

GEOHAZARDS IN EUROPEAN GEOPARKS

Editors

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Prefaces

Foreword by Kula-Salihli Geopark president

Dear Readers,

It is with great pleasure that we introduce to you the book "Geohazards in European Geoparks." This comprehensive work aims to shed light on the geohazard landscape of Europe, focusing on the geohazards in geoparks, as well as educational and dissemination initiatives and activities related to geohazards.

Geohazards pose significant challenges to society worldwide, and Europe is no exception. From seismic events and volcanic eruptions to landslides and coastal erosion, the continent has witnessed the destructive power of nature's forces. Understanding these geohazards, their causes, and their potential impact is crucial for effective preparedness, mitigation, and response.

This book delves into the geohazard situation in geoparks across Europe, where the unique geological features meet efforts to raise awareness, educate, and disseminate knowledge about these. Geoparks serve as living laboratories, providing a platform for scientific research, conservation, and sustainable development. By exploring the experiences and practices within geoparks, this book showcases the valuable work carried out in addressing geohazards and fostering public understanding.

Furthermore, the book emphasizes the importance of education and dissemination activities in geohazard management. It presents case studies, best practices, and innovative approaches to education and outreach, highlighting the efforts to engage various stakeholders, including local communities, schools, tourists, and policymakers. By empowering individuals with knowledge and promoting a culture of resilience, these initiatives contribute to building more prepared and informed communities.

The contributors to this book are experts in their respective fields, including Earth scientists, educators, and practitioners. Their diverse perspectives and experiences enrich the content, providing a multidimensional view of geohazards and the strategies to address them. The book encompasses a wide range of topics, from geological and geotechnical aspects to risk assessment, communication strategies, and the integration of geohazard education into formal and informal learning environments.

I would like to express my gratitude to all the authors and contributors who have dedicated their time and expertise to this book. Their collective efforts have resulted in a comprehensive resource that will serve as a reference for researchers, educators, policymakers, and anyone interested in geohazard management and geoparks.

Finally, we extend our sincere appreciation to the readers who embark on this journey through the pages of "Geohazards in European Geoparks". May this book inspire further collaborations, spark new ideas, and contribute to the advancement of geohazard awareness, education, and preparedness in Europe and beyond.

Yours sincerely,

Cengiz Ergün
Mayor of Geopark Municipalities Union (Mayor of Manisa Metropolitan Municipality)

Foreword by the European Geoparks Network

Humanity is an integral part of nature. Our way of living, our daily choices and our future plans are influenced by the world around us. Immersed in our immediate human timescale, we often underestimate of the power of the Earth. We easily forg

et that our landscapes were forged over millions of years, and yet that they can change dramatically in just minutes.

The European Network of UNESCO Global Geoparks (UGGps) brings together exceptional territories that are skilled in conserving, sharing and educating inhabitants and visitors about Earth heritage. Spanning from the Arctic Circle to the shores of Africa, from the heart of the Atlantic Ocean and deep into the Eurasian continent, these regions present incredible climatic and geographic diversity. Each area has its own character and its own relationship with nature. This includes the natural hazards that cannot be prevented, such as earthquakes, floods and mass movements.

European UGGps' work in partnership with geological surveys and universities, government agencies, education authorities and other partners to understand, inform and anticipate geohazards. They play a crucial role in helping the public and decision makers prepare and plan for these events, and thus reduce the risk.

This book brings together for the first time an important collection of articles about geohazards from the four corners of Europe. The European Geoparks Network draws its strength from our ability to cooperate, share and learn from each other, of which this collective work is a perfect example. The incredible territorial diversity is reflected through the different approaches used in each UNESCO Global Geoparks to proactively manage emerging and existing risks and communicate about geohazards.

At the heart of sustainable development is the need to better understand and manage natural hazards. The many examples presented in this book confirm yet another way in which UNESCO Global Geoparks actively contribute Sustainable Development Goals (SDGs) of the 2030 Agenda. Some are direct examples related to risk informed climate action (SDG 13) or conservation to tackle land degradation, erosion, and flooding (SDG 15). Others provide inclusive educational opportunities to learn about reducing risks from all hazards (SDG 4).

We live in an uncertain world. Here, European UNESCO Global Geoparks share their knowledge and expertise of geohazards to contribute to a stronger management, adaptation, and resilience around the risks we collectively face.

Sophie Justice and Charalampos Fassoulas
EGN Coordinators
19th December 2023

Foreword by the Global Geoparks Network

The Global Geoparks Network (GGN), established in 2004, represents today a dynamic growing network of excellence. The GGN includes 195 UNESCO Global Geoparks in 48 countries. It is a not-for-profit organization where members are committed to working together, exchange ideas of best practice, and promote conservation, management, and communication of the Earth heritage.

Since 2015 the GGN has worked closely with UNESCO for the development and operation of the UNESCO Global Geoparks Programme. The GGN is supporting UNESCO Global Geopark activities, collaboration, and networking to protect geological heritage and promote local sustainable development.

The GGN includes 5 continental Geopark networks, among them the European Geoparks Network (EGN) with 98 UNESCO Global Geoparks.

UNESCO Global Geoparks promote awareness on geological hazards, including earthquakes, volcanic eruptions, tsunamis, landslides, floods, and other natural disasters. All of them have a direct impact on human communities, as well as on natural and cultural heritage. Geo-hazards can seriously damage or even completely destroy communities, natural monuments, historical and archaeological sites or cultural landscapes. In addition to the endangerment of people who live in or visit Geoparks, the degradation of natural and cultural heritage has a negative socioeconomic impact on local communities and involves a loss of identity-generating values and of cultural diversity.

Climate change, which lies behind the rising frequency and intensity of some natural disasters, is exposing Geoparks to new threats where few used to exist and increasing the vulnerability of areas already at risk.

Many UNESCO Global Geoparks provide information on the sources of geological hazards through educational activities for the local people and visitors, as well as, ways to reduce their impact such as disaster response strategies. These efforts build important capacity and contribute to building more resilient communities that have the knowledge and skills to effectively respond to potential geological hazards.

GGN and EGN working groups on geo-hazards coordinate common activities and help prepare disaster mitigation strategies among Geoparks.

This publication of the Working Group of Geohazards of the European Geoparks Network is an excellent tool to communicate geoscientific knowledge, to interpret geo-hazard related geological features and landscapes for the general public and to raise awareness against geo-disasters by promoting geo-hazard risk and disaster resilience based on the experience of the UNESCO Global Geoparks in Europe.

It is also a significant contribution to the exchange of know-how and experiences on geo-hazards risk reduction among UNESCO Global Geoparks at the global level.

Prof. NICKOLAS ZOUROS
Department of Geography, University of the Aegean
Lesvos Island UNESCO Global Geopark
President of the Global Geoparks Network

Foreword by the UNESCO Earth Sciences and Geoparks section

Geohazards, including earthquakes, landslides, volcanic eruptions, tsunamis, and floods, are inherent features of the Earth's dynamic systems. Their impact is wide, impacting human lives, infrastructure, and the environment, and yet their potential devastating impacts can be mitigated through a combination of scientific research, technological innovation, community engagement, and international cooperation. UNESCO has been at the forefront of global initiatives, recognising the imperative need to comprehend these hazards and pool our expertise on the global level.

One of UNESCO's primary mandates is to foster the advancement of knowledge and science for the benefit of humanity. In the realm of geohazards, this commitment translates into supporting cutting-edge research initiatives that deepen our understanding of the underlying processes and mechanisms triggering such events. UNESCO's International Geoscience Programme (IGCP) has been instrumental in uniting Earth scientists worldwide for crucial research initiatives since its creation in 1972, in partnership with the International Union of Geological Sciences (IUGS). This programme aims to equip communities with resilience, preparedness, and adaptive capacity in confronting challenges including geohazards, such as through establishing early-warning systems and monitoring mechanisms for volcanic eruptions and tsunamis.

With the addition of the UNESCO Global Geoparks, UNESCO now has the privilege of connecting with an ever-expanding network of breathtaking 'living laboratories', committed to safeguarding the geological, natural and cultural heritage of our home planet. These geoparks, characterised by their captivating topographies, cultural richness, and varied climates, tell the story of Planet Earth's 4,600 million-year history. Embracing a forward-thinking approach, they work to sustain these invaluable sites for future generations. With the Global Geoparks Network (GGN), and its regional bodies like the European Geoparks Network (EGN), UNESCO continues to promote the concept and train experts worldwide to expand and reinforce the network.

In the face of the paramount modern challenge – climate change – geoparks emerge as pivotal players in steering societies towards sustainability. Embedded within natural landscapes and human cultures, they are crucial entities in a collective effort towards a sustainable future. Many UNESCO Global Geoparks promote awareness of geological hazards and their sources, and educate on disaster-mitigation strategies among local communities and for visitors.

UNESCO commends the authors of this book for bringing together different initiatives and good practices that can inspire others to further cooperation, in the true spirit of UNESCO and the Global Geoparks.

Kristof Vandenberghe
Chief Earth Sciences and Geoparks
UNESCO

Foreword by the book editors

The intent of sharing experiences and promoting best practices on educational activities regarding dangerous natural phenomena is why the working group of the European Geoparks Network on Geohazards decided to publish the volume you are currently holding. This work represents years and years of research, study, and other educational activities that its members have perfected while working in their respective Geoparks.

Most UNESCO Global Geoparks are located in vastly diverse geographical settings and are often subject to natural hazards and weather events which have become more extreme by the years.

In addition, the past decade climate change has affected both geological and hydro-meteorological hazards in terms of intensity and occurrence.

For all these reasons, collecting and promoting best practices for the communication of and education on disaster risk reduction is a decisive factor for the territories embraced by UNESCO Global Geoparks. Moreover, as the intensity of climate change heightens, these territories are already becoming beacons of innovation and best practices on these topics for the whole planet Earth.

The body of this book provides comprehensive and concise information about the geohazards in European Geoparks, reinforcing the image of these territories as natural laboratories showcasing a wide representation of geohazards.

The main effort has been to disseminate concepts that are not simple for a non-expert audience, using understandable language without ever neglecting the scientific correctness of the contents conveyed.

Educational activities and projects serve to raise awareness on the potential impact of climate change and geohazards. They also provide local communities with the knowledge needed to effectively mitigate and adapt to the potential effects of climate change.

Considering that it is a pre-requisite that the UNESCO Global Geoparks develop and operate educational activities for all ages to spread awareness of our geological heritage, it becomes of paramount importance to reinforce the image of European Geoparks as an essential intermediary to better understand geohazards and to contribute to educating and preparing people when these events occur.

Therefore, we hope this volume will become an educational tool not only for the students, but also facilitate all the Geopark actors in the pursuit of building more and more disaster-resilient communities through activities and programmes that engage locals and tourists alike by raising their awareness about natural hazards, the associated risks, and the possible ways to reduce their impact.

The editors

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