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# Extreme magnitude earthquake scenarios for Guadalajara, Mexico

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The largest instrumentally observed earthquake in Mexico occurred the $3^{rd}$ of June 1932. This event was a shallow thrust subduction (STS), Ms 8.2, with epicentral distance of the order of 200 km from Guadalajara (G) in northwestern Mexico. The $9^{th}$ of October 1995 another similar, but smaller event, Ms 7.4, Mw 8, with an epicentral distance of about 240 km from G occurred in the same region and produced low to moderate damage in G. This event was recorded at G at 11 free field strong motion stations, as well as at two downhole instruments located at one of the former stations. From those recordings it was concluded that the sandy G superficial soils were able to significantly amplify the rock and firm soil ground motions (Chavez et al., 1996) and a preliminary microzonation of G was proposed (Chavez et al., 2000). Taking into account that in 1932 G had a population of about 250,000 inhabitants, and an areal extent of about 40 km$^2$, compared to present day numbers of about 6 million people and 300 km$^2$, respectively, it is important to estimate upper bounds of the strong ground motions expected in G for extreme magnitude earthquakes similar to the one observed in 1932.

In this work we generated broadband synthetic accelerograms expected at G at the 11 accelerographic stations mentioned above, for extreme seismic scenarios for STS Mw 8.5 earthquakes. The broadband synthetics were generated using a hybrid method, validated by synthetics from the strong ground motions observed for the 09/10/1995 event (Chavez and Olsen, 2002, Chavez et al., 2004). Our simulations predict maximum ground accelerations and response spectral accelerations (5% damping) (mean + 3 standard deviations) of 170 and 1000 on the horizontal components, and 100 and

500 cm/s$^2$on the vertical component expected in G for STS Mw 8.5 events.