Geophysical Research Abstracts
Vol. 17, EGU2015-3572-1, 2015
EGU General Assembly 2015

Influence of weak motion data to magnitude dependence of PGA prediction model in Austria

Yan Jia
ZAMG, Geophysics, Vienna, Austria (yan.jia@zamg.ac.at)

Data recorded by the STS2-sensors at the Austrian Seismic Network were differentiated and used to derive the PGA prediction model for Austria (Jia and Lenhardt, 2010). Before using it to our hazard assessment and real time shakemap, it is necessary to validate this model and obtain a deep understanding about it. In this paper, influence of weak motion data to the magnitude dependence of our prediction model was studied. In addition, spatial PGA residuals between the measurements and predictions were investigated as well.

There are 127 earthquakes with a magnitude between 3 and 5.4 that were used to derive the PGA prediction model published in 2011. Unfortunately, 90% of used PGA measurements were made for the events with a magnitude smaller than 4. Only ten quakes among them have a magnitude larger than 4, which is the important magnitude range that needs our attention and hazard assessment. In this investigation, 127 earthquakes were divided into two groups: the first group only includes events with a magnitude smaller than 4, while the second group contains quakes with a magnitude larger than 4. By using the same modeling for estimating PGA attenuation in 2011, coefficients of the model were inverted from the measurements in two groups and compared to the one based on the complete data set. It was found that the group with the weak quakes returned results that only have small differences to the one from all 127 events, while the group with strong quakes (ml> 4) gave greater magnitude dependence than the model published in 2011. The distance coefficients stayed nearly unchanged for all three inversions.

As the second step, spatial PGA residuals between the measurements and the predictions from our model were investigated. As explained in Jia and Lenhardt (2013), there are some differences in the site amplifications between the West- and the East-Austria. For a fair comparison, residuals were normalized for each station before the investigation. Then normalized residuals were spatially displayed and discussed for each station. A good correlation between the majority of residuals and geological closeness were observed.

References

1. Y. Jia and W. Lenhardt, “Estimation of peak ground acceleration attenuation in Austria”, ESC 2010, Montpellier, France.
2. Y. Jia and W. Lenhardt, “Applying spectral ratio techniques to estimate station site response”, EGU 2013, Vienna, Austria.