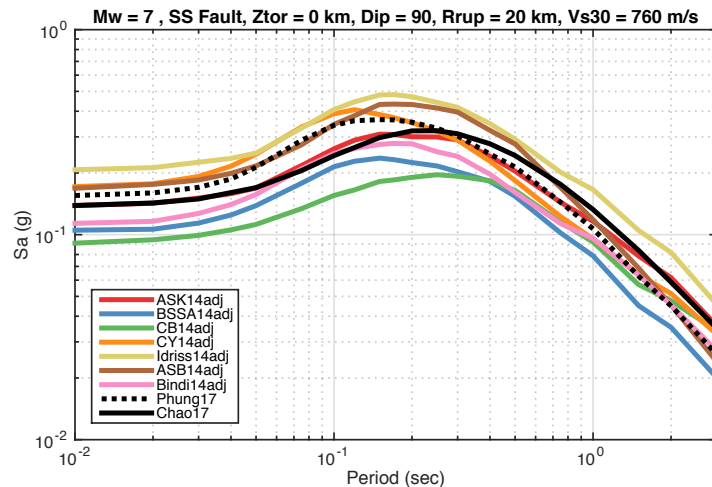
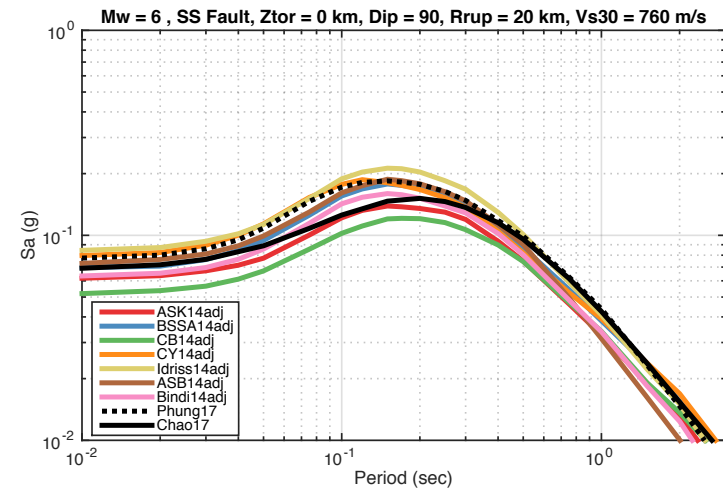
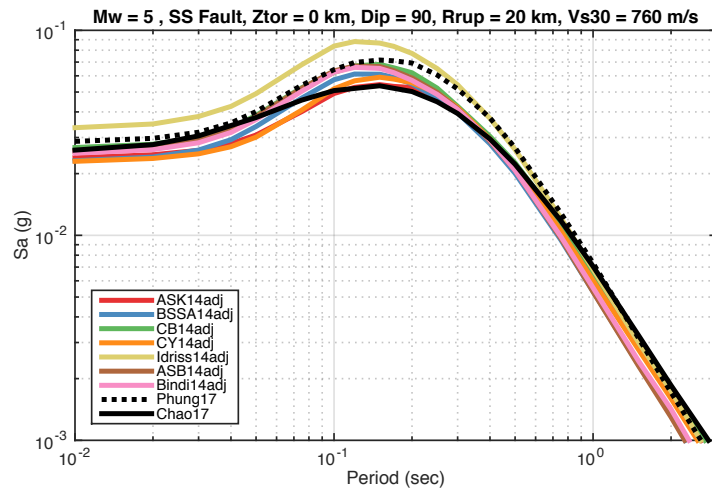
Comparison of the Response Spectrum – Scenario 3



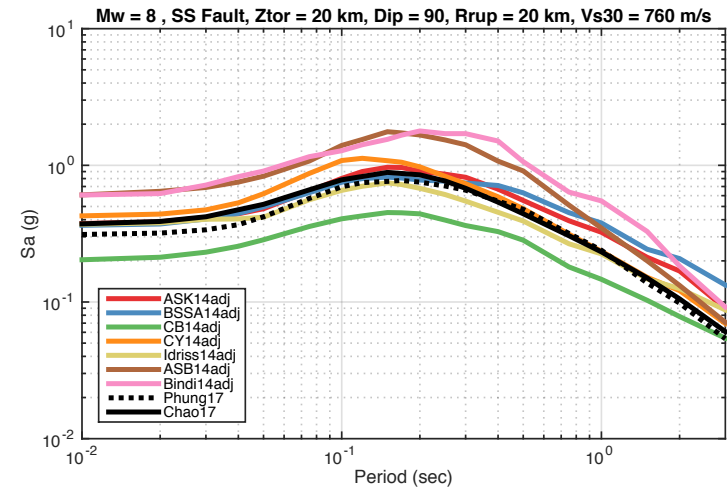
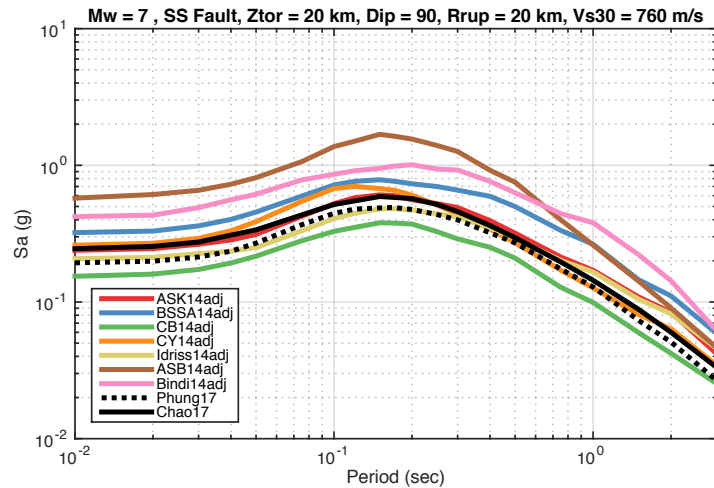
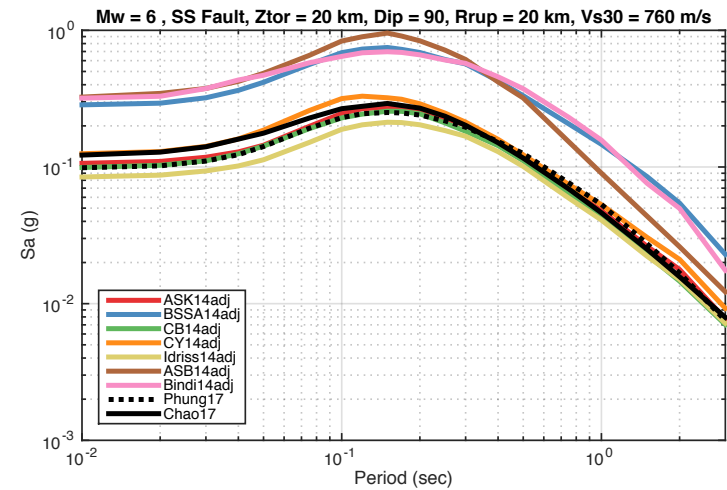
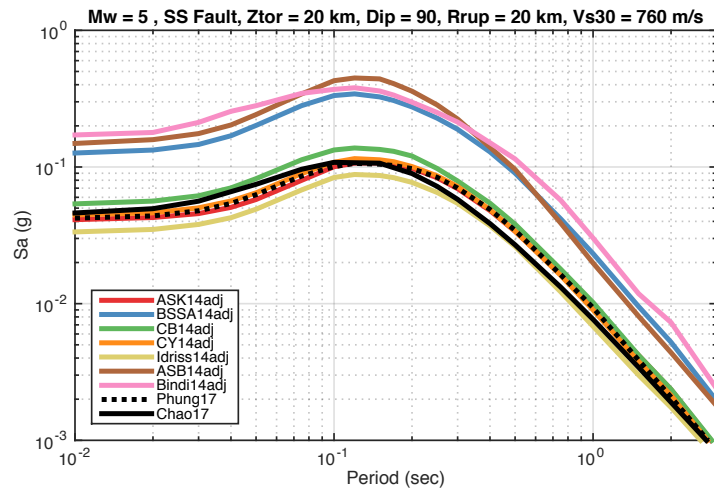
Comparison of the Response Spectrum – Scenario 4



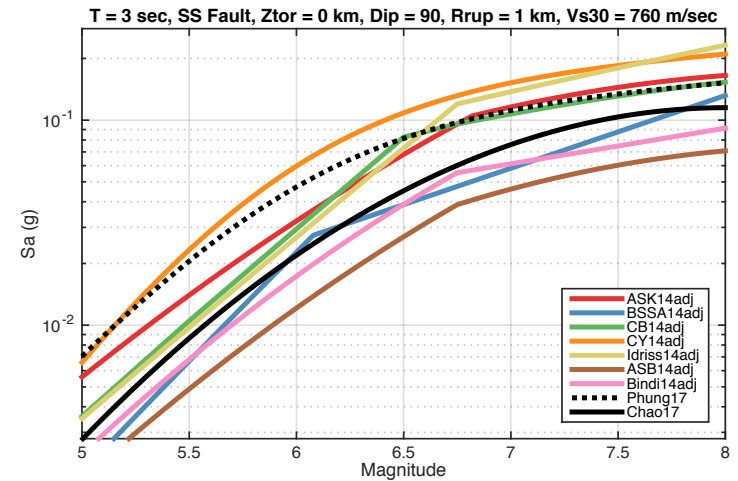
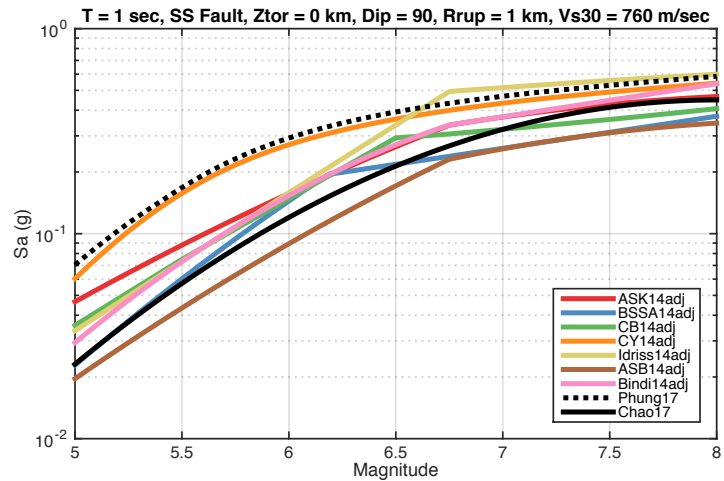
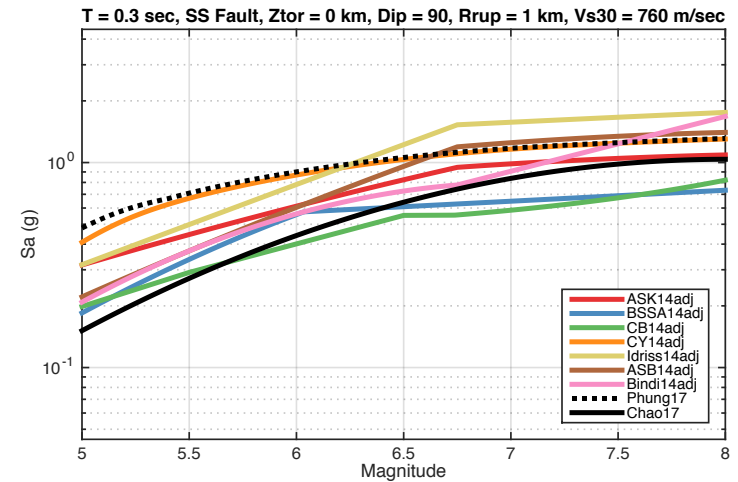
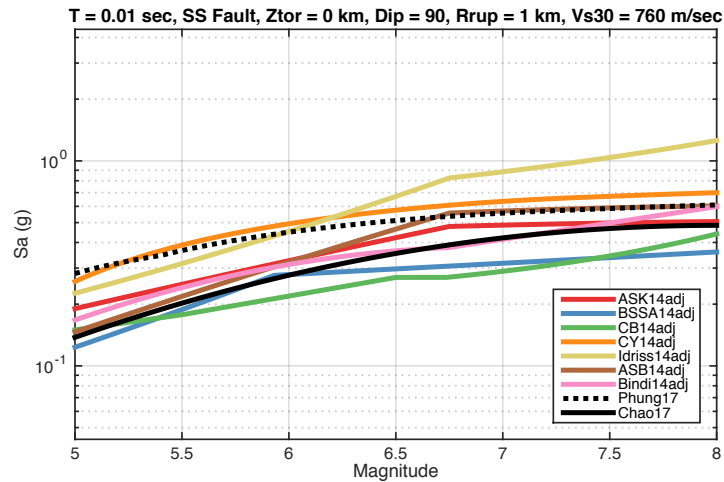
Comparison of the Response Spectrum – Scenario 5



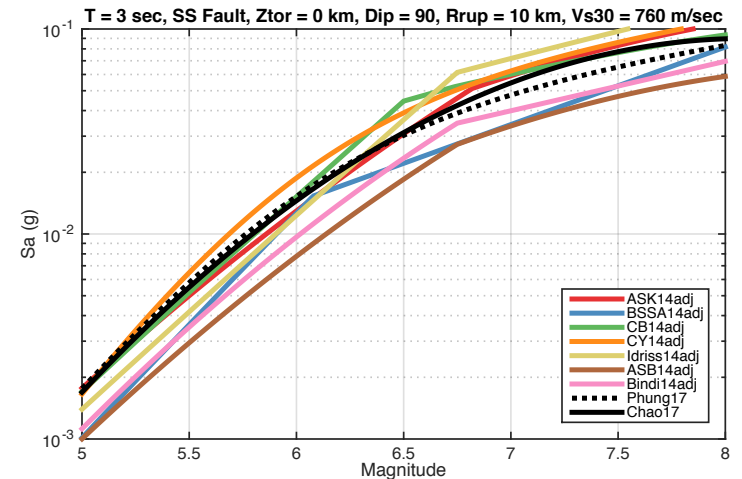
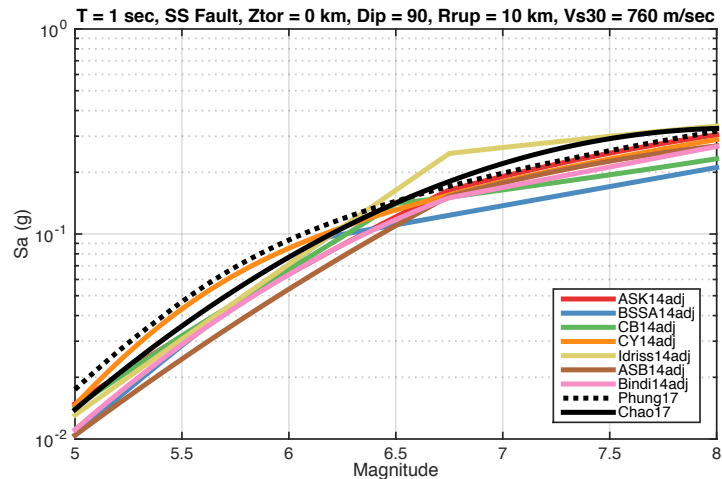
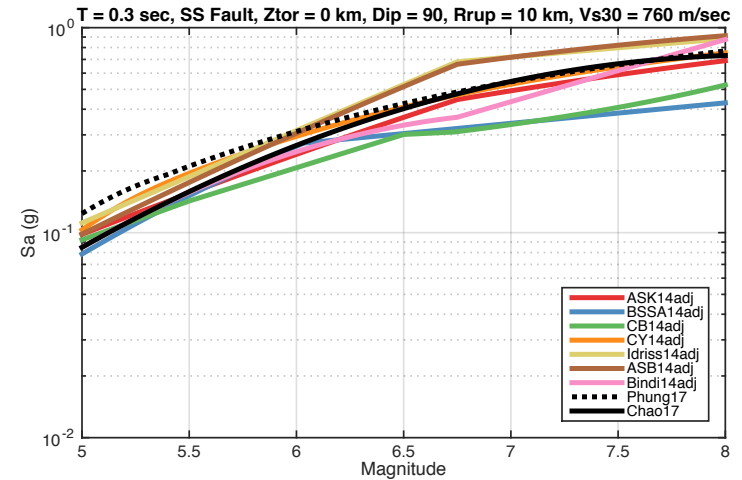
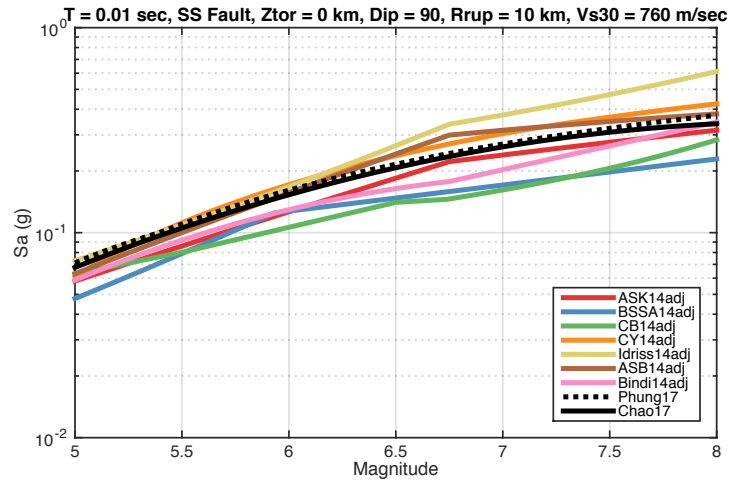
Comparison of the Response Spectrum – Scenario 6



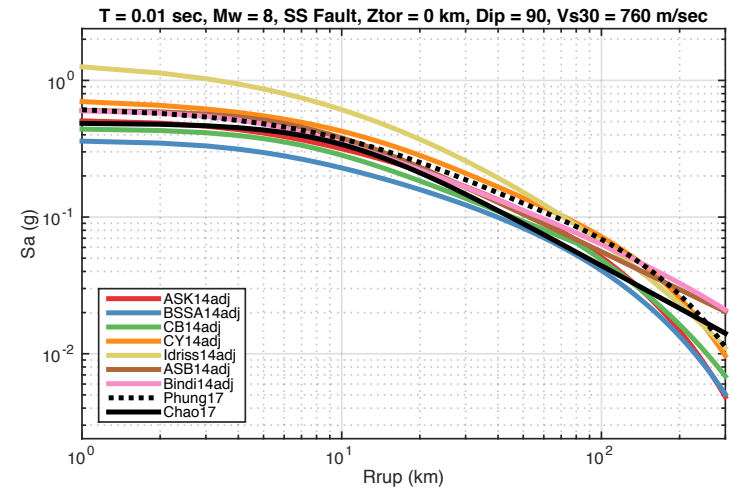
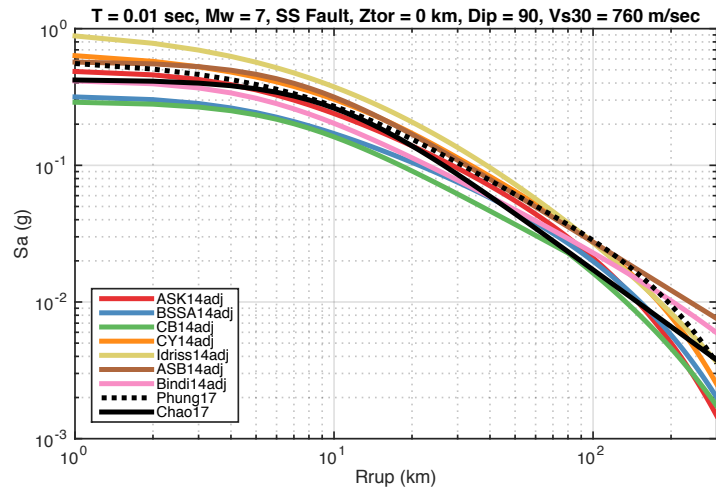
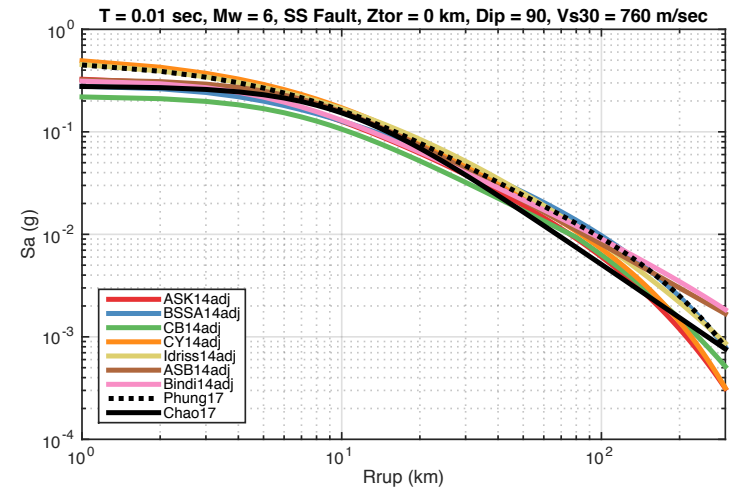
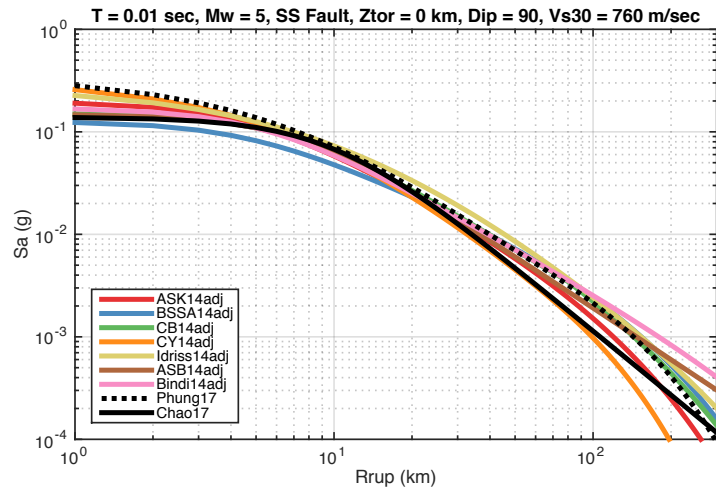
Magnitude Scaling for $R_{rup} = 1$ km



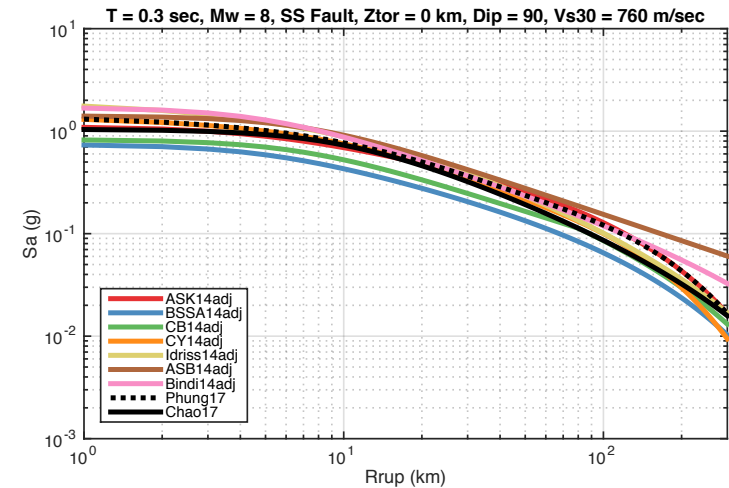
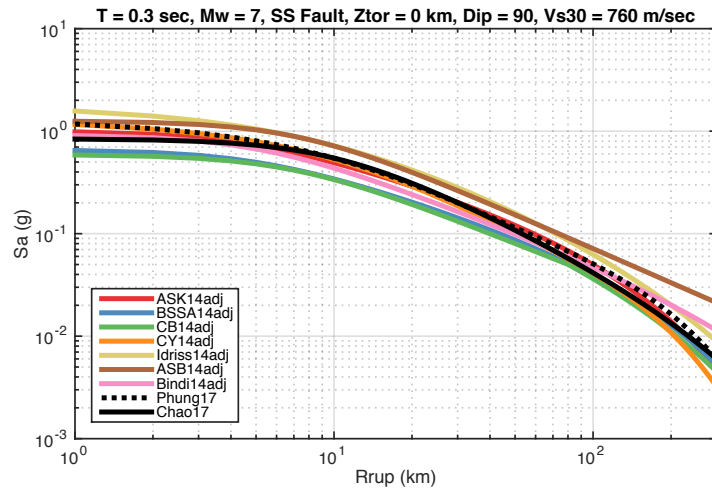
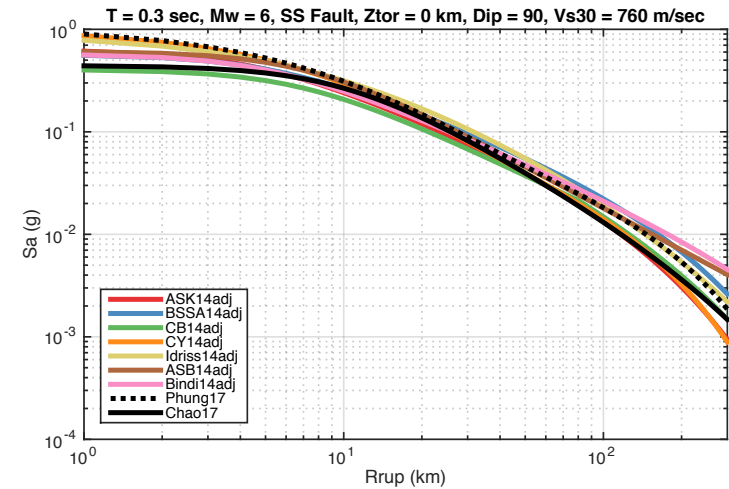
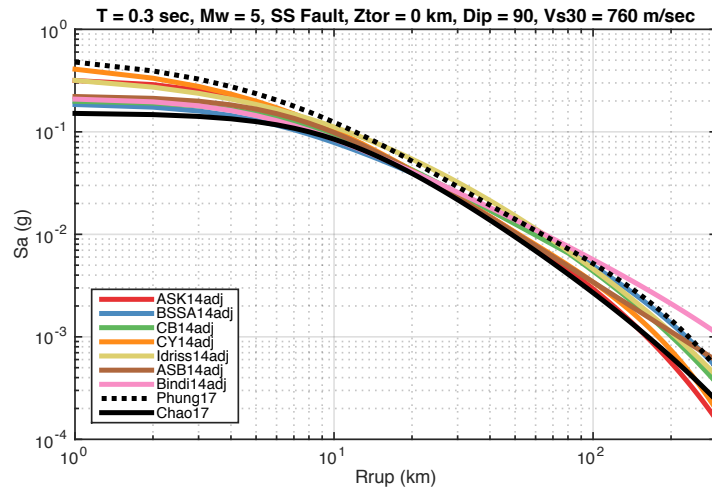
Magnitude Scaling for $R_{rup} = 10$ km



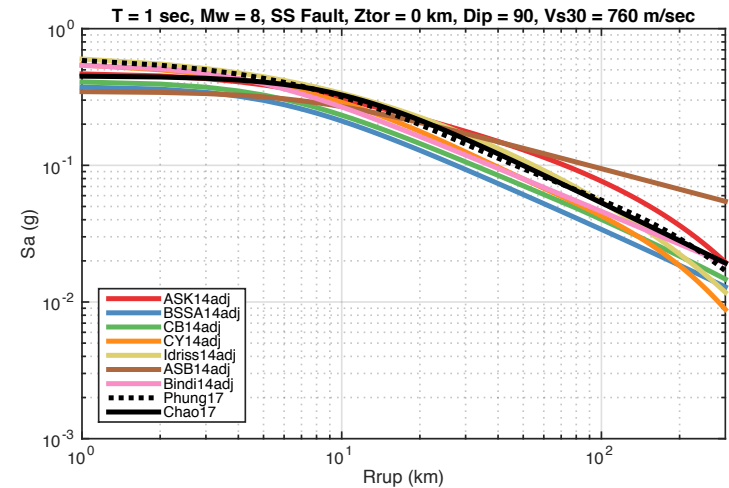
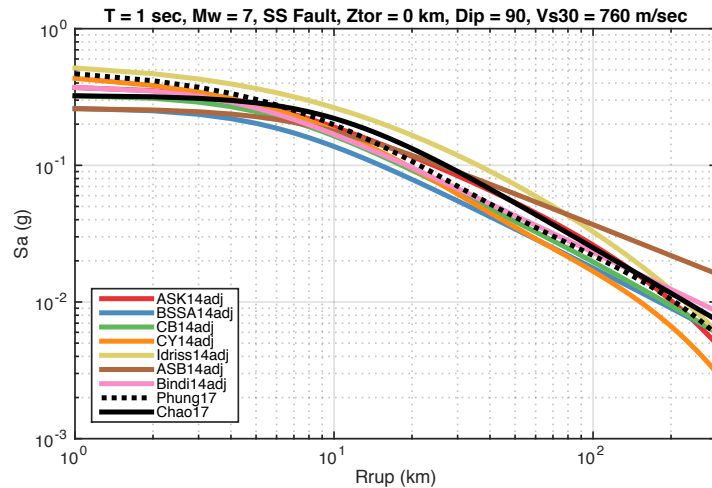
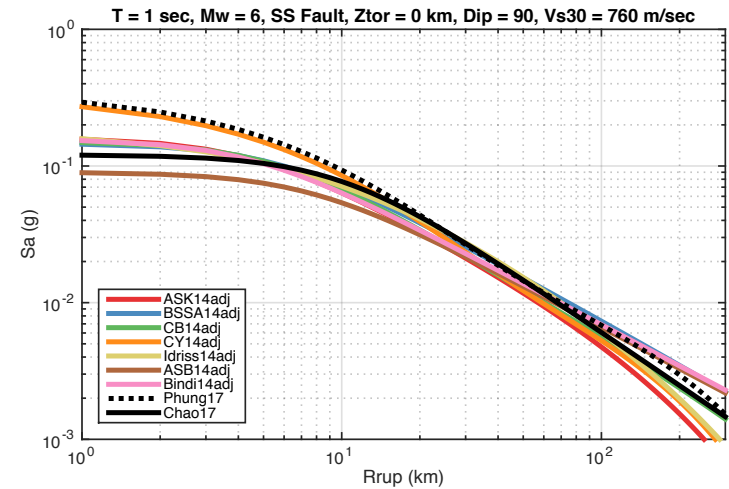
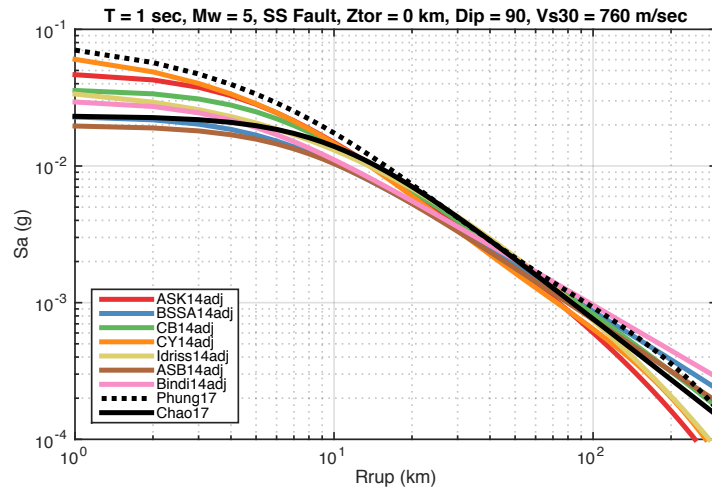
Distance Scaling for $T = 0.01$ sec



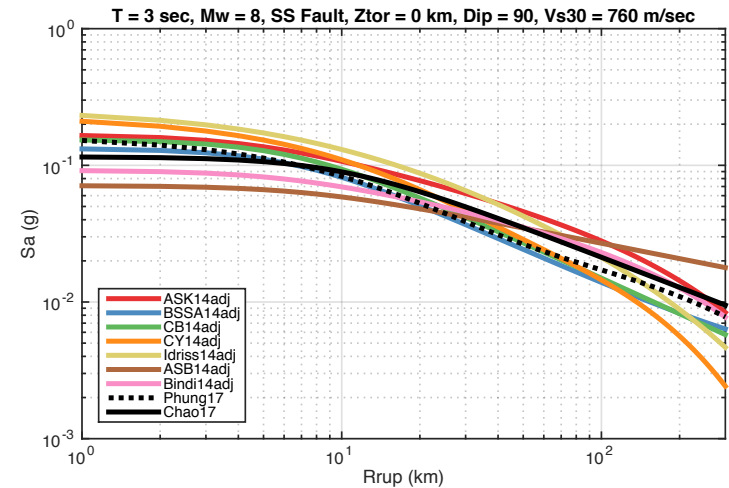
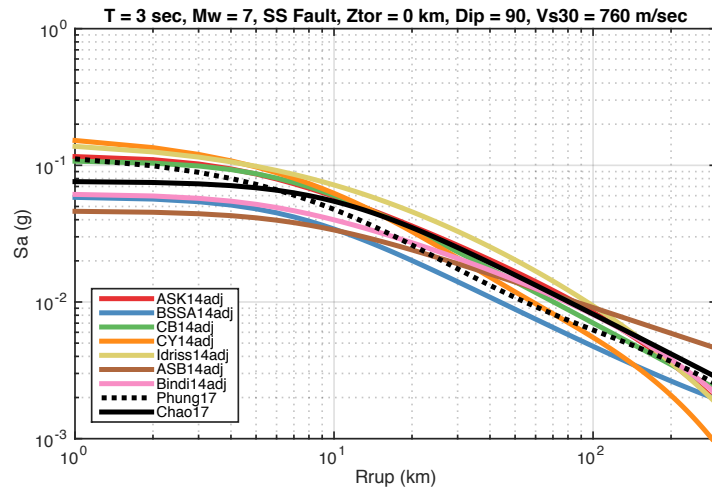
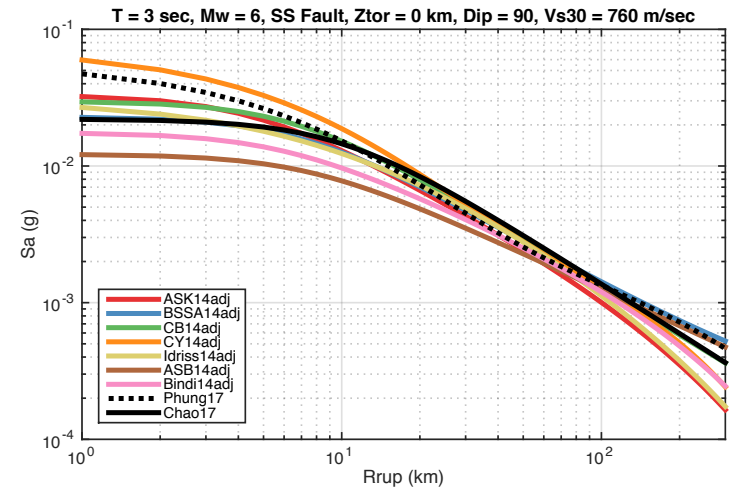
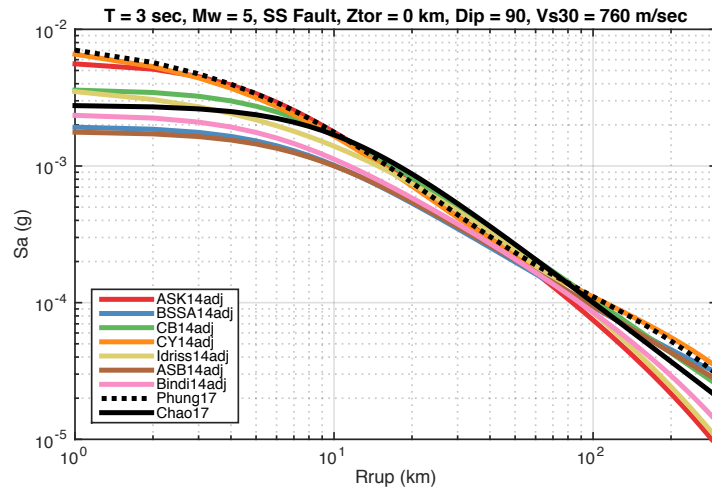
Distance Scaling for $T = 0.3$ sec



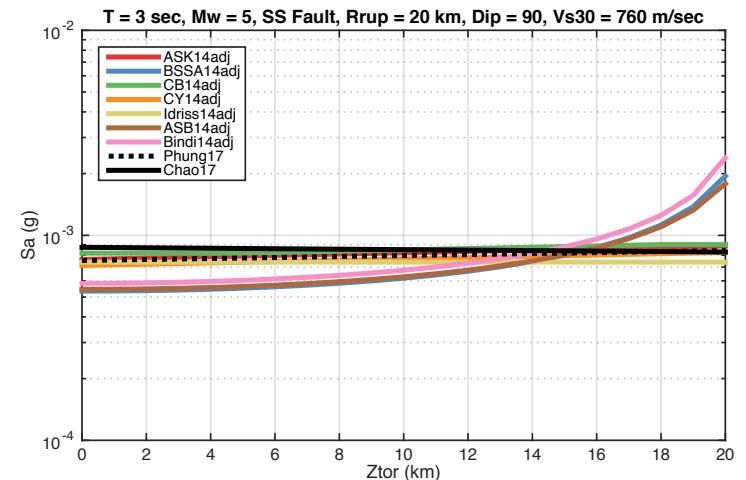
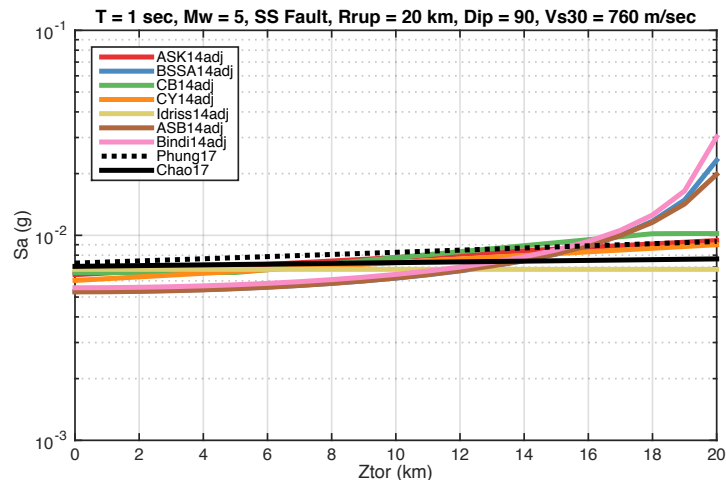
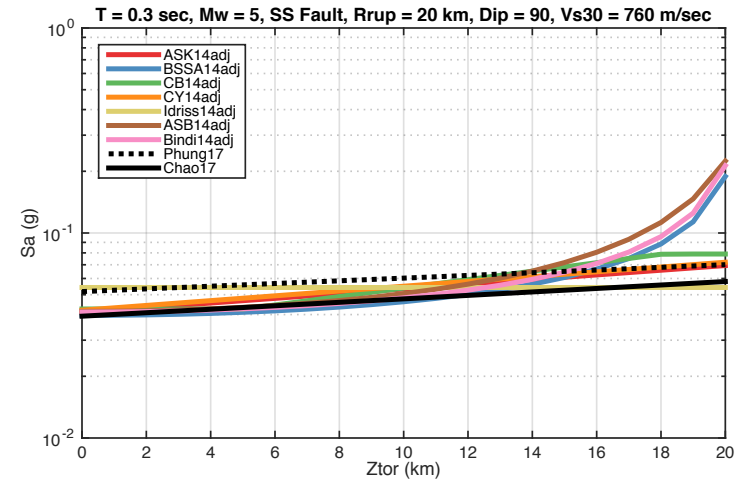
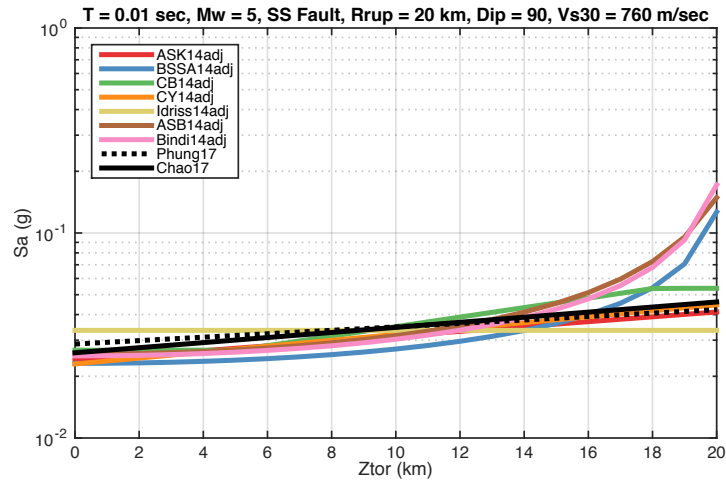
Distance Scaling for T = 1 sec



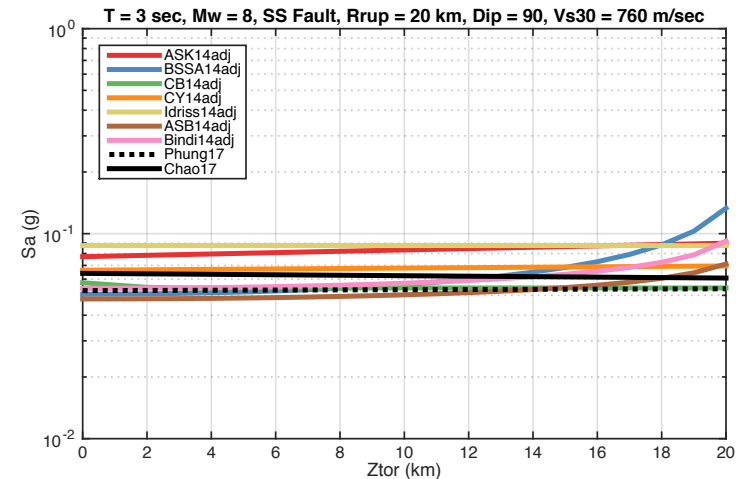
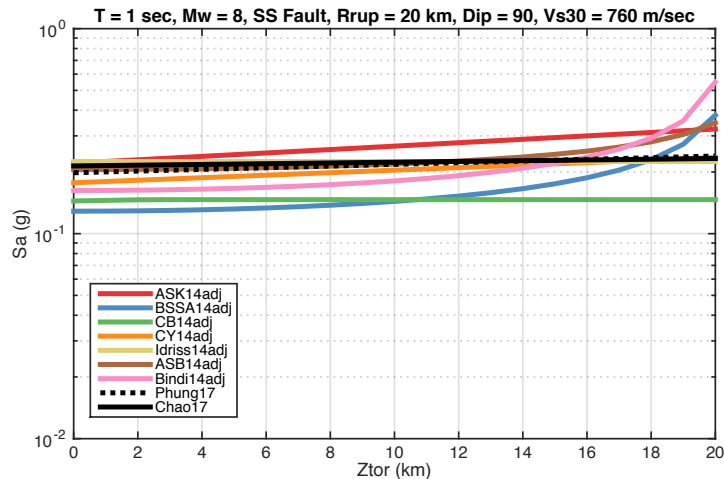
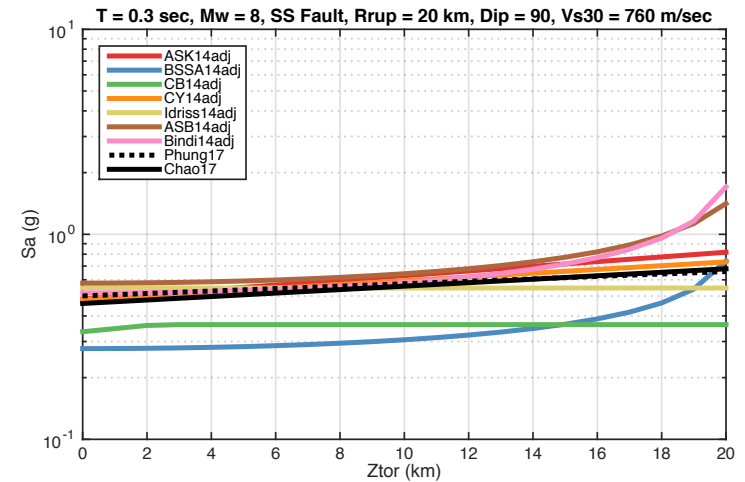
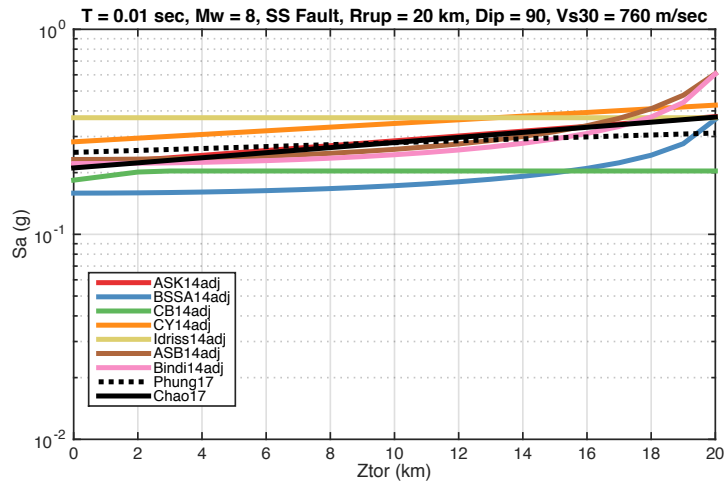
Distance Scaling for T = 3 sec



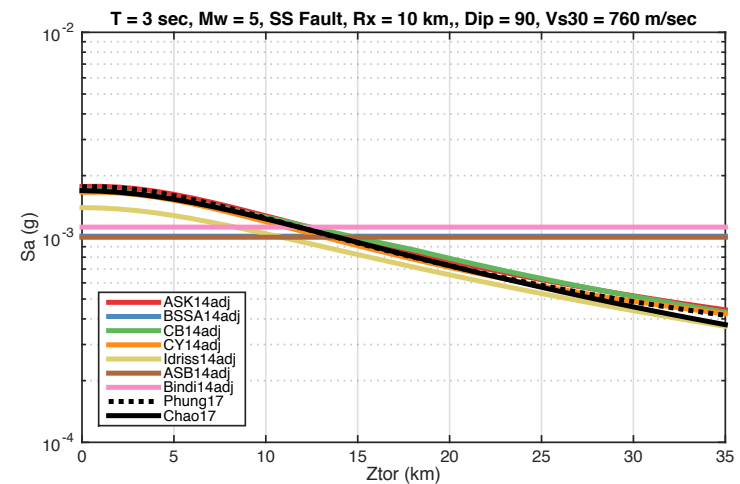
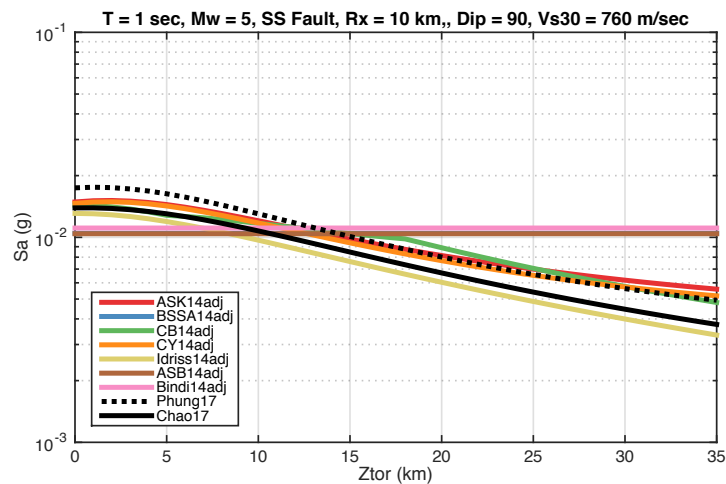
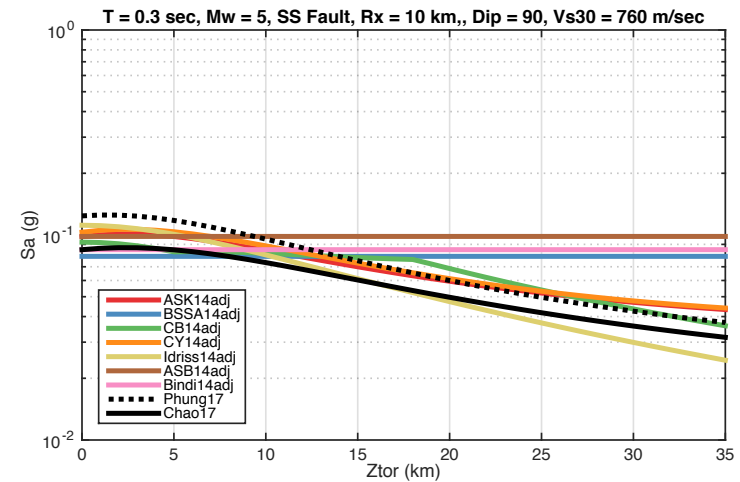
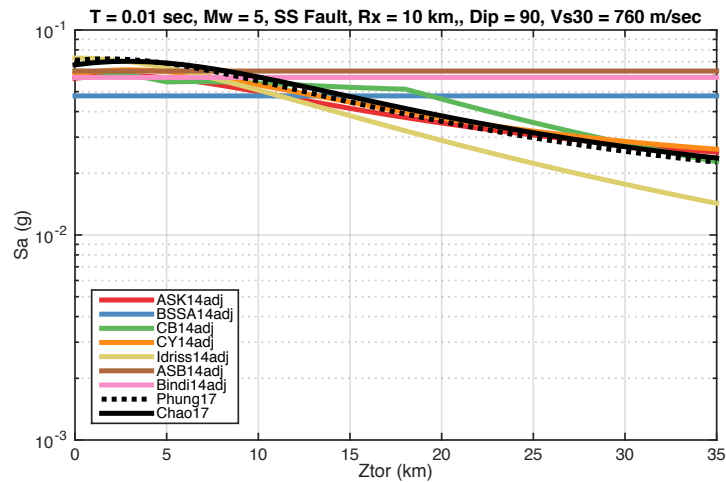
Depth Scaling – Fixed Rrup Value as 20 km for Mw 5.0



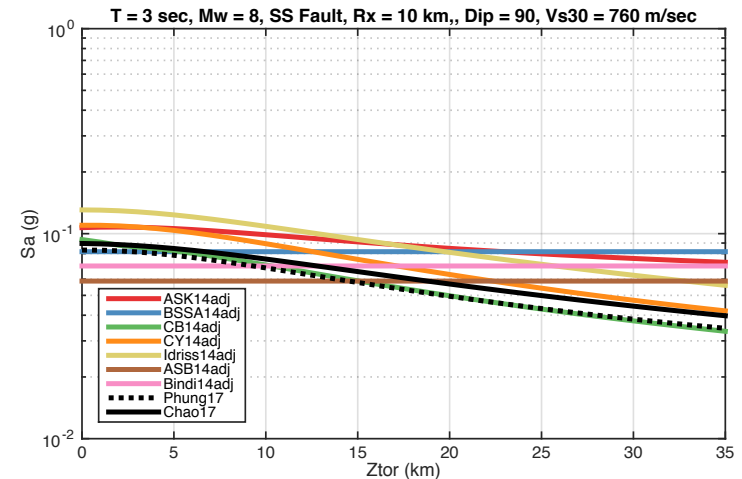
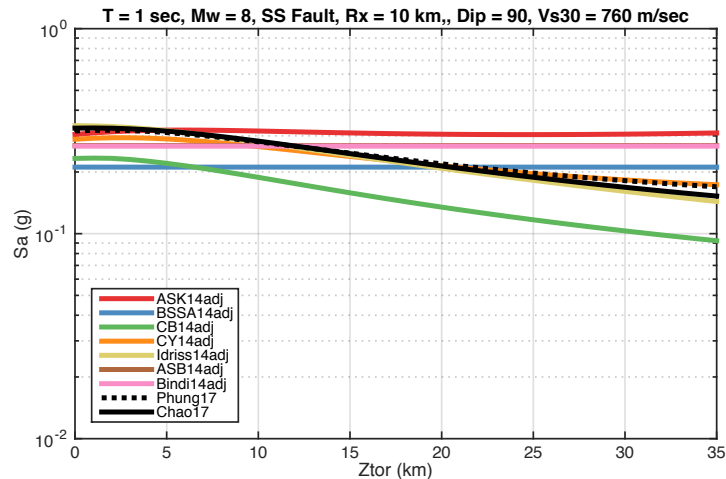
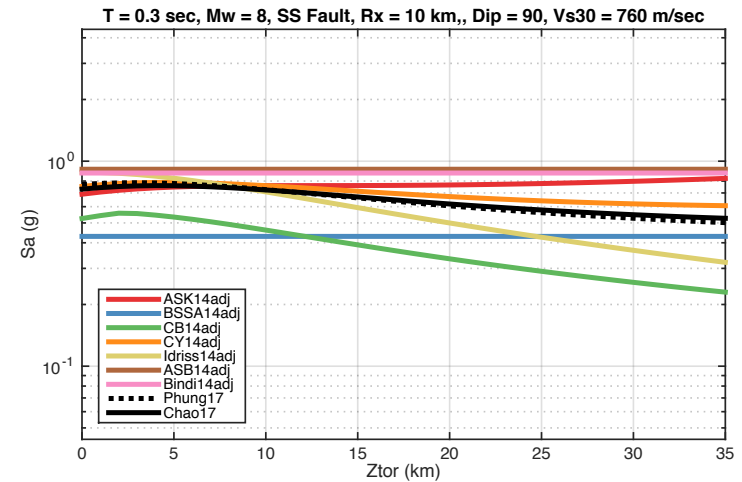
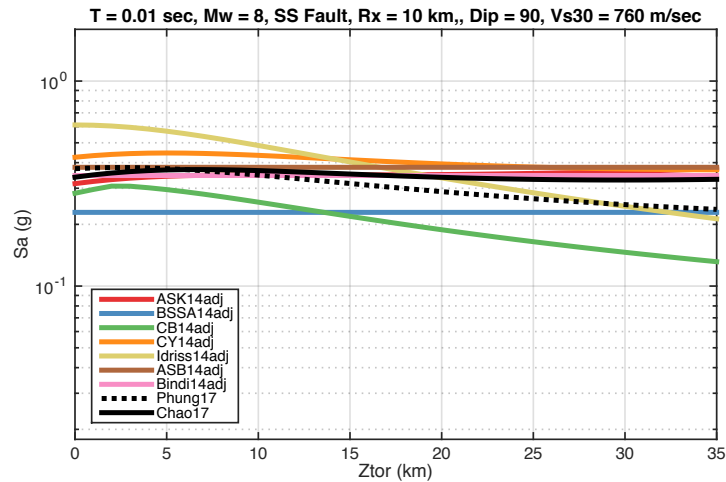
Depth Scaling – Fixed Rrup Value as 20 km for Mw 8.0



Depth Scaling – Fixed Rx Value as 10 km for Mw 5.0



Depth Scaling – Fixed Rx Value as 10 km for Mw 8.0



Summary and Discussion

- I14adj have larger short period spectral prediction for large magnitude and short distance scenario.
- Rjb based models have larger prediction for Mw 5 – 6 and when the site is on the surface Rupture line ($Rjb = 0$)
- Rrup-based models and Rjb-based models have different Ztor scaling and larger uncertainty for the prediction of deep source

Thank You for Your Attention !!

Questions ?