ESC2016-224, 2016
35th General Assembly of the European Seismological Commission
© Author(s) 2016. CC Attribution 3.0 License.

35th General Assembly of the European Seismological Commission
4–10 September 2016 Trieste

Improving the basis for seismic hazard assessment in Germany by combining earthquake catalogues with paleoseismic and neotectonic evidence

Diethelm Kaiser (1), Thomas Spies (1), Jörg Schlittenhardt (1), and Klaus Reicherter (2)

(1) Federal Institute for Geosciences and Natural Resources, Hannover, Germany (diethelm.kaiser@bgr.de), (2) RWTH Aachen University, Aachen, Germany

The quality of seismic hazard assessment depends on the knowledge about the occurrence and causes of earthquakes. Several projects coordinated by BGR have the goal to improve the relevant databases in Germany.
The earthquake catalogues and bulletins with instrumentally and macroseismological derived parameters for earthquakes from the year 800 until today have been combined in one common database "GERSEIS". The source parameters of most of the historical events have not been inferred from original sources like entries in chronicles and historical newspaper articles but from later compilations (secondary sources). A pilot study for 8 important earthquakes in Germany between 858 and 1871 showed that a re-evaluation is required and that investigations in archives are promising. We plan to intensify historical earthquake research starting with damaging earthquakes. In parallel we will build up an archive of macroseismic data points (MDP) and estimate homogeneous magnitude values (Mw) for all earthquakes.
Although much paleoseismic work has been performed in the last decades, paleoseismic evidence is sparse in Central Europe, both in terms of temporal and spatial distribution. The paleoseismic data base “PalSeisDB” was established that documents the records of paleoseismic evidence (trenches, soft-sediment deformation, mass movements). Regions, where paleoseismic data or historical and instrumental seismicity are missing, should not be taken as sign of absence of active tectonics, merely as sign of lack of field investigations. Especially the Lower and Upper Rhine Graben are areas of great interest. Findings of seismically induced soft-sediment deformation features in the North German Basin also indicate a potential. The Swabian and Franconian Alb including the Franconian Lineament, are characterised by moderate seismic activity in historical and instrumental catalogues but the expected paleoseismic evidence has not been documented there, so far.
A comprehensive compilation of active faults in Central Europe is still missing. Current neotectonic evidence will be compiled on the basis of geological, seismic, seismological, geomorphological and remote sensing studies to achieve such a data base. In regions of low and moderate seismicity usually it is not possible to attribute earthquake sources to fault structures. For seismic hazard assessment in these regions in Central Europe we will apply new approaches to develop seismotectonic zones as areas or volumes with spatially homogeneous seismicity taking into account all available neotectonic evidence. Studies to develop a data base of active faults and a model of seismotectonic zones are in the planning stage.