

**General Session G11**  
**Environmental geosciences**



## SOCIOECONOMIC INFLUENCE OF NATURAL DISASTERS IN THE WESTERN BALKAN COUNTRIES

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**Abstract:** The Western Balkan region is a region of south-eastern Europe that presents pronounced activities of various types of natural hazards and natural disasters. This paper analyses data sets from two international databases of the main types of natural disasters namely geophysical, hydrological, climatological and meteorological disaster events in the period 1900-2008. The following have been analysed: the number of natural disaster events, natural disaster occurrence by disaster type, the total number of fatalities, the total number of affected people and the corresponding economic damages expressed as a percentage of selected types of natural disasters. The data analysis in this paper aims to confirm the importance of data collection and analysis as a foundation for planning and preparing disaster reduction programs for the Western Balkan countries.

**Key words:** Western Balkan countries, period 1900-2008, natural disasters, statistical review

### 1. Introduction

Natural disasters occur all over the world. Climate changes, environmental degradation and development in high-risk zones have all contributed to the increased number of natural disasters worldwide and the increased vulnerability of society, particularly for regions that are prone to natural hazards. An analysis of the total number of natural disasters and the total economic loss reported by natural hazards shows a distinct trend of growth during the last fifty years worldwide. According to data from Munich Reinsurance Company (<http://munichre.com>) the total economic losses have multiplied in the period 1950-2008. This information can be confirmed if we review the data from (Centre for Research on the Epidemiology of Disasters) CRED (Centre for Research on the Epidemiology of Disasters) (<http://www.cred.be>) for individual continents or for the entire world. The human and economic losses caused by natural disasters only in 2008 were devastating. More than 235.000 people were killed; 214 million people were affected and the economic cost was over 190 billion US dollars (Rodriquez et al., 2009).

Several definitions of natural disasters emphasize the usage of this term. The Centre for Research on

the Epidemiology of Disasters, Catholic University of Louvain, Belgium (Guha-Sapir, 2008) defines natural disaster as “a situation or event which overwhelms local capacity, necessitating a request to national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering”.

It can be said that natural hazards and natural disasters are present all over the world; however, certain types of natural disasters and their total impact differ between geographical locations and the degree of development and vulnerability (social, economic, political or cultural) of the region or country (Abolmasov et al., 2009).

This paper will present the results of an analysis and statistical review of international databases of selected data sets on natural disasters and their impact on the Western Balkan countries.

### 2. Methodology of collecting data

The collection of information on natural disasters and their impact is complex as it depends on time, funding, the huge variability of definitions, methodologies, sources and data points that have been

collected. There is still no international consensus regarding the best practice for the collection of data on natural disasters (Guha-Sapir, 2008). However, when there are no regional or national databases, internet searches for disaster databases produced an enormous number of references. This paper analyses the data that was obtained by searching two international databases with publicly accessible data: The Emergency Disasters Data Base (EM-DAT) managed by the Centre for Research on the Epidemiology of Disasters (CRED) at the Catholic University of Louvain, Belgium (Accessed September 20, 2009: <http://www.emdat.be>) and NATHAN disaster database maintained by Munich Reinsurance Company (Accessed September 10, 2009: <http://mrnathan.munichre.com>).

base, at least one of the following criteria must be fulfilled:

- 10 or more people reported killed,
- 100 or more people reported affected,
- declaration of a state of emergency,
- call for international assistance.

Events are entered on a country-level basis and information collected includes location, date, number of people killed/injured/affected, number of homeless, and estimated damage costs. Sources include governments, UN agencies, research institutions, insurance institutions and press agencies, although priority is given to UN agencies. Amongst disaster databases, both databases provide one of the most comprehensive and transparent explanations of the

Table 1. Definitions of the natural disasters and their main types (Guha-Sapir 2008)

Disaster Main Type	Definition	Disaster Subgroup
Geophysical	Events originating from solid earth	Earthquake, Volcano, Mass Movement (dry)
Meteorological	Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days)	Storm
Hydrological	Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	Flood, Mass Movement (wet)
Climatological	Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability)	Extreme Temperature, Drought, Wildfire
Biological	Disaster caused by the exposure of living organisms to germs and toxic substances	Epidemic, Insect infestation, Animal Stampedo

The unique classification of natural disasters types in both databases allows for data integration and analysis. Table 1 presents the classification and definitions of certain types of natural disasters, which were established by MunichRe/Geo Risks Research Department and CRED (Guha-Sapir, 2008). The data presented on the biological type of natural disasters was not analysed. Events are entered on a country-level basis and the information collected includes location, date, number of people killed and affected, and the estimated damage costs.

Both databases record data on the number of people killed and affected, in addition to estimated amounts of economic damage expressed in US dollars for the majority of natural disasters. The terms “killed”, “affected” and “estimated economic damage” have been identically defined in both databases. For a disaster to be entered into the data-

methodology employed. Databases are searchable by country, disaster type or timeframe. As most data was organised on a country-level basis, an additional database was created for this research, containing data organised by disaster-type and by killed-affected-economic damage per disaster type. The Western Balkan countries for which data was collected and analysed in this paper were: Serbia, FYR of Macedonia, Albania, Montenegro, Bosnia and Herzegovina and Croatia (Fig. 1). The data collected covered the period from 1900 to 2008 for the above listed countries.

### 3. Data analysis and results

The analysis was conducted on selected data sets including all the data for the four main types of disasters and their sub-types, namely: geophysical, hydrological, climatological and meteorological disaster events for the period 1900-2008. Data on the number of disaster events, disaster occurrence

by disaster type, total number of killed and total number of affected people and the corresponding economic damages with percent share by selected types of natural disasters was analysed. Due to the nature of the data provided, i.e. not collected in the same manner in each country and not having an occurrence of a natural disaster event in every year during the period under analysis, only a basic statistical analysis was able to be performed.



Fig. 1. Geographical position of study area.

The basic statistical analysis showed that in the period 1900-2008 in the Western Balkan region, a total of 2.480 people were reported as being killed by all natural disaster types and related subgroups, i.e. 1.299 from geophysical events (8 events), 189

from hydrological events (11 events) and 992 from climatological disasters (13 events). The total number of people killed and the total number of disaster events by disaster types are presented in figure 2.

The analysis of the total number of reported people affected by natural disasters in the same period showed that 6.353.849 persons were affected. Within the total number, 652.220 were affected by ten geophysical events, 885.451 by hydrological events (31 events), 4.290.088 by climatological events (9 events) and 526.090 from meteorological disasters (3 events). The total number of persons affected and the total number of disaster events by disaster types are presented in figure 3.

The analysis of the reported economic damage showed that the total economic cost from natural disasters in the Western Balkan region for the period 1900-2008 amounted to 4.726.886.000 US dollars. The reported economic damages from geophysical disasters was 1.158.600.000 US dollars (5 events), from hydrological disasters was 1.448.973.000 US dollars (8 events) and from climatological disasters was 2.119.313.000 US dollars (9 events) (Fig. 4).

#### 4. Discussion

The review of the natural disasters data from two selected databases for the Western Balkan countries in the period 1900-2008 has shown that in the geographically small study area all types of natural disasters occurred.

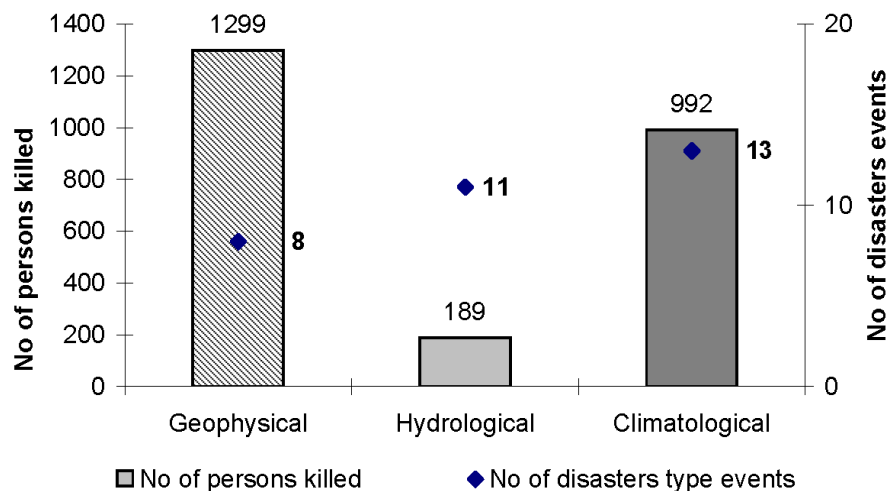


Fig. 2. Total number of persons killed and number of events by disaster type from 1900-2008. Source: EM-DAT and NATHAN.

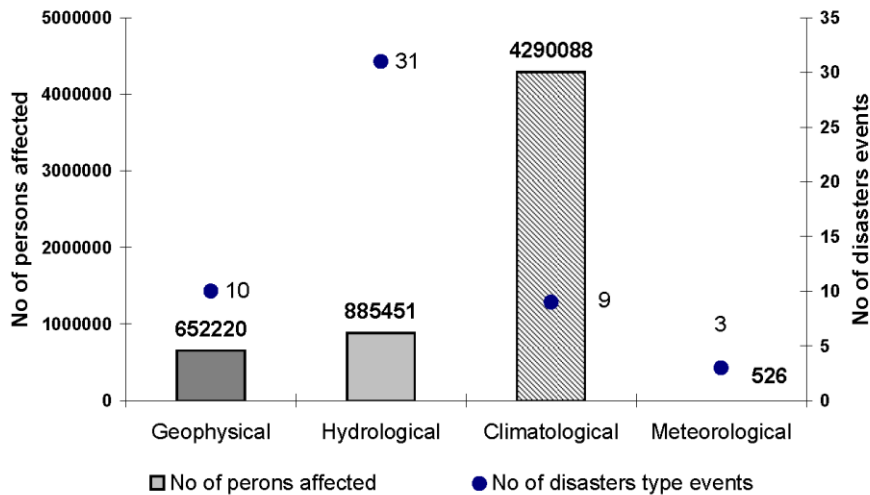


Fig. 3. Total number of persons affected and number of disasters events by disasters type from 1900-2008. Source: EM-DAT and NATHAN.

The analysis of the number of people killed by natural disasters showed that in the Balkan region the greatest number of people killed was by geophysical disasters-earthquakes. A comparison between the percentages of total number of persons killed by the geophysical disaster of earthquakes was 52%, even though the event represents only 25% of the total number of natural disasters events. The earthquake that claimed the most victims was in Skopje on 26<sup>th</sup> of July 1963 with a death toll of 1.100 people. The disasters type that had the second highest number of people killed was climatological disasters with a total number of deaths of 40% of the total number of people killed by all

types of natural disasters (Fig. 2). That number of deaths was in consequence to 13 climatological events, which represent 41% of all events. Only 8% of the persons killed were killed from hydrological disasters, which represent approximately 34% of the total number of disasters events. If we compare the number of persons killed by different types of natural disasters and disaster occurrences, we can conclude that the mortality rate is the highest in the case of earthquakes, where the smallest number of events killed the largest number of people.

The analysis of the total number of persons af-

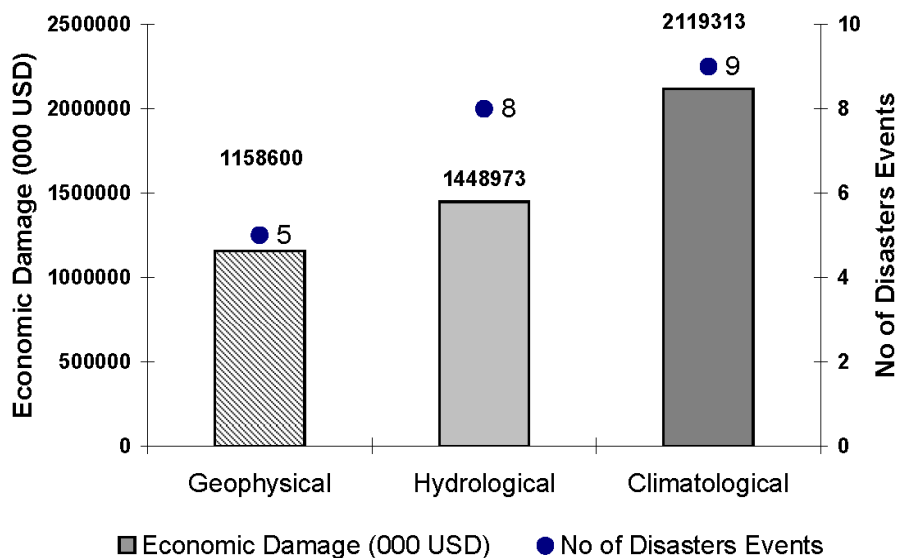


Fig. 4. Total amount of economic damage and number of disasters events by disasters type from 1900-2008. Source: EM-DAT and NATHAN.

ected from natural disasters in the period 1900-2008 shows that the greatest number of people (68%) were affected by climatological disasters and this percentage of people affected came from only 17% of the total number of events, as shown on figure 3. The percentage of the total number of persons reported affected from hydrological disasters was 14% with 10% of persons affected by geophysical events. Only 8% of persons were affected by meteorological disasters. It can be concluded from the results above that of the total number of people affected by natural disasters the greatest number of people was affected by climatological disasters, even though hydrological disasters had the greatest number of events in the same period.

In addition, a review of the economic damages from natural disasters in the Western Balkan countries in 1900-2008 shows that the greatest economic losses were due to climatological disasters (Fig. 4), totalling 44% of the total amount of economic damages, coming from 41% of the total number of natural disaster events. The second highest percentage (31%) of the total amount of economic damages was from hydrological disasters while the reported economic damages from geophysical disasters were only 25% of the total amount of economic damages. The single climatological event that had the greatest amount of economic damages was the drought in the central part of former Yugoslavia during July 1990. The second in order was the hydrological event of flooding during October 1990 in the same region. The earthquake that claimed the most economic damage was in Skopje on 26<sup>th</sup> of July 1963 which has the third highest reported economic damage, but has the highest number of reported killed.

## 5. Conclusion

The results of this analysis show that the Western Balkan region, in which more than 22 million people live in approximately 264.000 km<sup>2</sup> (Source: IMF, <http://www.imf.org>, Accessed October 21, 2009), is affected by all forms of natural hazards and disaster types. Unfortunately, the natural disasters data for all the countries in the region can only be found in the two global databases that were utilised. With differences in the recording criteria and the presentation of data a large amount of local data has not been entered the databases. In addition, many natural disaster types, for example floods or heat waves, are not localized to individual countries, but their effects are often extended to

several neighbouring countries, and may not have been registered individually on a country-level basis as they did not fulfil the recording criteria for that individual country. Development and response agencies in the Western Balkan countries have to recognize the importance of disaster data collection and storage in regional databases and local databases in the same way. This is an important issue to the local economy, because the Western Balkan countries are also some of the least economically developed countries within Europe. With the exception of Croatia, whose GNP per capita exceeds 10.000 US dollars for 2009, all the other countries reviewed had a GNP per capita far below that amount. A systematic collection of data related to the frequency and impact of disasters would provide an invaluable tool to local governments and regional institutions charged with the planning of reduction programmes to protect their populations from the effects of natural disasters.

## Acknowledgements

The research was supported by the Ministry of Science and Technology of the Republic of Serbia and the Ministry of Science, Education and Sports of the Republic of Croatia, as part of the bilateral Project GeohazardINFO.

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