



A new earthquake catalogue for seismic hazard assessment of the NPP (Nuclear Power Plant) Jaslovske Bohunice, Slovakia, site

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According to the IAEA (International Atomic Energy Agency) Safety Guide No. SSG-9, an earthquake catalogue should comprise all information on pre-historical, historical and seismometrically recorded earthquakes in the region which should cover geographic area not smaller than a circle with radius of 300 km around the site.

Jaslovske Bohunice is an important economic site. Several nuclear facilities are located in Jaslovske Bohunice – either in operation (NPP V2, national radioactive waste repository) or in decommissioning (NPP A1, NPP V1). Moreover, a new reactor unit is being planned for the site.

Jaslovske Bohunice site is not far from the Dobra Voda seismic source zone which has been the most active seismic zone at territory of Slovakia since the beginning of 20th century. Relatively small distances to Austria, Hungary, Czech Republic and Slovak capital Bratislava make the site a prominent priority in terms of seismic hazard assessment.

We compiled a new earthquake catalogue for the NPP Jaslovske Bohunice region following the recommendations of the IAEA Safety Guide. The region includes parts of the territories of Slovakia, Hungary, Austria, the Czech Republic and Poland, and it partly extends up to Germany, Slovenia, Croatia and Serbia. The catalogue is based on data from six national earthquake catalogues, two regional earthquake catalogues (ACORN, CENEC) and a catalogue from the local NPP network.

The primarily compiled catalogue for the time period 350 – 2011 consists of 9 142 events. We then homogenized and declustered the catalogue. Eventually we checked the catalogue for time completeness.

For homogenization, we divided the catalogue into preseismometric (350 – 1900) and seismometric (1901-2011) periods. For earthquakes characterized by the epicentral intensity and local magnitude we adopted relations proposed for homogenization of the CENEC catalogue (Grünthal et al. 2009). Instead of assuming the equivalency between local magnitudes reported by the national agencies, we analyzed and estimated relations between them.

For declustering we applied two independent methods. In the window method we applied parameters of the time-space windows proposed by Burkhard & Grünthal (2009). In the cluster method (Reasenbergs 1985) we applied alternative sets of input parameters.

For investigating time completeness we divided the catalogue into four subcatalogues corresponding to different seismogeological domains. The completeness was determined from the plots displaying cumulative number of events (for given subcatalogue and interval of magnitude) as a function of time.

The homogenized catalogue consists of 2 652 earthquakes with moment magnitude larger than 1.5. The catalogue was subsequently used as an input source for hazard analysis.