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TOWARDS A CROSS-BORDER EXPOSURE MODEL FOR THE EARTHQUAKE MODEL CENTRAL ASIA

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The recently published OECD Global Science Forum report on Global Modelling of Natural Hazard Risks 2012 (OECD 2012) concludes from observations of risk assessment practices worldwide that exposure and vulnerability are critical elements for effective risk assessment and suggests that more efforts should be undertaken in order to identify and develop proxy measures, to reduce uncertainties and to consider time-dependency in these components in order to improve assessments. Moreover, the report highlights that commonly used methods and data for risk assessments are strongly heterogeneous in format and quality, making it difficult to compare results between different methods, analysis scales or across national borders.

This becomes particularly evident in data-poor regions, such as Central Asia (Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan), where not only sparse data are available about exposed assets but, moreover, the few available data are largely outdated, spatially fragmented or highly aggregated and are strongly heterogeneous especially across the national borders. Having a good understanding of exposure and vulnerability in the region is of utmost importance for seismic risk assessments, especially on the background that Central Asia is one of the seismically most hazardous areas in the world (Bindi et al. 2010) and shows an increasing urbanization trend and a potentially high vulnerability of the building stock. Therefore, an urgent need to update the estimation of hazard and risk for Central Asia is recognized (King et al. 1999). GEM (Global Earthquake Model[11]), through its regional programme EMCA (Earthquake Model Central Asia[12]), is undertaking research activities, jointly with regional partners, in order to provide up-to-date cross-border risk assessments (Pittore et al. 2011).

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[11] Global Earthquake Model: http://www.globalquakemodel.org
[12] Earthquake Model Central Asia: http://www.emca-gem.org

The presented work provides an insight into the development of the first harmonized exposure model for Central Asia and presents outcomes of the EMCA Workshop on Exposure and Vulnerability Assessment in Central Asia, held 15.04.-19.04.2013 in Bishkek, Kyrgyzstan. The workshop brought together regional experts on earthquake engineering from all five Central Asian countries in order to define a harmonized building typology for Central Asia. The EMCA exposure model combines commonly used data sources and acquisition techniques (e.g., rapid visual screening) with novel rapid assessment approaches (e.g., satellite remote sensing and omnidirectional imaging (Wieland et al. 2012)) in the framework of an integrated sampling scheme and stores the data in a multi-representational spatio-temporal database. The database was specifically designed to manage time-dependent exposure data that are represented at multiple spatial scales. The exposure model implements the new harmonized building typology for all Central Asian countries and follows the international standard taxonomy and ontology of the GEM (Brzev et al. 2013). Also aspects of a probabilistic information integration (Pittore and Wieland 2013) and object life-cylce management will be discussed in this work.

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