



## Revised seismic hazard map for the Kyrgyz Republic

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As part of a seismic risk study sponsored by the World Bank, a revised seismic hazard map for the Kyrgyz Republic has been produced, using the OpenQuake-engine developed by the Global Earthquake Model Foundation (GEM). In this project, an earthquake catalogue spanning a period from 250 BCE to 2014 was compiled and processed through spatial and temporal declustering tools. The territory of the Kyrgyz Republic was divided into 31 area sources defined based on local seismicity, including a total area covering 200 km from the border. The results are presented in terms of Peak Ground Acceleration (PGA). In addition, macroseismic intensity estimates, making use of recent intensity prediction equations, were also provided, given that this measure is still widely used in Central Asia. In order to accommodate the associated epistemic uncertainty, three ground motion prediction equations were used in a logic tree structure. A set of representative earthquake scenarios were further identified based on historical data and the nature of the considered faults.

The resulting hazard map, as expected, follows the country's seismicity, with the highest levels of hazard in the northeast, south and southwest of the country, with an elevated part around the centre. When considering PGA, the hazard is slightly greater for major urban centres than in previous works (e.g., Abdrakhmatov et al., 2003), although the macroseismic intensity estimates are less than previous studies, e.g., Ulomov (1999). For the scenario assessments, the examples that most affect the urban centres assessed are the Issyk Ata fault (in particular for Bishkek), the Chilik and Kemin faults (in particular Balykchy and Karakol), the Ferghana Valley fault system (in particular Osh, Jalah-Abad and Uzgen), the Oinik Djar fault (Naryn) and the central and western Talas-Ferghanafault (Talas). Finally, while site effects (in particular, those dependent on the upper-most geological structure) have an obvious effect on the final hazard level, this is still not fully accounted for, even if a nation-wide first order Vs30 model (i.e. from the USGS) is available.

Abdrakhmatov, K., Havenith, H.-B., Delvaux, D., Jongsmans, D. and Trefois, P. (2003) Probabilistic PGA and Arias Intensity maps of Kyrgyzstan (Central Asia), *Journal of Seismology*, 7, 203-220.

Ulomov, V.I., The GSHAP Region 7 working group (1999) Seismic hazard of Northern Eurasia, *Annali di Geofisica*, 42, 1012-1038.