

## Comments on ground motions for large-magnitude earthquakes

by Paul Somerville

We only have one recording close to a magnitude ~8 earthquake – the Pump Station 10 recording of the Denali, Alaska earthquake, so we do not know much about such ground motions. From a theoretical point of view, we would not expect the largest recordings of smaller earthquakes to have the same characteristics as median near-fault ground motion levels of a magnitude 8 earthquake. Specifically, we would expect the median response spectral ordinates of magnitude 8 earthquakes to be much stronger than those of smaller earthquakes, and for the flat-in-velocity region of the M 8 response spectrum to extend out to a period of 12 seconds or more. We expect the average displacement on the fault to be about 5 meters, so near the fault, each side of the fault would have a permanent displacement of 2.5 meters. The median ground motion level from a magnitude 8 earthquake occurs in San Francisco once every few hundred years, so it is not a rare ground motion.