Geophysical Research Abstracts
Vol. 21, EGU2019-18972, 2019
EGU General Assembly 2019

The 1906 Dobra Voda Earthquake (M=5.7) at the Vienna Basin Transfer Fault, its aftershocks and the consequences on potential seismic hazard

Asma Nasir (1), Esther Hintersberger (2), and Kurt Decker (1)

(1) Department of Geodynamics and Sedimentology, University of Vienna, Vienna, Austria, (2) Geological Survey of Austria (GBA), Vienna, Austria

Aftershock identification plays an important role in the assessment and characterization of large earthquake. Especially, the temporal length of the aftershock sequence is an important aspect of declustering earthquake catalogues and therefore impacts the frequency of earthquakes in a certain region is very important for future hazard assessment. Typically, aftershocks are identified either by using the empirical Omari's law (Ogati, 1983) or by the combination of spatial (Wells and Coppersmith, 1994) and temporal windows (Knopoff & Gardner, 1969). However, for diffused plate boundaries and in interplate regions with low deformation rates and low to moderate seismicity it is still questionable if the aftershock activity after a major event may continue for much longer time as proposed by Stein & Liu (2009).

The Dobra Voda segment of the Vienna Basin Transfer Fault System is one of the seismically most active zones on the territory of Slovakia with the 1906 Dobra Voda earthquake as the strongest recorded earthquake with I0=9 and a macroseismic magnitude of M=5.7. In this study, we incorporate the environmental effects caused by the 1906 Dobra Voda earthquake to better constrain the intensity and magnitude of the historical event and compare its aftershock sequence with the model predictions of the Omori law. The goal is to check if the earthquakes recorded after 1906 indicate to a protracted aftershock sequence as proposed by Stein & Liu (2009). Earthquake data are taken from ACORN earthquake catalogue. Aftershocks are plotted for two spatial window extending for 13km and 26km from the epicenter of the main shock due to the location uncertainty inherent in the historical data. Being at the transition between historical and instrumental observations, the comparison of the background seismicity before and after the main shock is difficult. In addition, the earthquake record shows large gaps with long intervals devoid of any record. Nevertheless, the temporal evolution may be interpreted by Omori-type aftershock sequences following two events in 1906 and 1930. However, earthquake occurrence in the circle of 13 km shows elevated earthquake activity right after the 1906 main shock that decays to a lower level of activity only a few decades after the main shock as expected by Stein & Liu (2009). The seismic activity even today might be still affected by the 1906 earthquake.

References:
Knopoff, L., & Gardner, J. K. (1969). Proceedings of the National Academy of Sciences, 63(4), 1051-1054.
Ogata, Y. (1983). Journal of Physics of the Earth, 31(2), 115-124.
Stein, S., & Liu, M. (2009). Nature, 462(7269), 87.
Wells, D. L., & Coppersmith, K. J. (1994). BSSA, 84(4), 974-1002.