

Constraints on GMPEs for CEUS Using Wenchuan Data

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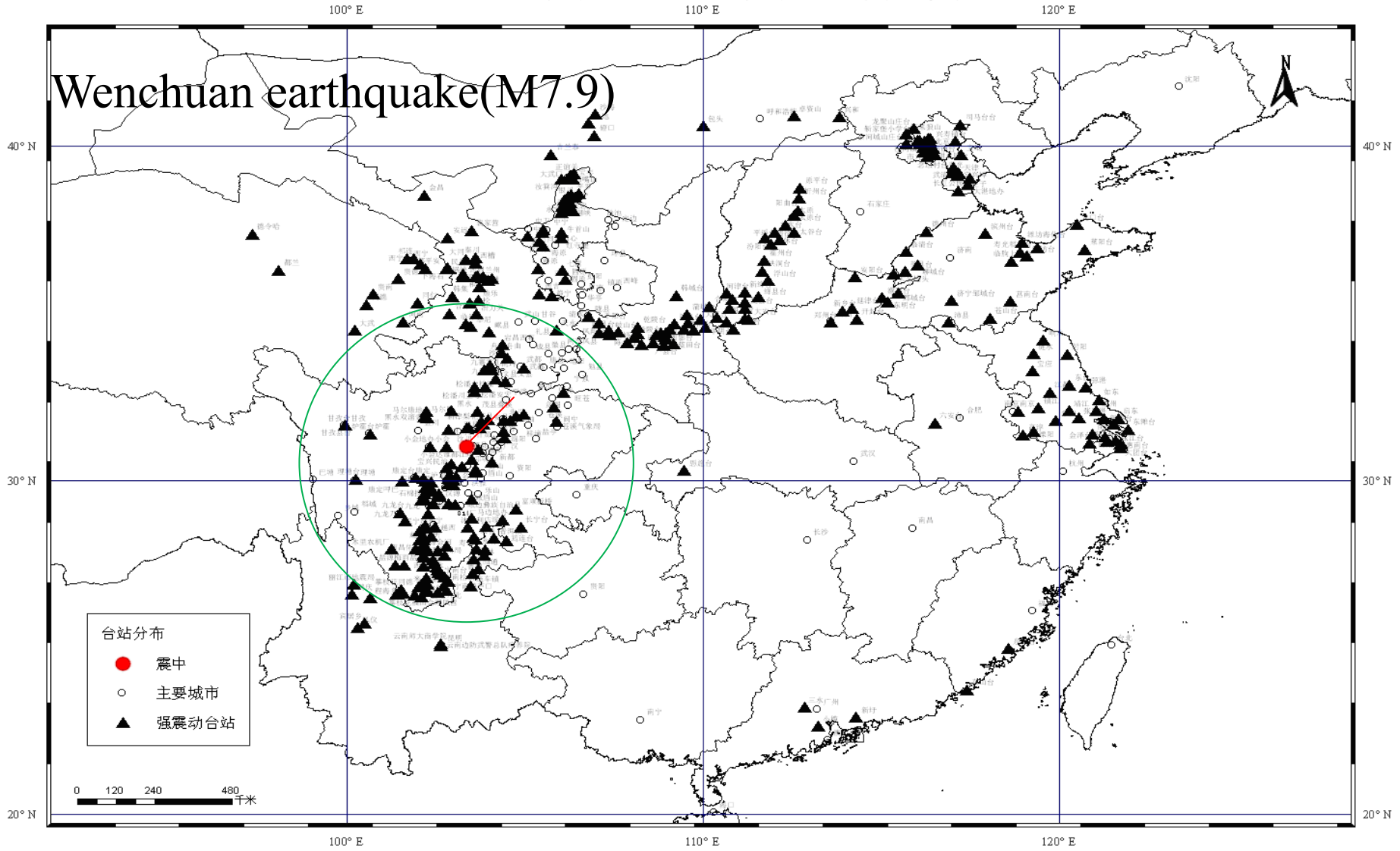
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USGS National Seismic Hazard Map (NSHMp) Workshop on
Ground Motion Prediction Equations (GMPEs)
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I-House, Berkeley, CA

Outline

- Wenchuan Strong Motion Data
- Some Preliminary Comparisons
- Summary

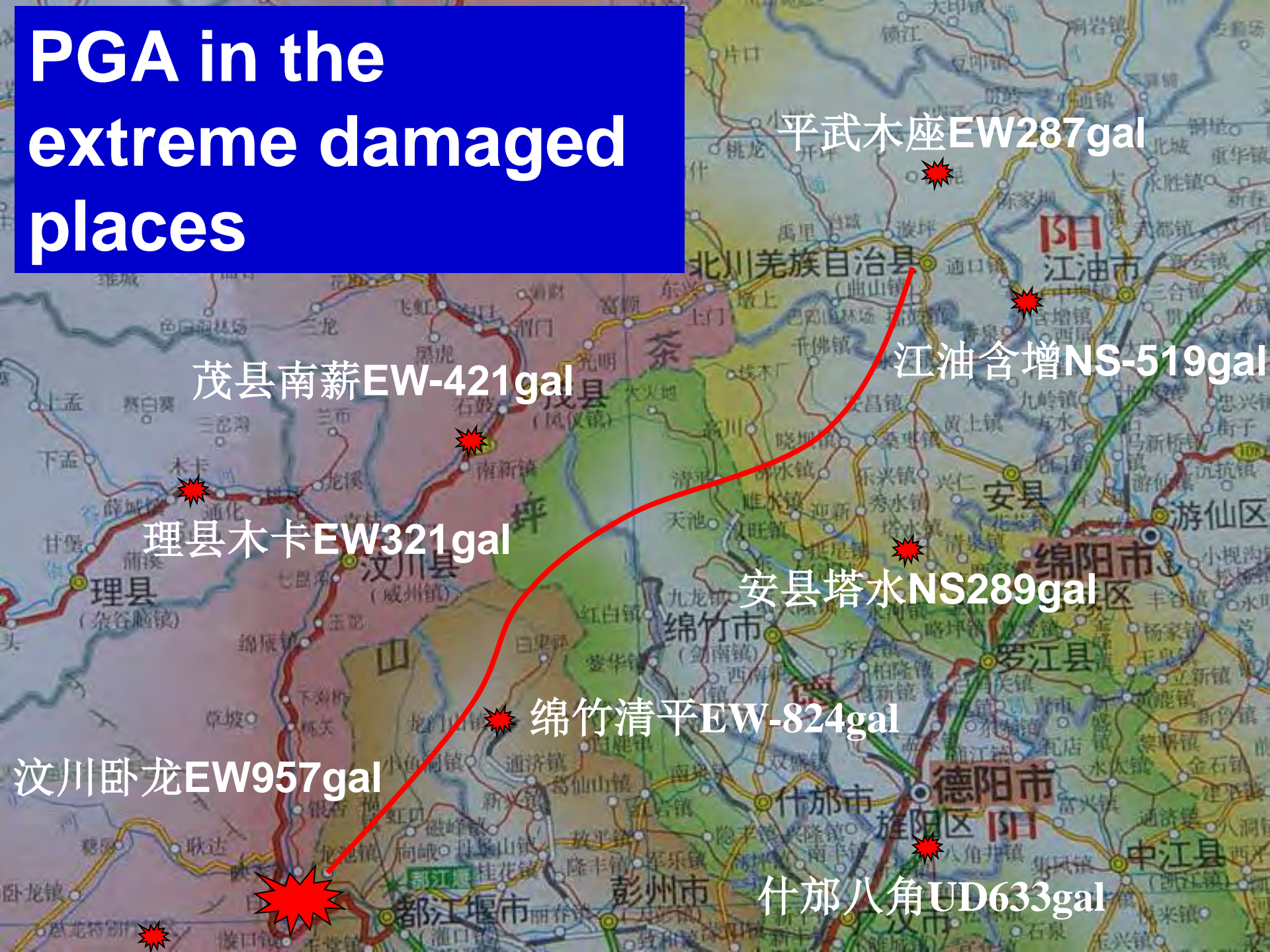
398 stations of ground motion obtained the main shock records

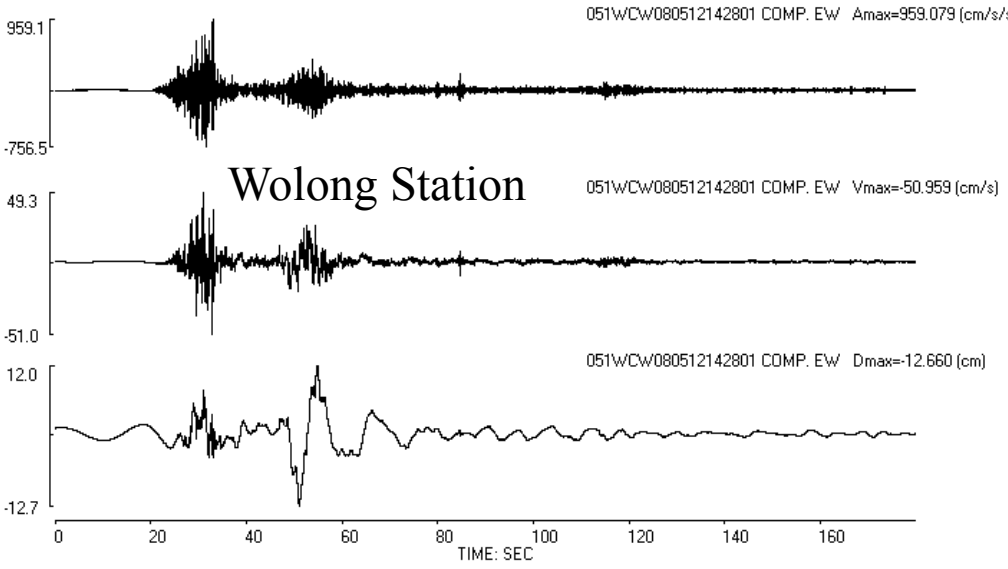


国家强震动台网中心

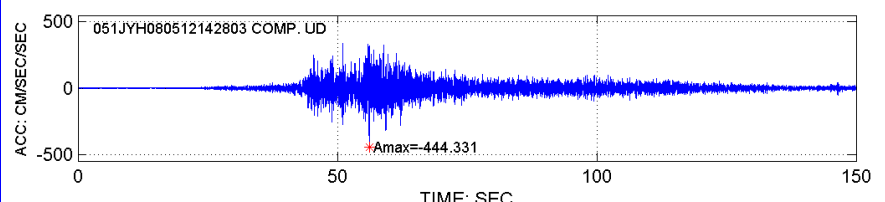
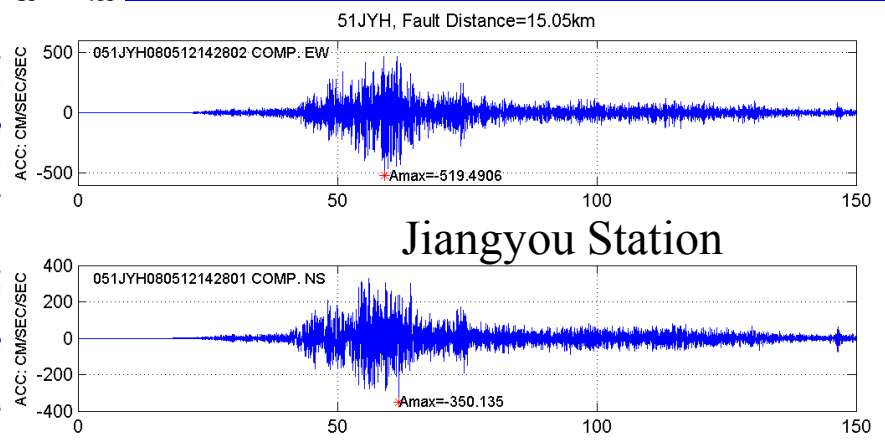
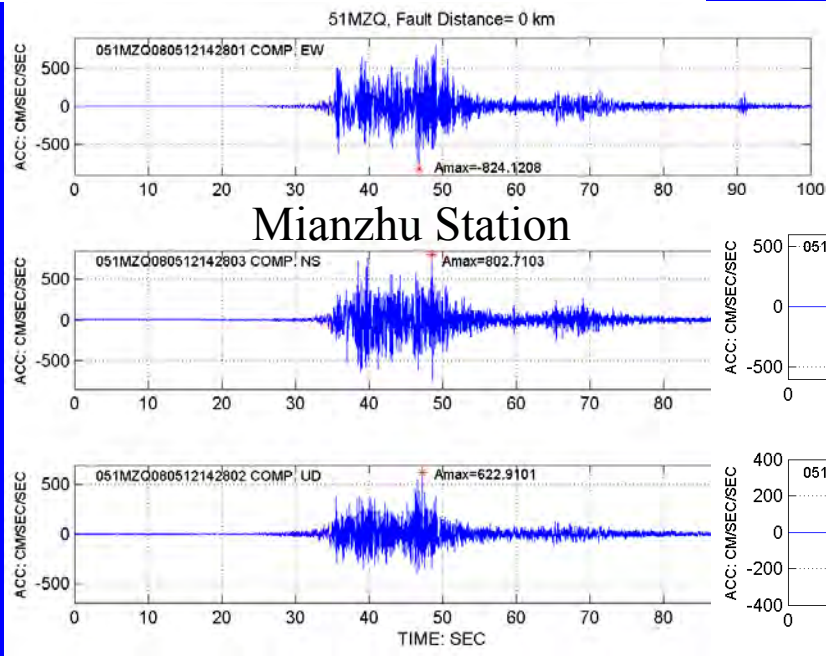
Aftershocks: M6.0-6.5 (8) and M5.0-5.9 (34)

PGA in the extreme damaged places

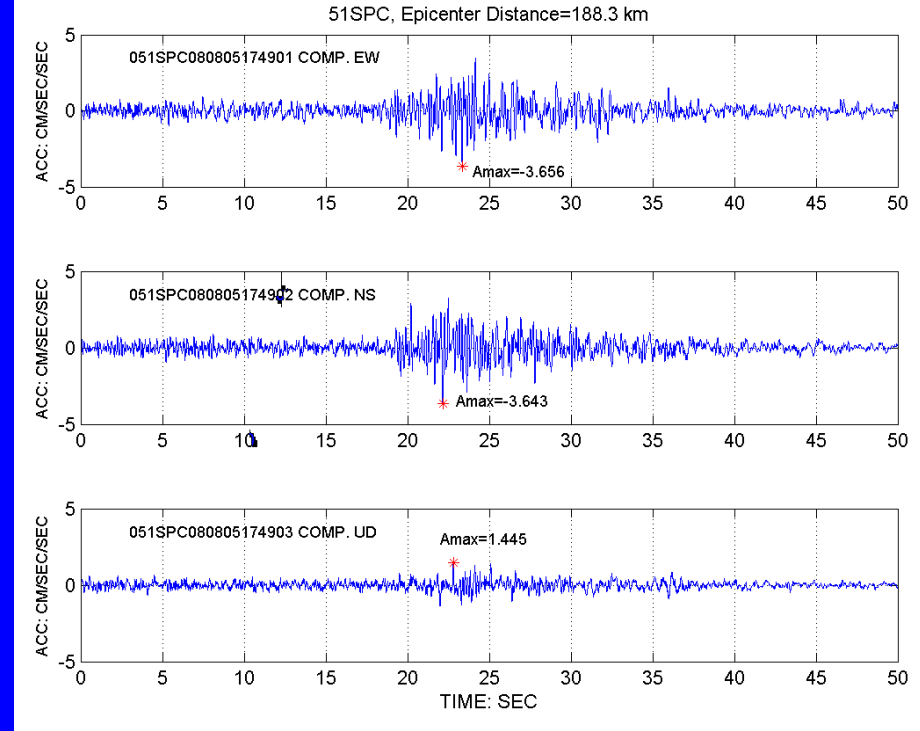
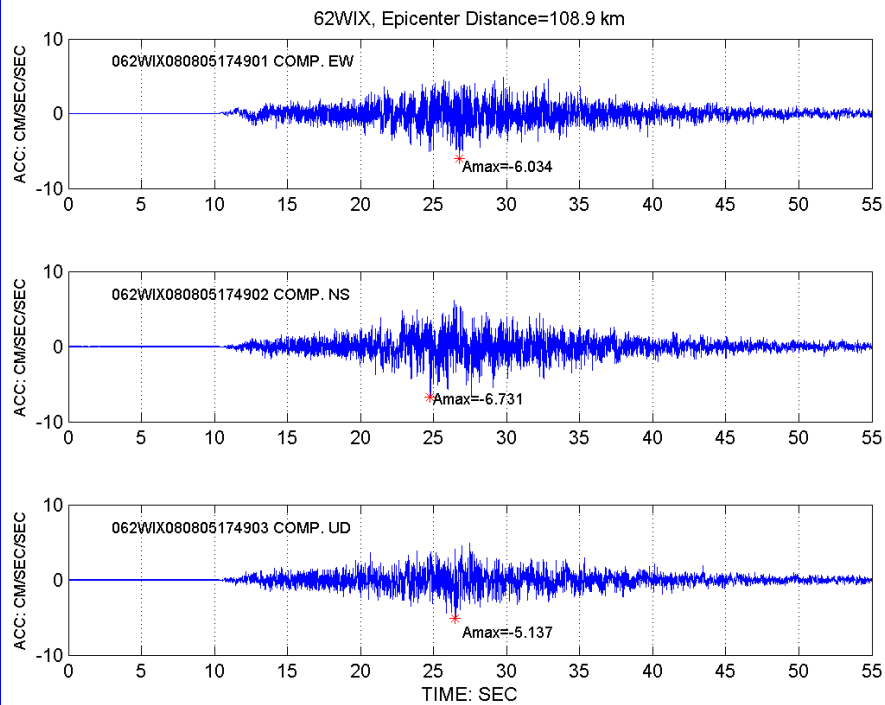
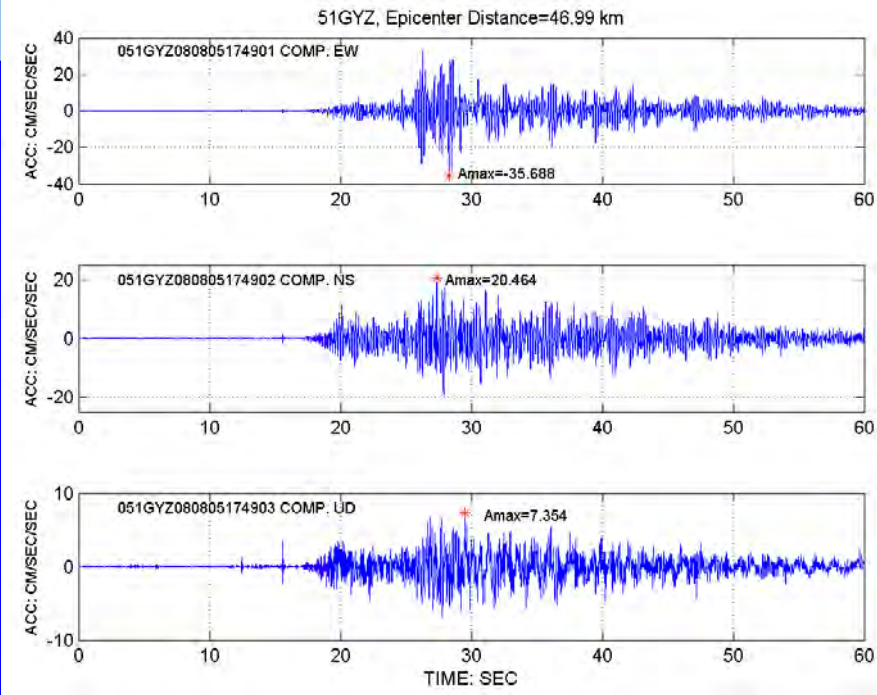




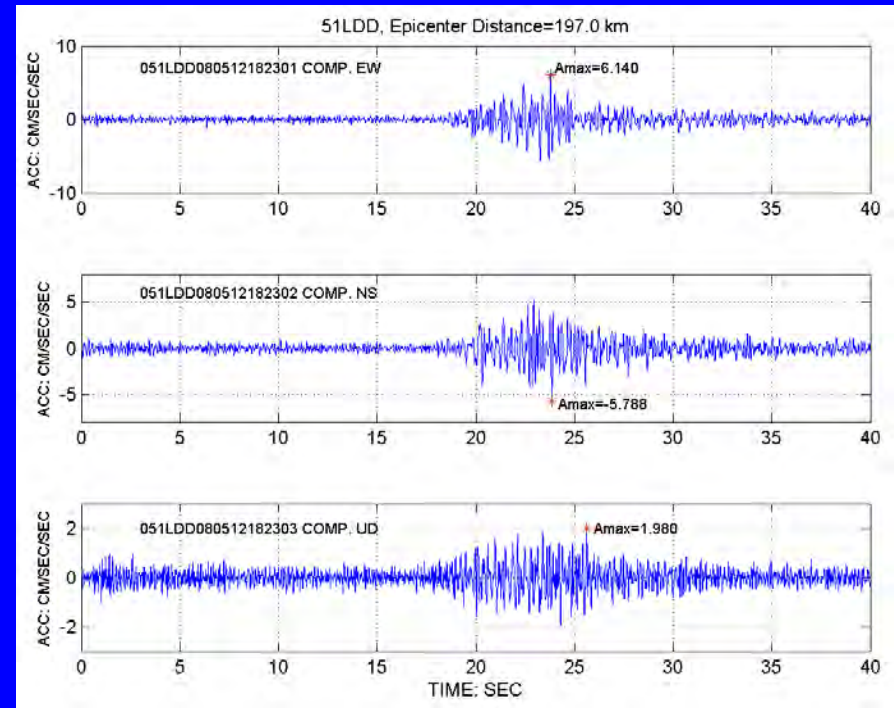
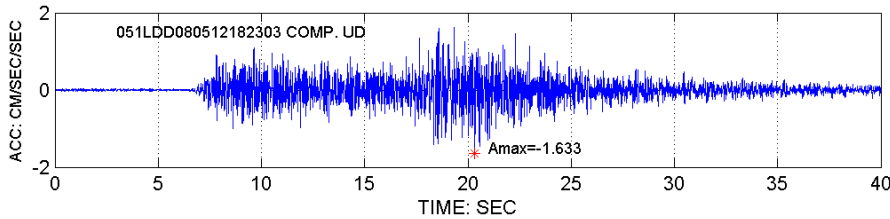
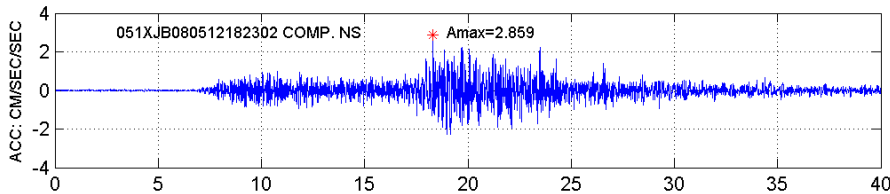
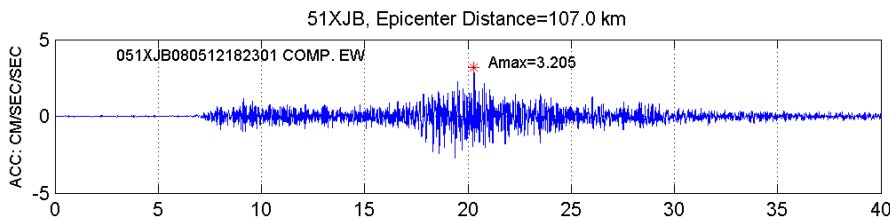
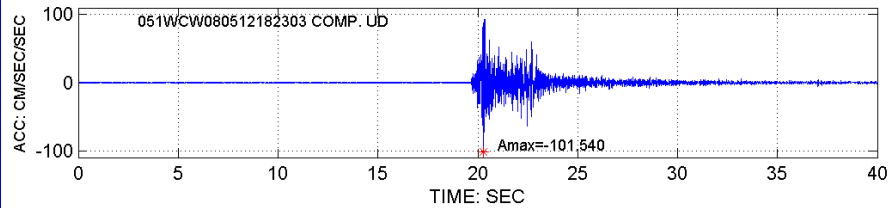
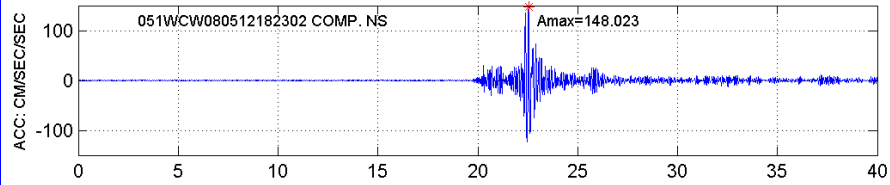
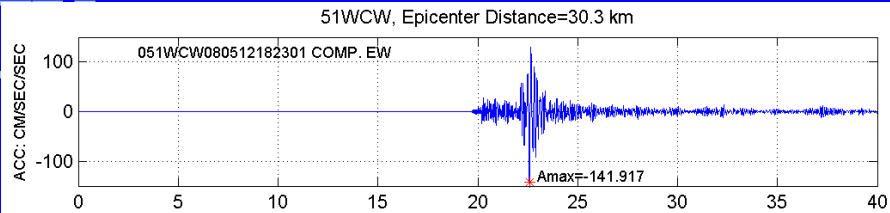
Mainshock (M7.9)



The largest aftershock (M6.4)



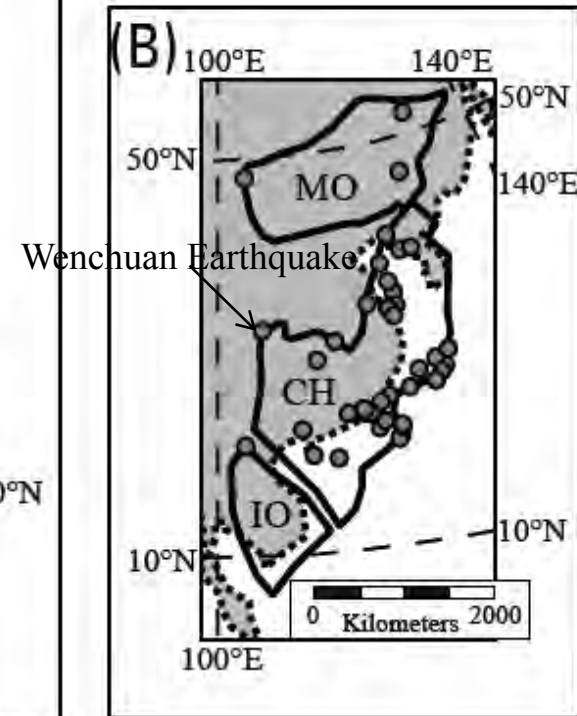
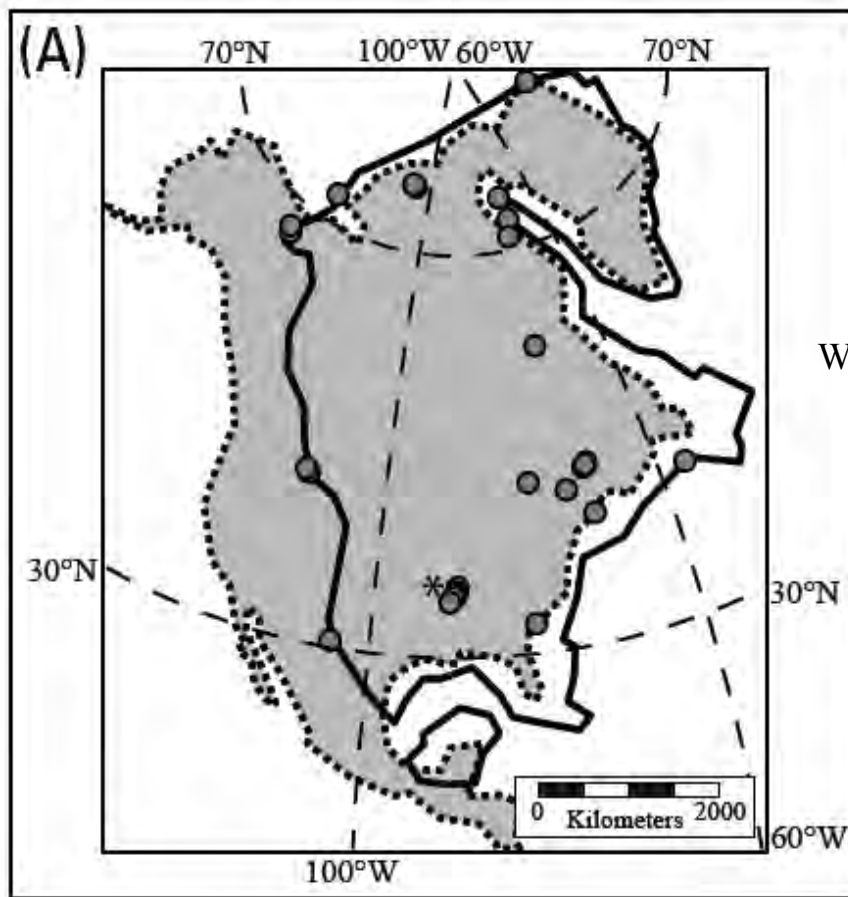
M5.0 aftershock



Station Site Information

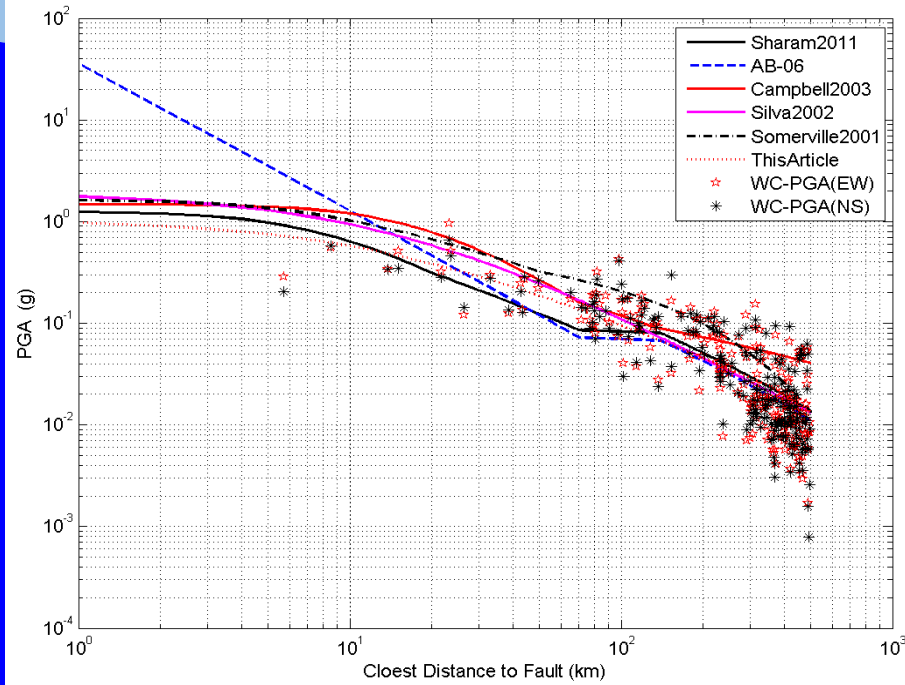
录：地质资料

台站名	钻孔深度 (m)	NEHRP		GB50011-2010		备注	
		V30(m/s)	分类	v20(m/s)	分类		
西吉	30.5	228.7	D(180~370)	195.1	2.0	中硬场地土	黄土, v30.45=375m/s
清水驿	34.0	259.3		202.6	2.0	中软土	泥岩, v34=560
定远	43.0	265.3		265.3	2.0	中软土	粉土和卵石
和平	50.0	270.1		221.2	2.0	中软土	粉土
民和	30.0	270.5		215.5	2.0	中软土	黄土状粉土和卵石
陈井	30.0	275.3		229.5	2.0	中软土	角砾,埋藏深度 25.1m 以下, v30=382m/s
西槽	30.0	310.7		243.6	2.0	中硬场地土	角砾, v30=506
中心乡	20.0	659.5		B(760~1500)	261.9	2.0	中硬场地土
芦山县飞仙关	9.8	666.2	242.0		2.0	中硬场地土	弱风化砂质泥岩, 基岩层, 未揭穿
雅安沙坪	22.0	689.8	226.0		2.0	中硬场地土	中分化泥岩, 基岩, 未揭穿
雷波黄琅	7.2	695.0	114.0		2.0	中软土	弱风化峨眉山玄武岩, 未揭穿
苍溪气象局	22.0	706.6	321.0		2.0	中硬场地土	弱风化细砂岩, 未揭穿
康定呷巴	22.0	765.2	252.0		2.0	中软土	稍密卵石土,未揭穿
芦山凤禾	9.8	790.3	324.0		2.0	中硬场地土	弱风化细砂岩, 基岩层, 未揭穿
卓尼	12.0	801.2	168.8		2.0	中硬场地土	基岩, 板岩, v9=730m/s, 未揭穿
天全县两路	22.0	854.1	273.0	2.0	中软土	弱风化钙质页岩,未揭穿	
芦山计生局	22.0	862.8	162.0	2.0	中软土	中风化泥岩, 未揭穿	
博物馆	10.0	1519.0		487.8	1.0	中软土	基岩层
西昌小庙		无					基岩
长安		无					基岩
富顺板桥		无					基岩
大关		无					基岩

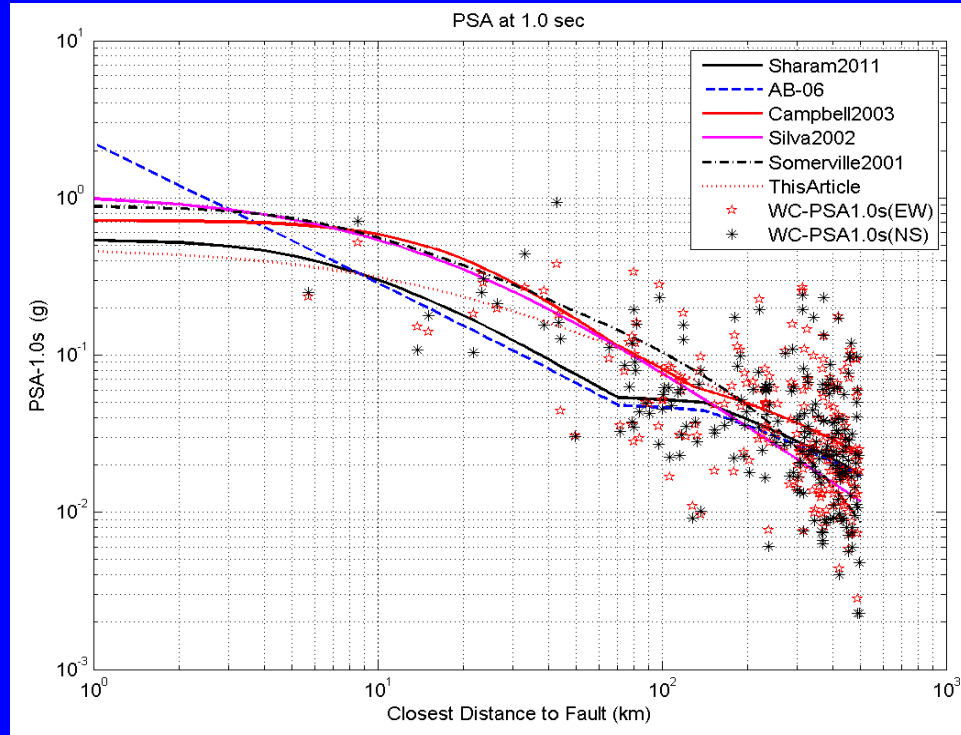
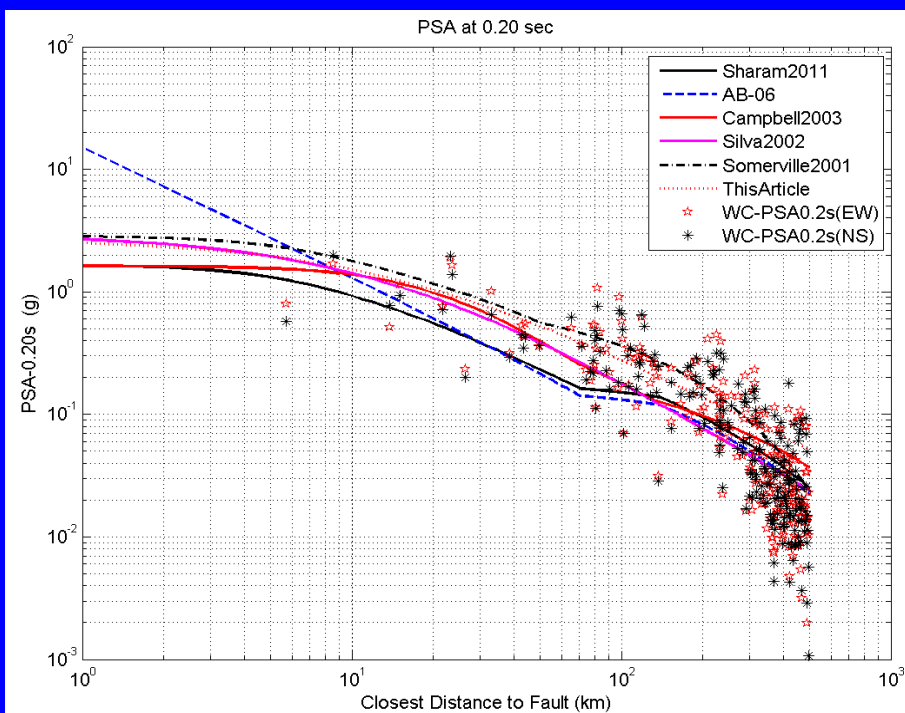


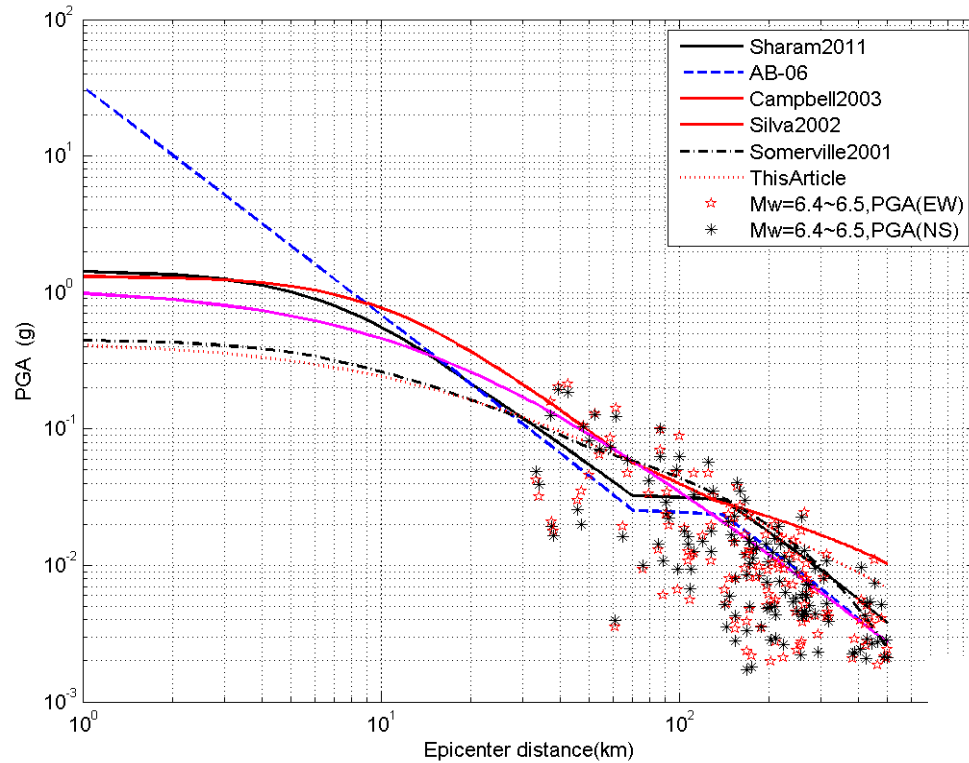
- Earthquake epicenter
- ⋯ Mainland and coastline of continent
- ▭ Boundary of stable continental region
- * Large earthquakes of New Madrid seismic zone

(Wheeler, 2011)



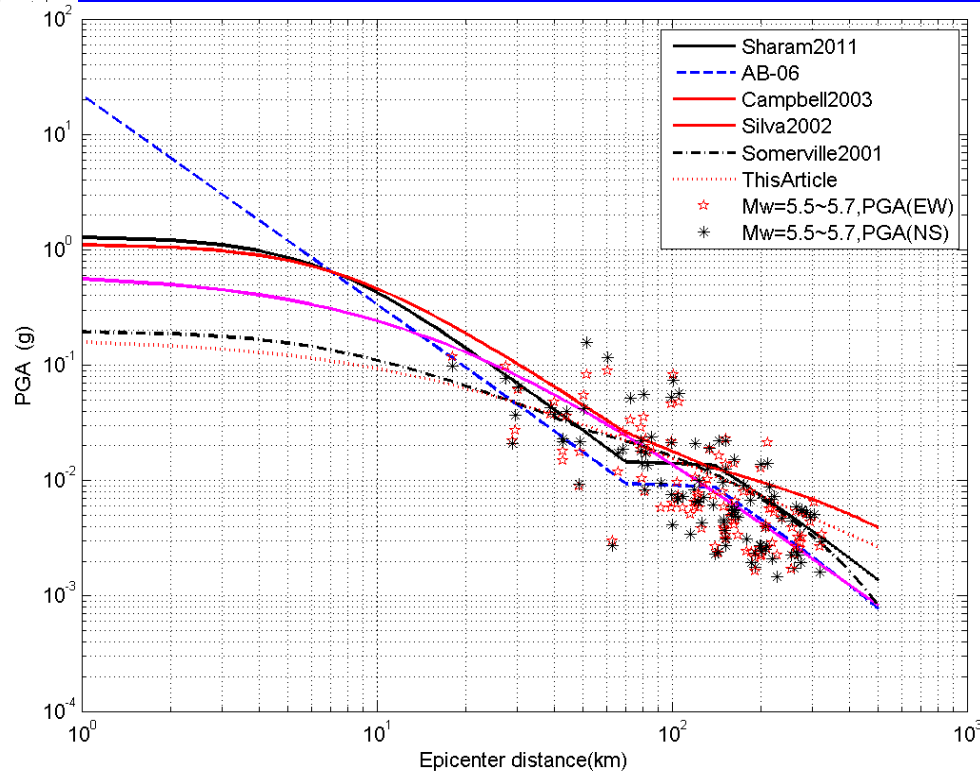
Mainshock (M7.9)





Aftershock (M5.6)

The largest aftershock (M6.4)



Summary

- Preliminary comparisons show that the Wenchuan strong motion data can provide constraints on GMPEs for CEUS
- Near-source saturation should be considered in GMPEs for CEUS
- Standard deviation (σ): 0.3-0.33 (log10)

Thank you!