

## Natural Hazards and Disaster Risk Reduction Policies

Loredana Antronico, Fausto Marincioni (Eds.)

### UNESCO Global Geoparks: living laboratories to mitigate natural induced disasters and strengthen communities' resilience

Charalampos Fassoulas<sup>1</sup>, Mahito Watanabe<sup>2</sup>, Irina Pavlova<sup>3</sup>, Alessia Amorfini<sup>4</sup>, Edoardo Dellarole<sup>5</sup>, Florian Dierickx<sup>6</sup>

#### Abstract

UNESCO Global Geoparks (UGGps) are forming a network of 140 territories all over the globe (GGN), that are located in various geographical settings that may be partly or entirely exposed to various natural hazards and extreme weather events. In recent years, natural hazards have already caused extensive damage to several UGGps. In addition, climate change seems to affect both occurrence and intensity of various hydro-meteorological hazards. In order to have a better understanding of the exposure of UGGps to natural hazards, and their activities to mitigate risks the GGN and UNESCO's Section on Earth Sciences and Geo-Hazards Risk Reduction team undertook in 2015 a thematic survey. Analyses of the data revealed the high risk that UGGps are facing, the important role of training and awareness raising actions, as well as of the existence and implementation of adequate risk management plans. Many UGGps in Asia and Europe have already set as top priority the reduction of naturally induced disasters and the protection of citizens and infrastructure, having implemented certain projects and developed concrete infrastructure and activities to raise awareness and mitigate risks. Existing knowledge of indigenous communities help UGGps to develop practices and initiatives to overpass crises and become more resilient. Hereby we present thus the results of the UNESCO and GGN survey in UGGps, as well as examples and good practices developed so far among the various geoparks.

**Keywords:** Global Geoparks, Natural Hazards, risk mitigation, geo-hazards, resilience.

#### Works Cited

Bartelletti, A., Amorfini, A., & Ottria, G., 2017, *Rains and Ruins in the Apuan Alps*, Parco Regionale delle Alpi Apuane – Apuan Alps UGGp, Massa, Italy, 80 p.

CRED, 2014, *Disasters in Numbers*, Centre for Research on the Epidemiology of Disasters – CRED, retrieved from: <http://cred.be/sites/default/files/CredCrunch35.pdf>. Last access: 8/1/2019.

<sup>1</sup> Corresponding author; Psiloritis UNESCO Global Geopark - Natural History Museum, University of Crete, Heraklion 70013, Greece, [fassoulas@nhmc.uoc.gr](mailto:fassoulas@nhmc.uoc.gr).

<sup>2</sup> Geological Survey of Japan, AIST, [mht.watanabe@aist.go.jp](mailto:mht.watanabe@aist.go.jp).

<sup>3</sup> Section on Earth Sciences and Geo-Hazards Risk Reduction, Natural Sciences Sector, UNESCO, Paris, France, [i.pavlova@unesco.org](mailto:i.pavlova@unesco.org).

<sup>4</sup> Apuan Alps, UNESCO Global Geopark, 54100 Massa, Italy, [aamorfini@parcapuane.it](mailto:aamorfini@parcapuane.it).

<sup>5</sup> Sesia Val Grande UNESCO Global Geopark, 28805 Vogogna, Italy, [presidente@sesiavalgrandegeopark.it](mailto:presidente@sesiavalgrandegeopark.it).

<sup>6</sup> Section on Earth Sciences and Geo-Hazards Risk Reduction, Natural Sciences Sector, UNESCO, Paris, France, [f.dierickx@unesco.org](mailto:f.dierickx@unesco.org), [florian.dierickx@uca.fr](mailto:florian.dierickx@uca.fr).

## Natural Hazards and Disaster Risk Reduction Policies

Loredana Antronico, Fausto Marincioni (Eds.)

Dierickx, F., Pavlova, I., & Gaines, S., 2016, “Natural Hazards in UNESCO Global Geoparks”, *European Geoparks Magazine*, 13, 16-17.

EGN, 2012, *The Shimabara Declaration*, European Geoparks Network, website (<http://www.europeanGeoparks.org/?p=1974>).

Fassoulas, C., 2013, Facing Natural Risks in European Geoparks. In: *San’In Kaigan Geopark International Academic Conference*, Abs vol., Kinosaki, Japan.

Fassoulas, C., Mouriki, D., Dimitriou-Nikolakis, P., & Iliopoulos, G., 2011, “Quantitative assessment of geotopes as an effective tool for geoheritage management”, *Geoheritage*, 4, 3, 177-193, DOI 10.1007/s12371-011-0046-9.

Fassoulas, C., & Burlando, M., 2015, Collaborating under EVANDE project to establish a Geoparks network of Volunteers against Natural Disasters. In: *13<sup>th</sup> International European Geoparks Congress*, Abs vol., Oulu.

Forzieri, G., Cescatti, A., Silva, F. B., & Feyen, L., 2017, “Increasing risk over time of weather-related hazards to the European population: a data-driven prognostic study”, *The Lancet Planetary Health*, 1, 5, 200–208, [https://doi.org/10.1016/S2542-5196\(17\)30082-7](https://doi.org/10.1016/S2542-5196(17)30082-7)

Hessel, C., Jongman, B., Veldkamp, T.I.E., Hallegatte, S., Bangalore, M., & Ward, P. J., 2018, “Disaster risk, climate change, and poverty: assessing the global exposure of poor people to floods and droughts”, *Environment and Development Economics*, 1–21. DOI: 10.1017/S1355770X17000444.

IPCC, 2014, *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, Working Group II Contribution to the IPCC. 5<sup>th</sup> Assessment Report (Summary for Policymakers), Intergovernmental Panel on Climate Change (IPCC), Cambridge, UK.

Manfredi, G., Rose, A., Sapountzaki, K., Jørgensen, G., Callaghan, E., Tobin, G., Gasparini, P., & Asprone, D., 2014, Resilience and Sustainability in Relation to Disasters: A Challenge for Future Cities: Common Vision and Recommendations. In: Gasparini, Manfredi, Asprone (Eds.) *Resilience and Sustainability in Relation to Natural Disasters: A Challenge for Future Cities*, Springer, 77-83.

Martini, G., & Pages, J.S., (Eds.), 1994, Actes du premier symposium international sur la protection du patrimoine géologique. *Memoires de la Societe geologique de France*, 165pp.

Nakada, S., 2014, What is reasonable geotourism in volcanic areas? In: *6<sup>th</sup> International Geopark Congress*, Stonehammer Geopark, Saint John New Brunswick, Canada, 61.

O’Brien, G., O’Keefe, P., Rose, J., & Wisner, B., 2006, “Climate change and disaster management: Climate Change and Disaster Management”, *Disasters*, 30, 1, 64–80. <https://doi.org/10.1111/j.1467-9523.2006.00307.x>.

Pavlova I., Makarigakis, A., Depret, T., & Jomelli V., 2017, “Global overview of the geological hazard exposure and disaster risk awareness at world heritage sites”, *Journal of Cultural Heritage*, 28, 151-157.

Plodinec, J., 2009, *Definitions of resilience: An analysis*. Oak Ridge: Community and Regional Resilience Institute (CARRI).

Staridas, S., & Fassoulas, C., 2015, Designing a shared web map of the rapidly expanding list of Global & European Geoparks Networks Members using web GIS technologies. In: *13<sup>th</sup> International European Geoparks Congress*, Abs vol., Oulu.

UNISDR, 2004, *Living with Risk: A global review of disaster reduction initiatives*, Geneva, Vol. 1.

UNISDR, 2007, *Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters*. United Nations, Geneva,



Geographies  
of the  
Anthropocene



PEER-REVIEWED  
SERIES  
ISSN 0911-8171

IL Sileno  
Edizioni

### Natural Hazards and Disaster Risk Reduction Policies

Loredana Antronico, Fausto Marincioni (Eds.)

<http://www.preventionweb.net/english/professional/publications/v.php?id=1037>, last access: 08/01/2019.

UNISDR, 2009, *Risk and Poverty in a Changing Climate: Invest Today for a Safer Tomorrow*, 2009 Global Assessment Report on Disaster Risk Reduction, (Geneva: United Nations), <http://www.preventionweb.net/gar09>. Last access: 8/1/2019.

UNISDR, 2015, *Sendai Framework for Disaster Risk Reduction 2015-2030*, United Nations, Geneva, p. 37, retrieved from: <http://www.unisdr.org/we/inform/publications/43291>. Last access: 8/1/2019.

Wang, L., & Tian, M., 2013, "A discussion on the development model of earthquake relic Geopark – a case study of the Qingchuan Earthquake Relic Geopark in Sichuan Province, China", *Journal of Cultural Heritage*, 15, 459–469.

WB, 2010, Disaster types and impacts. In: "*Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters*", published by the World Bank in January 2010, 339-344, World Bank, Washington D.C.

WB, 2012, *Disaster risk management: Building a safe and resilient future for all*, Sustainable Development Network, published by the World Bank in September 2011, p.1-20, World Bank, Washington D.C.

Zouros, N. & Martini, G., 2003, Introduction to the European Geoparks Network. In: Zouros N., Martini G. & Frey M.L. (Eds.), *Proc 2<sup>nd</sup> European Geoparks Network Meeting*, Mytilene, Greece, 17-21.