
Preface

The year 2015 will be the 25th year of the implementation of the International Decade for Natural Disaster Reduction (IDNDR) and International Strategy for Disaster risk Reduction (ISDR) proposed by the United Nations. Great achievements have been attained in the field of global integrated disaster reduction. Disaster risk reduction, global climate adaptation, and sustainable development have become the joint responsibilities of every country in economical, social, cultural, political, and ecological construction. During these 25 years, UNIDNDR or UNISDR has worked together with governments around the world, scientific and technological groups, nongovernmental organizations, entrepreneur groups, media groups, and various relevant regional organizations, gaining effective results in alleviating human casualties, property loss, damage to resources and environment caused by natural hazards in the world, and earning a great reputation at every stratum of society as well. However, the data released by UN organizations demonstrate that the number of natural disasters is ascending in fluctuation. Though some countries and regions have obtained remarkable results in natural disaster reduction, and have reduced the impacts brought by natural hazards, the ability to cope with large-scale disaster remains insufficient. The task of natural disaster risk reduction is still arduous.

The decade-long IHDP/Future Earth—IRG international program proposed by CNC-IHDP/Future Earth and organized by scientists around the world has been implemented for nearly 5 years. Meanwhile, the “Hazard and Risk Science Base” at Beijing Normal University supported by the Ministry of Education and the State Administration of Foreign Experts Affairs of China (111 Project, No. B08008), which is sponsored by Chinese government has also been carried out for nearly 7 years since 2008. Funded by the Chinese government, a series of scientific projects have attained enormous results and valuable references which laid a solid foundation for the compilation of this atlas, including the phrasal results and findings from the following ongoing projects: the “Relationship Between Global Change and Environmental Risks and its Adaptation Paradigm” (No. 2012CB955400)—a project supported by the special research plan of global change of the Ministry of Science and Technology of China (MOST), the creative research group “Model and Simulation of Earth Surface Process” (No. 41321001), the “Research on the Regional Agriculture Drought Adaptation Assessment Model and Risk Reduction Paradigm” (No. 41171402), and the project “the Land-use and Integrated Erosion of Soil by Wind and Water in the Eastern Ecotone of Agriculture and Animal Husbandry in North China” (No. 41271286) sponsored by the National Natural Science Foundation of China (NSFC). The atlas has also received help and data from the following completed projects: the “Geographic Transaction Zone Study on Interaction Mechanism of Human-earth System on Earth Surface” (No. 40425008)—distinguished young scientists projects, the “Integrated Natural Disaster Risk Evaluation and Disaster Reduction Paradigm Study in Rapid Urbanization Regions” (No. 40535024)—a key project of National Nature Science Foundation of China, the major international joint research program “Integrated Risk Governance—case study of IHDP—IRG Core Science Plan” (No. 40821140354), a key project of NSFC, “Global Climate Change and Large-scale Disaster Governance” (No. 2008DFA20640)—an international joint project of MOST, “the Key Technology Study and Demonstration of Integrated

Risk Prevention” (No. 2006BAD20B00)—a key science and technology pillar project of MOST, and the “Technology for Evaluating Natural Disaster Risk in the Yangtze River Delta” (No. 2008BAK50B07).

We organized all faculties and students of Beijing Normal University in the disaster risk science, and international experts who participated in the IHDP/Future Earth—IRG and “111 Project”, as well as all the personnel involved in these two projects, throughout 10 years of preparation, planning, and execution, to compile this atlas, aiming to reflect the spatial patterns of major natural disaster risk all around the world. This atlas provides scientific evidence for taking effective measures of world natural disaster risk reduction by demonstrating the spatial variation from the following three spatial scales for the main natural disaster risk on the world: the grid ($1\text{km} \times 1\text{km}$, $0.1^\circ \times 0.1^\circ$, $0.25^\circ \times 0.25^\circ$, $0.5^\circ \times 0.5^\circ$, $0.75^\circ \times 0.75^\circ$ and $1^\circ \times 1^\circ$), the comparable-geographic unit (about $448334 \text{ km}^2/\text{region}$), and the national or regional unit (245 nations and regions).

The “Natural Disaster Hotspots” program, jointly completed by the World Bank and Columbia University (USA), has for the first time provided the major global natural disaster risk maps in small scale, which enormously inspires us in compiling this atlas. Our job has obtained desirable improvement in aspects like sorting natural disaster types, assessment method and accuracy, data upgrading, spatial comparability, temporal and spatial resolution, and results verification. Moreover, these improvements have wider and more effective applicability.

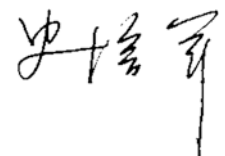
The providers of the shared data online has made great scientific contribution to world natural disaster risk reduction, which not only inspires us to make joint efforts to develop disaster risk science and compile this atlas, but will also save numerous lives, property, and the service capacity of the earth’s ecological system from damage by disasters. Hence, we express our heartfelt appreciation and respect to those institutions and websites which provide related shared global data, and to those scientific personnel who devoted themselves to this grand cause.

Since 1989, BNU’s integrated disaster research efforts by all its involved faculty and students have evolved in synchronization with the disaster reduction activities of the United Nations. Initiated by the establishment of “China Natural Disaster Monitoring and Prevention Research Laboratory” in 1989, a number of academic institutions and subjects have been set up, such as the “Disaster Insurance Technology Center at BNU” in 1992, “Open Laboratory for Environmental Change and Natural Disaster of Ministry of Education of China (MOE)” in 1994, “Catastrophe Insurance Technology Center at BNU” in 1998, “Key Laboratory of Environmental Change and Natural Disaster, MOE, BNU” in 1998, “Beijing Desertification and Blown-sand Control Technology Center” in 2002, the master and doctor programs of “Natural Disaster Science” which has been granted to admit students in 2003, the “Desertification and Blown-sand Control Engineering Center of MOE” in 2006, “Academy of Disaster Reduction and Emergency Management, Ministry of Civil Affairs of China (MOCA) and MOE” in 2006, and the “State Key Laboratory of Earth Surface Processes and Resource Ecology” in 2007. The BNU disaster and risk study group has enlarged from three faculties at the very beginning to nearly 100 faculties, more than 100 master students, and over 200 doctoral students today, making itself a national professional team focusing on R&D projects of natural disaster risk. Furthermore, it keeps close and excellent collaborative relationships with many top research institutions all over the world, such as Disaster Prevention Research Institute of Kyoto University in Japan, International Institute for Applied Systems Analysis in Austria, Stockholm Environment Institute in Sweden, Hazard Research Center of Clark University in the U.S., School of Sustainability Science at Arizona State University in the U.S., as well as Potsdam Institute for Climate Impact Research in the Germany, etc. Now this group is playing a significant role in integrated natural disaster risk research in the world.

In the process of compiling and publishing this atlas, as well as in the evolution of Disaster Risk Science of BNU, we received strong support and help from many institutions at home and abroad. We would like to express our gratitude to the following centers, academic

institutions, and state-owned enterprises for their help in related references, data, and technological guidance and guarantee: National Climate Center of China Meteorological Administration, National Remote Sensing Center of China Ministry of Science and Technology of the People's Republic of China, National Disaster Reduction Center of China, Ministry of Civil Affairs, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Science (CAS), Cold and Arid Regions Environmental and Engineering Research Institute, CAS, Research Center for Eco-Environmental Sciences, CAS, Institute of Tibetan Plateau Research, CAS, Institute of Earth Environment, CAS, Institute of Mountain Hazards and Environment, CAS, Institute of Atmospheric Physics, CAS, Institute of Geology and Geophysics, CAS, College of Urban and Environmental Sciences of Beijing University, School of Geography and Ocean Sciences of Nanjing University, College for Global Change Studies of Tsinghua University, School of Geography and Planning of Sun Yat-Sen University, Faculty of Geo-Science of East China Normal University, College of Earth and Environmental Sciences of Lanzhou University, School of Resource and Environmental Sciences of Wuhan University, People's Insurance Company of China, and China Reinsurance Company. Many world-recognized universities and academic institutions, who keep close academic collaborative relationship with us, have also supplied us with substantial data and references, as well as the theoretical support regarding assessing methodology. They are University of Maryland in the USA, Nanyang Technological University in Singapore, University Wien in Austria, Oxford University in the UK, University of Stuttgart in Germany, University of California-Berkeley in the USA, Risk Management Solution (RMS), Swiss Re, Munich Re, and Aon Benfield. UNISDR, UNISDR Asia-Pacific Office and UNISDR-Global Assessment Report on Disaster Risk Reduction (GAR) have also offered us great supports and detailed guidance. Star Map Press (Beijing) has provided great supports in editing the maps, and Beijing Normal University Press and Springer-Verlag have jointly provided the ideal conditions for the publishing of this atlas.

We also owe an incalculable debt of gratitude to the following notable scientists and experts for their guidance to this atlas: Academician Guanhua Xu, Dahe Qin, Zhisheng An, Changming Liu, Xueyu Lin, Xiaowen Li, Yong Chen, Zongjin Ma, Xinshi Zhang, Rixiang Zhu, Tandong Yao, Bojie Fu, Prof. Yanhua Liu, Jun Chen, Ms. Margareta Wahlström, Dr. Fenmin Kan, Sujit Mohanty and Pedro Basabe. Ms. Margareta Wahlström and Academician Dahe Qin also wrote prefaces for this atlas. Here, we would like to express our sincere appreciation to all of the leaders and experts. At the same time, we are looking forward to a greater achievement in worldwide disaster prevention and reduction, and a significant improvement of integrated disaster risk governance capability in the near future. Restricted from limited references and data, it is regrettable to give an incomplete evaluation to some countries and regions. We wish that the insufficiency will be revised and perfected in our further work. Comments and suggestions from peers and readers will be highly welcome and appreciated.



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