Geophysical Research Abstracts
Vol. 17, EGU2015-2939, 2015
EGU General Assembly 2015

Towards the Seismic Hazard Reassessment of Paks NPP (Hungary) Site: Seismicity and Sensitivity Studies

Laszlo Toth (1,2), Peter Monus (1,2), Erzsebet Gyori (1), Gyula Grenerczy (4,1), Tamas Janos Katona (3), and Marta Kiszely (1)

(1) MTA CSFK, Budapest, Hungary (toth.laszlo@csfk.mta.hu), (2) GeoRisk Earthquake Engineering, Budapest, Hungary, (3) MVM Nuclear Power Plant Paks Ltd. 7031 Paks, Hungary, (4) FÖMI Satellite Geodetic Observatory, Penc, Hungary

In context of extension of Paks Nuclear Power Plant by new units, a comprehensive site seismic hazard evaluation program has been developed that is already approved by the Hungarian Authorities. This includes a 3D seismic survey, drilling of several deep boreholes, extensive geological mapping, and geophysical investigations at the site and its vicinity, as well as on near regional, and regional scale. Furthermore, all relevant techniques of modern space geodesy (GPS, PSInSAR) will be also utilized to construct a new seismotectonic model. The implementation of the project is still in progress. In the presentation, some important elements of the new seismic hazard assessment are highlighted, and some results obtained in the preliminary phase of the program are presented and discussed.

The first and most important component of the program is the compilation of the seismological database that is developed on different time scale zooming on different event recurrence rates such as paleo-earthquakes ($<10^{-3}$/a), historical earthquakes (10^{-3}– 10^{-2}/a), instrumental earthquake data (10^{-2}– 10^{-1}/a), and site-specific instrumental data of local seismic monitoring ($>10^{-1}$/a).

In 1995, Paks NPP installed and started to operate a sensitive microseismic monitoring network capable for locating earthquakes as small as magnitude 2.0 within about 100 km of the NPP site. During the two decades of operation, the microseismic monitoring network located some 2,000 earthquakes within the region of latitude 45.5 – 49 N and longitude 16 – 23 E. Out of the total number of events, 130 earthquakes were reported as “felt events”. The largest earthquake was an event of ML 4.8, causing significant damage in the epicenter area. The results of microseismic monitoring provide valuable data for seismotectonic modelling and results in more accurate earthquake recurrence equations.

The first modern PSHA of Paks NPP site was carried out in 1995. Complex site characterization project was implemented and hazard curves had been evaluated for 10^{-3} – 10^{-5} annual frequency. As a follow-up, PSHA results have been reviewed and updated in the frame of periodic safety reviews, and hazard characterization of the site has been confirmed. The hazard curves have been extended to lower probability events, as it is required by the probabilistic safety analysis. These earlier projects resulted in 0.22-0.26 g and 0.43-0.54 g mean PGA at 10^4 and 10^5 return periods. The site effect and liquefaction probability have also been evaluated. As it is expected for the site of soft soil conditions, the amplification is greater at shorter periods for the lower amplitude ground motion of 10^4 return period compared to the longer periods for the higher amplitude of the 10^5 year level ground motion. Further studies will be based on the improved regional seismotectonic model, state-of-the-art hazard evaluation software, and better knowledge of the local soil conditions. The presented preliminary results can demonstrate the adequacy of the planned program and highlight the progress in the hazard assessment.