ANNALS of GEOPHYSICS

[Special Issue_58_01_2015]

Earthquake Model Central Asia: seismic hazard and risk assessment in Central Asia.

Edited by Stefano Parolai, Jochen Zschau, Ulugbek Begaliev.

ANNALS of GEOPHYSICS

[Special Issue_58_1_2015]
Earthquake Model Central Asia: seismic hazard and risk assessment in Central Asia

PREFACE

Stefano Parolai, Jochen Zschau, Ulugbek Begaliev S0101

ARTICLES

Central Asia earthquake catalogue from ancient time to 2009
Natalya N. Mikhailova, Aidyn S. Mukambayev, Irina L. Aristova, Galina Kulikova, Shahid Ullah, Marco Pilz, Dino Bindi S0102

Probabilistic seismic hazard assessment for Central Asia
Shahid Ullah, Dino Bindi, Marco Pilz, Laurentiu Danciu, Graeme Weatherill, Elisa Zuccolo, Anatoly Ischuk, Natalya N. Mikhailova, Kanat Abdrakhmatov, Stefano Parolai S0103

An overview on the seismic microzonation and site effect studies in Central Asia
Marco Pilz, Tanatkan Abakanov, Kanatbek Abdrakhmatov, Dino Bindi, Tobias Boxberger, Bolot Moldobekov, Sagynbek Orunbaev, Natalya Silacheva, Shahid Ullah, Sheyshenaly Usupaev, Pulat Yasunov, Stefano Parolai S0104

Probabilistic seismic hazard assessment of Bishkek, Kyrgyzstan, considering empirically estimated site effects
Shahid Ullah, Dino Bindi, Marco Pilz, Stefano Parolai S0105

Towards a cross-border exposure model for the Earthquake Model Central Asia
Marc Wieland, Massimiliano Pittore, Stefano Parolai, Ulugbek Begaliev, Pulat Yasunov, Jafar Niyazov, Sergey Tyagunov, Bolot Moldobekov, Saidislom Saidiy, Indalip Ilyasov, Tanatkan Abakanov S0106

Focus maps: a means of prioritizing data collection for efficient geo-risk assessment
Massimiliano Pittore S0107

A summary of hazard datasets and guidelines supported by the Global Earthquake Model during the first implementation phase
Marco Pagani, Julio Garcia, Damiano Monelli, Graeme Weatherill, Anselm Smolka S0108

Global Seismic Hazard Assessment Program - GSHAP legacy
Laurentiu Danciu, Domenico Giardini S0109

Building monitoring in Bishkek and Dushanbe by the use of ambient vibration analysis
Bojana Petrovic, Dino Bindi, Marco Pilz, Matteo Serio, Sagynbek Orunbaev, Jafar Niyazov, Farhod Hakimov, Pulat Yasunov, Ulugbek T. Begaliev, Stefano Parolai S0110

Toward a cross-border early-warning system for Central Asia
Jacek Stankiewicz, Dino Bindi, Adrien Oth, Stefano Parolai S0111

On-site early-warning system for Bishkek (Kyrgyzstan)
Dino Bindi, Tobias Boxberger, Sagynbek Orunbaev, Marco Pilz, Jacek Stankiewicz, Massimiliano Pittore, Iunio Iervolino, Enrico Ellguth, Stefano Parolai S0112

The contribution of EMCA to landslide susceptibility mapping in Central Asia
Annamaria Saponaro, Marco Pilz, Dino Bindi, Stefano Parolai S0113

ANNALS of GEOPHYSICS

PREFACE

Earthquake Model Central Asia: seismic hazard and risk assessment in Central Asia

Central Asia is one of the regions of the world with the highest seismic hazard. A number of large events have occurred in this region between the end of the 19th and the beginning of the 20th century, when urbanization was still limited. However, the recent increase in population and, in particular, the expansion of urban areas after the collapse of the Soviet Union has greatly increased the seismic risk of Central Asian countries. Within the framework of the Earthquake Model Central Asia (EMCA), the regional partnership of the Global Earthquake Model (GEM) for Central Asia, new Probabilistic Seismic Hazard models have been recently derived, along with site effects studies in several cities, and new models for exposure and vulnerability generated based on newly acquired data sets.

This volume consist of 12 papers providing both an overview of the activities undertaken and a general description of the main results of the first phase of the EMCA initiative and of other projects that directly benefited from their cooperation with EMCA.

Mikhailova et al. presents the earthquake catalog compiled for the EMCA project, consisting of 33,620 historical and instrumental events, where the main sources and procedures used to compile the catalogue are discussed. **Ullah et al.** (**a**) show the area source and the different approaches used for the Probabilistic Seismic Hazard Assessment (PSHA) for Central Asia, providing a comprehensive comparison of the results obtained by different methods. **Pilz et al.** provide an overview of the experiments carried out for the assessment of site effects in several urban areas in Central Asia, while **Ullah et al.** (**b**) presents a first attempt to take them into account for the PSHA of Bishkek, where the importance of site effects in modifying the ground motion is highlighted.

Wieland et al. provide insights into the development of the first harmonized exposure model for Central Asia. This model combines commonly used data sources and acquisition techniques with novel rapid assessment approaches (e.g., satellite remote sensing and omnidirectional imaging). **Pittore** introduces the concept of focus maps, and illustrates its application in Central Asia for an efficient geo-risk assessment. In the paper of **Pagani et al.**, a description of the main outcomes of the GEM global initiatives (e.g., global instrumental catalogue, global database of active faults) is provided and some of their initial applications illustrated. **Danciu and Giardini**, present a short retrospective overview of the achievements as well as the pitfalls of the GSHAP. Also, they focus their attention to the next generation of seismic hazard models, as elaborated within the Global Earthquake Model regional programs and partnerships: the 2013 European Seismic Hazard Model, the 2014 Earthquake Model for the Middle East, and the 2015 Earthquake Model for Central Asia.

Petrovic et al. report on the results from experiments aiming at assessing the dynamic characteristics of buildings in Central Asia, while **Stankiewicz et al.** and **Bindi et al.** show how the data collected can be useful for developing Regional and On Site Earthquake Early Warning (EEW)/rapid response systems, allowing real time risk assessment. Finally, the paper of **Saponaro et al.** presents results dealing with earthquake-triggered landslide susceptibility for the whole Central Asian region.

The editors are thankful to G. Ameri, O. Ozel, D. Di Giacomo, C. Geiss, M. Garcia-Fernandez, D. Ehrlich, R. Ditommaso, C. Milkereit and O. Polat who reviewed the submitted manuscripts.

Stefano Parolai
Helmholtz Center Potsdam - German Research Center for Geosciences, Potsdam, Germany

Jochen Zschau
Helmholtz Center Potsdam - German Research Center for Geosciences, Potsdam, Germany

Ulugbek Begaliev
International University of Innovation Technologies, Bishkek, Kyrgyzstan

ANNALS OF GEOPHYSICS, 58, 1, 2015, S0101;
doi:10.4401/ag-6784.