AFTERSHOCK DECAY RATES IN THE ZAGROS AND PROBABILISTIC SEISMIC AFTERSHOCK HAZARD ANALYSIS OF THE 2013 APRIL 9 SHONBE (BUSHEHR) EARTHQUAKE

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The main goal of this article is to study the Zagros aftershocks rate decay. For this propose, Iranian earthquake catalogue, has been collected and homogenized during 2002 to 2014. Eight prominent earthquakes in Zagros region were selected for aftershocks rate decay investigation. Magnitude completeness and its variation were determined for each event. In order to investigate the behavior of aftershocks in Zagros seismotectonic province, the Omori law parameters were calculated for selected earthquakes. Seismic rate for aftershocks in time (t) follows Omori law revised by Utsu (1961):

$$R(t) = \frac{K}{(C + t)^P}$$

t is the time distance to the main event, K, C, P are the fixed coefficients. The inserted variable C is considered to prevent from the overlapping of the aftershocks and the main event.

The result coming from the calculation of parameter P for the selected events of Zagros shows that factor P introduces the speed of seismicity. About Zagros province, the average and median of P is 1.02 and 0.98, respectively.
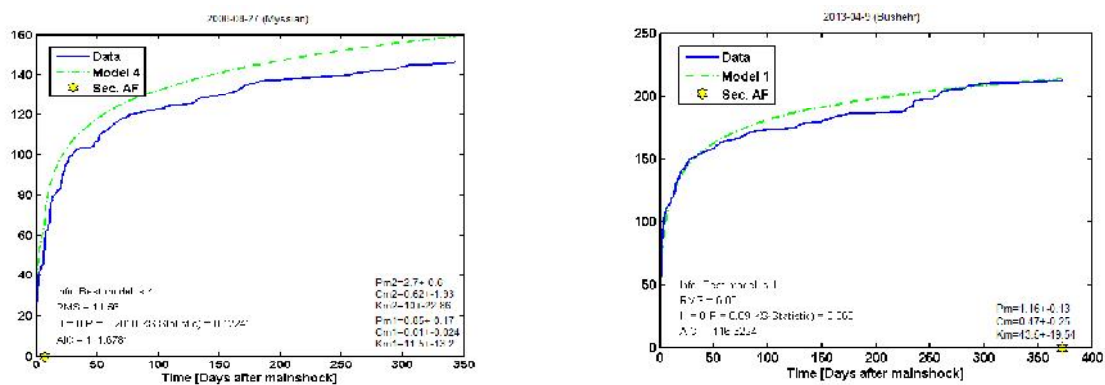

Figure 1. The calculation of the revised Omori Law parameters (the exactness of these calculations is 1000 bootstraps)

The blue line represents the plentitude of events per day and the green pleated line shows the practice of the observed given inputs. The star shows the location of the secondary aftershocks, **H** is the result of the test of goodness of fit, **AIC** shows the direction of the model selection, **RMS** shows the root mean square, **KS** shows the amount of mean Kolomogorov Smirnov, parameter **P** is for statistical testing to make adaption with the observations, **P**, **C**, **K** are the coefficients of Omori Law.

Probabilistic aftershock hazard assessment (PAHA) based on aftershock parameters (a, b, P, K) of Shonbe earthquake, has been estimated in temporal duration of 14, 30 and 60 days. In order to evaluate the variation of peak ground acceleration with time in Zagros region, present attenuation relations and NGA formula has been applied. For calculating the PGA variations with time in 33% probability, we used logic tree for weighing different equation.

REFERENCES

Enescu B and Ito K (2002) Spatial Analysis of the Frequency-Magnitude Distribution and Decay Rate of Aftershock Activity of the 2000 Western Tottori Earthquake, *Earth Planets Space*, 54: 847–859

Zafarani H and Soghrat M (2012) Simulation of Ground Motion in the Zagros Region of Iran Using the Specific Barrier Model and the Stochastic Method, Bulletin of the Seismological Society of America, 102(5): 2031–2045