ESC2016-518, 2016
35th General Assembly of the European Seismological Commission

Induced seismicity in Groningen, the Netherlands

Bernard Dost and Jesper Spetzler
Royal Netherlands Meteorologic, Seismological Division, De Bilt, (DOST@KNMI.NL)

Since 2003 a new mining law is in place in the Netherlands, which requires for each gas field in production a seismic risk analysis. Initially, due to the small number of events for specific fields, a general hazard (PSHA) was calculated for all gas-fields and a maximum magnitude was estimated at ML = 3,9. A main assumption in these calculations is that the seismicity is a stationary process.

In the Groningen gas field, which dominates induced seismicity in the Netherlands since 2003, an increase in the activity rate has been observed since this time and the non-stationary character of the seismicity in the Groningen field became apparent, leading to the development of new hazard models, a site specific GMPE (Bommer et al. , 2016) and a re-assessment of hazard parameters.

Apart from model development, the monitoring network was significantly extended. Since 2014 more than 60 additional borehole stations were installed in the province of Groningen, enabling the application of new location techniques and increasing the resolution of especially depth estimates of induced events. Continued research at KNMI is focused on reducing the uncertainties in the hazard models. We present the latest results of the ongoing development of improving the hazard models for Groningen.

Reference: Bommer, J.J. , B. Dost, B. Edwards, P.J. Stafford, J. van Elk, D. Doornhof and M. Ntinalexis, 2016, Developing an application-specific ground-motion model for induced seismicity, Bull. Seism. Soc. Am 106: 158-173.