2023
Disasters in Numbers

399
Reported Disasters

86,473
Deaths

93.1 Million
People Affected

202.7 Billion
US$ Economic Damage

A Significant Year of Disaster Impact

Executive Summary

In 2023,[1] the Emergency Events Database (EM-DAT) recorded a total of 399 disasters related to natural hazards.[2] These events resulted in 86,473 fatalities and affected 93.1 million people. The economic losses amounted to US$202.7 billion. The 2023 earthquake in Türkiye and the Syrian Arab Republic was the most catastrophic event of the year in terms of mortality and economic damage, with 56,683 reported deaths and damage worth US$42.9 billion damage. This earthquake impacted an estimated 18 million people, a total for both countries, making it the second most impactful event in terms of affected individuals. The first was the 2023 Indonesian Drought, which affected 18.8 million people from June to September 2023.

In the year under review there was a high level of disaster mortality, with a total of 86,473 deaths, exceeding the 20-year average of 64,148 deaths and the median value of 19,290 deaths[3] for the same period, mainly due to the dramatic earthquake in Türkiye and Syria in February 2023, counting for two-thirds of the EM-DAT total deaths. The number of individuals affected by disasters, 93.1 million, is below the 2003-2022 annual average of 175.5 million. The difference is mainly due to the relatively low number of new significant droughts. It is important to note that some events are still ongoing, so reports on droughts might be incomplete, making the current statistics provisional. The annual analysis highlights seasonal droughts beginning in 2023 but excludes ongoing multi-year droughts, such as the severe and long-lasting Horn of Africa Drought. Furthermore, the report probably underestimates the mortality from heat waves and the number of heatwave events in 2023. Awaiting further information, the EM-DAT validation for the 2023 European heat waves remains incomplete, as it may well omit several high-mortality events. This issue is addressed in a section of the report dedicated to this issue.

In terms of economic losses, the reported figure of US$ 202.7 billion is slightly higher than the EM-DAT 2003-2022 annual average of US$196.3 billion. Notably, only one-third of disasters covered in this report for the 2003-2022 period benefit from documented total economic damage, with a remarkably lower reporting percentage of 12% for Africa. This discrepancy underscores, once again, the critical need to enhance global efforts in the evaluation, reporting, and dissemination of economic loss data resulting from disasters.

In Türkiye, a sequence of earthquakes with magnitudes of 7.8 Mw and 7.5 Mw on February 6 led to 50,783 casualties and affected approximately 9.2 million people. In the Syrian Arab Republic, reports indicate 5,900 deaths and 8.8 million people affected by this disaster. The total economic damage is currently estimated to be at least US$34 billion for Türkiye and US$8.9 billion for Syria. Additionally, two other seismic events are among the Top 10 deadliest disasters. On September 8, a magnitude 6.8 Mw earthquake in the High Atlas Mountain Region, southwest of Marrakesh, Morocco, resulted in 2,946 fatalities and economic losses estimated at US$7 billion. In Western Afghanistan, an earthquake on October 7 in the Herat province led to 2,445 reported fatalities.

As far as severe storm events are concerned, Storm Daniel struck Libya in September, causing floods that led to 12,352 casualties – including 8,000 missing persons – and economic losses of US$6.2 billion. This event was the second deadliest disaster of 2023,

after the Türkiye and Syria Earthquake. Earlier in the year, Cyclone Freddy passed through Madagascar, Mozambique, and Malawi. The greatest impact was in Malawi, resulting in 1,209 fatalities and affecting 2.3 million individuals. Typhoon Doksuri, occurring at the end of July, hit the Philippines, followed by China where economic losses are estimated to be US$25 billion, making it the second most expensive disaster in 2023. There was also severe flooding in India due to Cyclone Michaung at the beginning of December, affecting 4.4 million people. In the Americas, two storms had notable economic impacts. In early March, the United States was hit by a storm that brought tornado outbreaks, strong winds, and floods, causing estimated costs of US$6 billion and 13 fatalities. Lastly, in October, Tropical Storm Otis in Mexico affected one million people, caused 104 fatalities, and resulted in damage worth US$12 billion, making it the costliest storm disaster ever recorded in Mexico.

Regarding the most prominent floods, in the Democratic Republic of the Congo there was severe flooding and landslides in May due to torrential rainfall in South Kivu province. The death toll, which remains uncertain, is currently estimated at 2,970, with 470 confirmed deaths and thousands missing. In North-East Nigeria, floods in October resulted in 275 fatalities. In December, Somalia experienced torrential rains during its rainy season, affecting approximately 2.5 million individuals, while a flood in the United Republic of Tanzania impacted 2.9 million people. In January, the Philippines were struck by nationwide floods and landslides, resulting in 52 deaths and affecting 2.1 million individuals. Monsoon floods also struck Pakistan and India from April to July, with India recording at least 1529 fatalities and 10.2 million people affected between June and September 2023. In addition, Yemen experienced a prolonged and intense annual rainy season between March and September 2023, with 248 reported deaths during this period. In Guatemala, heavy rainfall from May onward led to significant flooding and landslides, affecting over 4.4 million people and causing 78 deaths. In Europe, the mid-May floods in the Emilia-Romagna region resulted in 15 casualties and were among the costliest floods of 2023, with economic damage estimated at US$9.8 billion.

Regarding drought-related events, Indonesia's dry season – from May to October – severely impacted approximately 18.8 million residents. In the United States of America, the Southern and Midwestern regions experienced a significant drought, coupled with a heat wave, which was recorded as the costliest event of 2023 in the USA, with damage evaluated at US$14.5 billion. Additionally, in August, the Lahaina Wildfire on Maui Island in Hawaii was identified as one of the Top 10 costliest disasters, with economic losses amounting to US$5.5 billion.

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1   Date of reference: 2024-03-24.

2   In this report, disasters are related to natural hazards, excluding biological and extra-terrestrial hazards, reported at the country level in EM-DAT.

3   The median is the middle value of a sorted collection of observations, such that 50% of observations are above it and 50% are below it.

The 2023 European Heat Waves: Awaiting Harmonized Data

Heatwave events in Europe are noticeably absent from the EM-DAT 2023 Top 10 disaster rankings, not due to a lack of occurrence but because impact reports are still in the preliminary stage. These events have, therefore, not yet been published in EM-DAT. Last year, EM-DAT figures for the 2022 European heat waves had to be revised based on a comprehensive European study,[4] resulting in a substantial increase from the numbers initially published in the 2022 EM-DAT report.[5] While heatwave monitoring has undoubtedly progressed, obtaining consolidated and harmonized figures still requires time, and numerous challenges persist both in and beyond Europe.

Gaining insights into consolidated data on heat or heatwave-related impacts can take significant time. Last year, the EM-DAT 2022 annual report recorded 16,305 deaths due to heat waves in Europe based on preliminary data.[5] Subsequent revisions from a study published a year after the 2022 European heat waves, in July 2023,[4] updated the 2022 heat-related mortality impact to 61,570 deaths, offering a more consistent evaluation of the European continent. This update underscores the ongoing evolution in monitoring heat-related mortality, the notable lag and discrepancies between initial figures and subsequent comprehensive evaluations, as well as increasing recognition of heat-related mortality in annual reports. Given the anticipated rise in the frequency and intensity of heat waves associated with climate change projections and the potential improvements in heatwave impact monitoring techniques and initiatives, both the prominence and reported impact of such events are likely to increase.

Similar to the situation in Europe in 2022, in the summer of 2023 there were record-breaking temperatures, prolonged and severe heat stress, and repeated heat waves from June to September, impacting consecutively northern and southern Europe and other Mediterranean regions.[6] While a comprehensive reevaluation is pending, preliminary data from the European Mortality Monitoring (EuroMOMO) portal indicate a number of episodes of increased mortality rates during summer 2023, particularly among individuals aged 65 and over, in several European countries.[7] These include Greece, which also experienced significant forest fires and subsequent air pollution, as well as Italy, Malta, and Spain. In Spain, for instance, the *Mortality Attributable in Summer to Heat in Spain* (MACE) online application[8] reports an estimated 5,028 deaths due to extreme heat, with an additional 6,137 deaths attributed to moderate heat. It is important to note that heat-related mortality figures may vary according to methodological criteria and the periods being investigated. Multi-country analyses are expected to provide more uniform estimates.

Currently, global progress in monitoring heat-related mortality is uneven, leading to challenges in compiling a comprehensive worldwide summary. The ability to estimate excess mortality relies on Civil Registration and Vital Statistics Systems, which should ideally provide detailed information, for example, by region and age group.[9] However, in many countries, such surveillance systems are either lacking or available data may not be publicly accessible. This contributes to the uneven coverage of heat waves in EM-DAT, where, in particular, areas such as sub-Saharan Africa may be underrepresented.[10] Moreover, in nations with established registration systems, reported discrepancies have emerged due to methodological differences in reporting, highlighting the need for internationally standardized methods.[11]

4   Ballester, J. et al. Heat-related mortality in Europe during the summer of 2022. *Nat Med* **29**, 1857–1866 (2023). https://doi.org/10.1038/s41591-023-02419-z.

5   CRED. 2022 *Disasters in Numbers: Climate in Action.* (2023). https://cred.be/sites/default/files/2022_EMDAT_report.pdf.

6   European summer 2023: a season of contrasting extremes | Copernicus (2023). https://climate.copernicus.eu/european-summer-2023-season-contrasting-extremes.

7   Graphs and maps from EuroMOMO. Euro*MOMO* https://euromomo.eu.

8   MACE: Mortalidad Atribuible en Verano por Calor en España (2023). https://ficlima.shinyapps.io/mace.

9   Green, H. K. et al. Challenges with Disaster Mortality Data and Measuring Progress Towards the Implementation of the Sendai Framework. *Int J Disaster Risk Sci* **10**, 449–461 (2019). https://doi.org/10.1007/s13753-019-00237-x.

10   Harrington, L. J. & Otto, F. E. L. Reconciling theory with the reality of African heatwaves. Nat. Clim. Chang. 10, 796–798 (2020). https://doi.org/10.1038/s41558-020-0851-8.

11   Brimicombe, C. et al. Borderless Heat Hazards With Bordered Impacts. *Earth's Future* **9**, e2021EF002064 (2021). https://doi.org/10.1029/2021EF002064.

Occurrence of Disasters [12]

Figure 1

Number of Disasters by Continent and Top 10 Countries [13] in 2023

United States
25

France
7

Italy
7

Europe
61

Asia
163

China
17

Türkiye
8

Philippines
15

Americas
98

Democratic Republic of the Congo
7

Pakistan
13

India
17

Indonesia
15

Brazil
16

Africa
60

Oceania
17
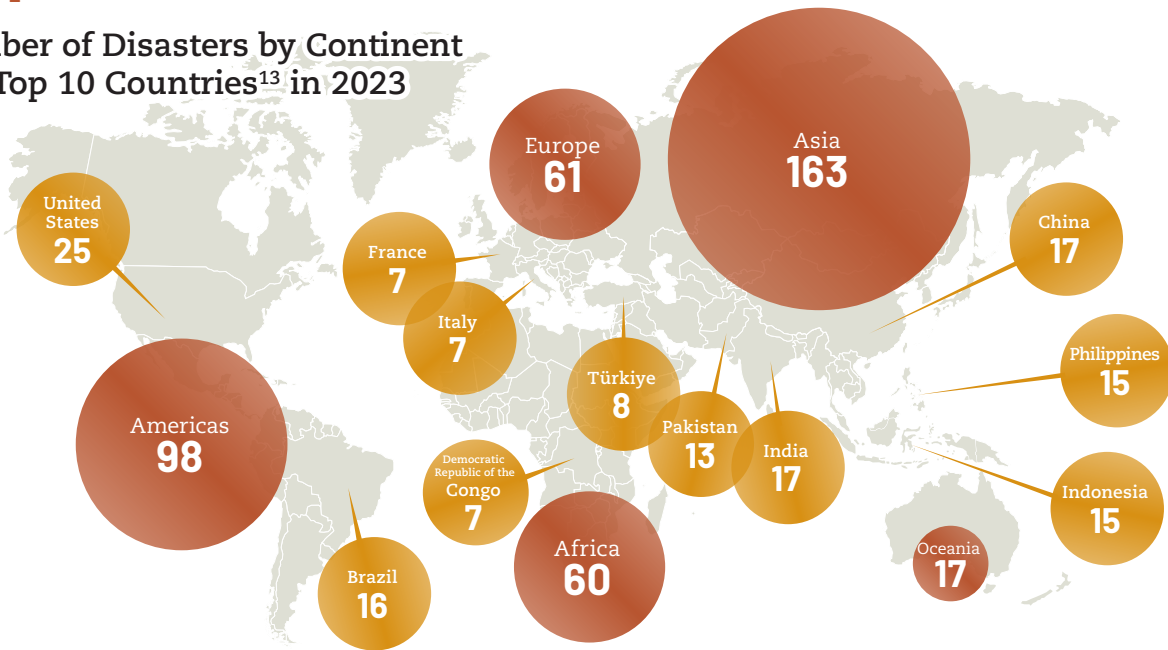
Figure 2

Occurrence by Disaster Type: 2023 Compared to the 2003-2022 Annual Average

369 2003 to 2022 **<** **399** in 2023

	Drought	Earthquake	Extreme temperature	Flood [14]	Mass movement (dry)	Mass movement (wet)	Storm	Volcanic activity	Wildfire	
2023	10	32	10	164	0	24	139	4	16	2023
2003-2022 ANNUAL AVERAGE	16	27	21	170	1	18	104	5	11	2003-2022 ANNUAL AVERAGE
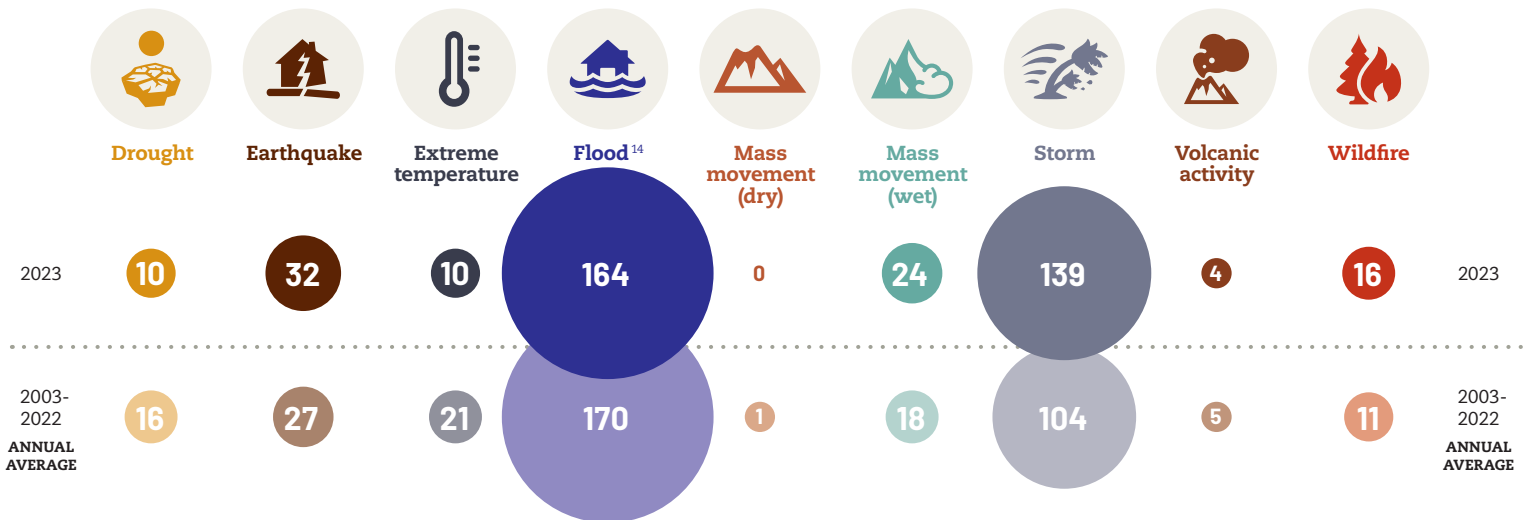
12 The reported disaster count may vary based on hazard frequency as well as the aggregation methods of reporting sources defining the extent of a disaster event.

13 Three countries tied for the ninth rank with seven disasters, so 11 countries are listed.

14 In this report, the category "Flood" includes glacial lake outburst flood events.

Human Impact: Total Deaths [15]
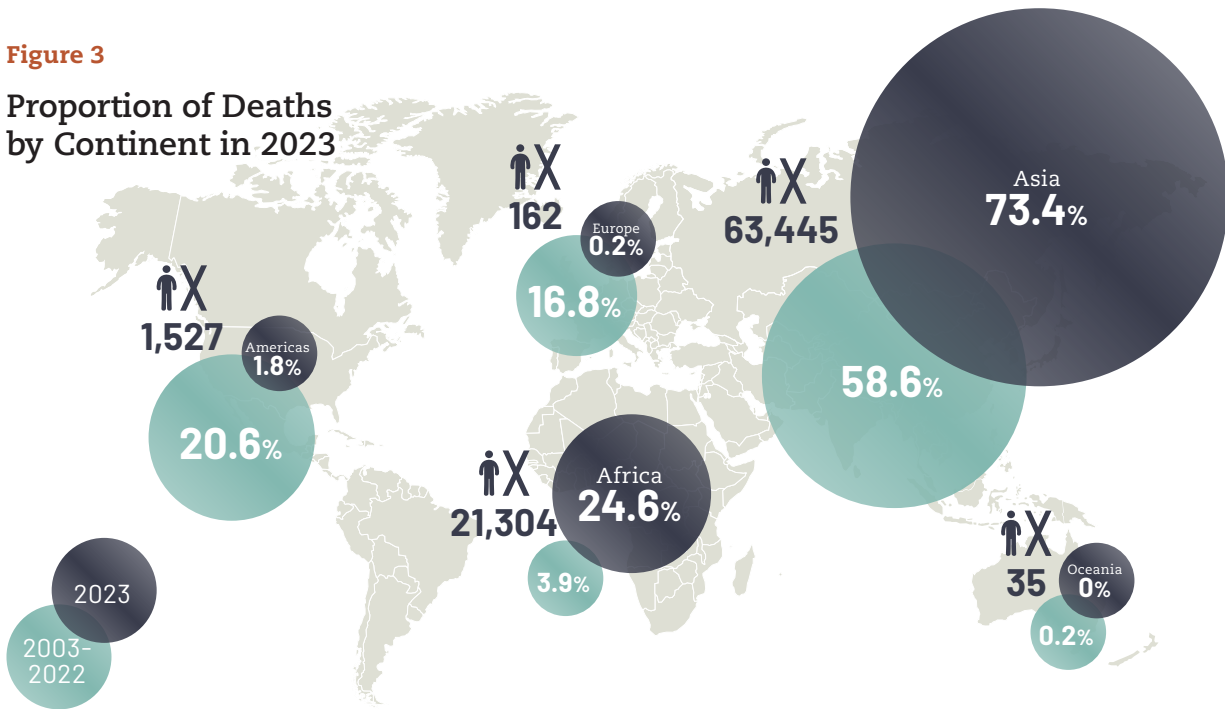
**Proportion of Deaths
by Continent in 2023**

162

Europe
0.2%

16.8%

1,527

Americas
1.8%

20.6%

63,445

Asia
73.4%

58.6%

21,304

Africa
24.6%

3.9%

35

Oceania
0%

0.2%

2023

2003-
2022

**Number of Deaths by Disaster Type: 2023
Compared to 2003-2022 Annual Average**

64,148 < 86,473
2003 to 2022   in 2023

	Drought	Earthquake	Extreme temperature[16]	Flood	Mass movement (dry)	Mass movement (wet)	Storm	Volcanic activity	Wildfire	
2023	247	62 451	406	7 763	0	654	14 666	23	264	**2023**
2003-2022 ANNUAL AVERAGE	1 157	35 124	11 470	5 518	35	803	10 017	80	86	**2003-2022 ANNUAL AVERAGE**
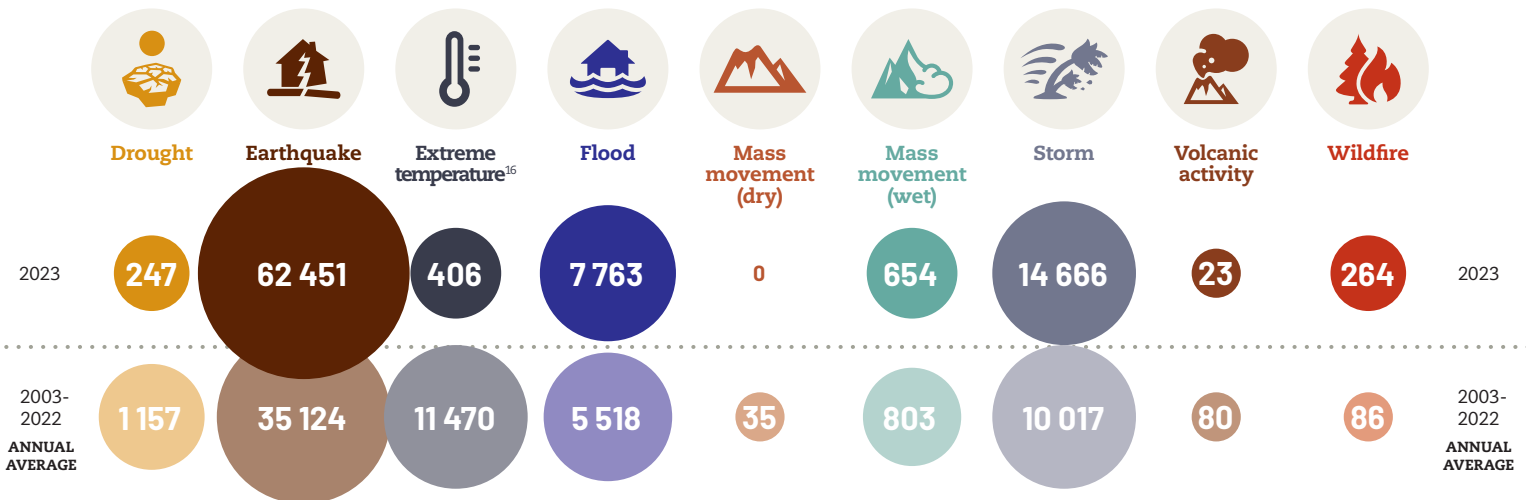
Table 1
Top 10 Mortality – 2023

Türkiye	**Earthquake**	50,783		Afghanistan	**Earthquake**	2,445
Libya	**Storm Daniel**	12,352		India	**Flood**	1,529
Syrian Arab Rep.	**Earthquake**	5,900		Malawi	**Tropical Storm Freddy**	1,209
Congo (Democratic Rep.)	**Flood**	2,970		Nigeria	**Flood**	275
Morocco	**Earthquake**	2,946		Yemen	**Flood**	248

15   The total deaths indicator includes those confirmed as dead, as well as those reported missing and presumed dead.
16   Figures do not include the 2023 European Heat Waves (awaiting comprehensive scientific reports).

Human Impact: Total Affected [17]

Figure 5

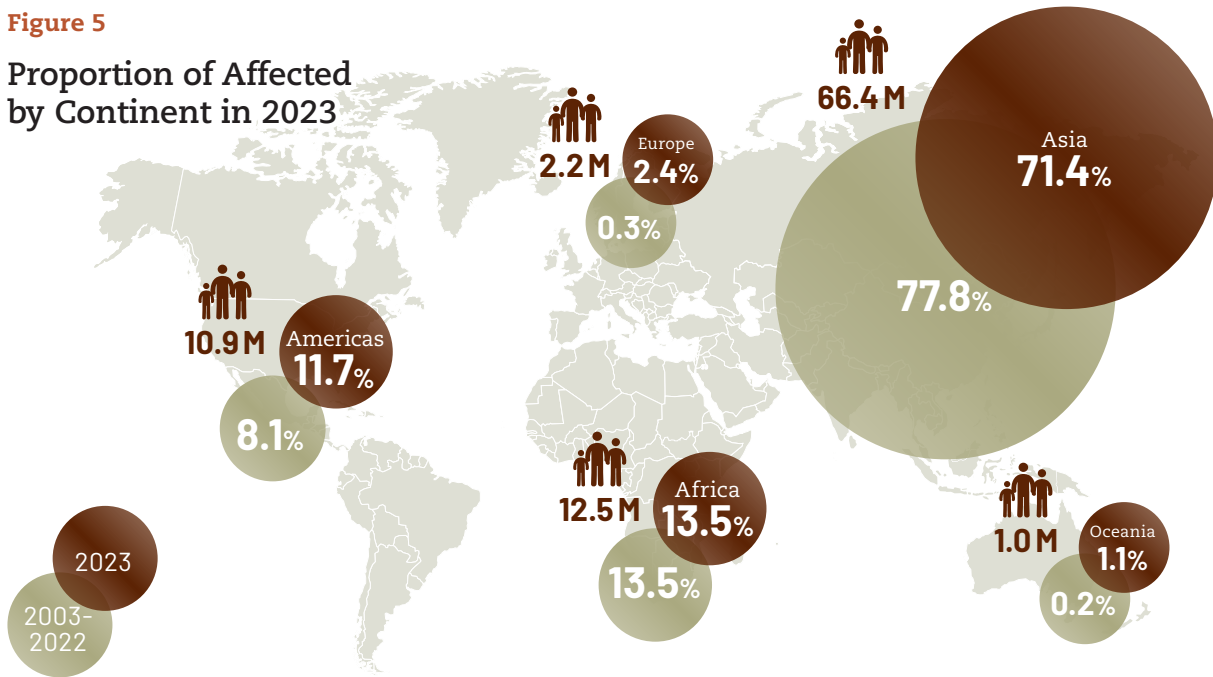## Proportion of Affected by Continent in 2023

66.4 M

Europe
2.4%
0.3%
2.2 M

Asia
71.4%
77.8%

Americas
11.7%
8.1%
10.9 M

Africa
13.5%
13.5%
12.5 M

Oceania
1.1%
0.2%
1.0 M

2023

2003–2022

Figure 6

Number of Affected by Disaster Type: 2003 Compared to 2003-2022 Annual Average

175.5 > **93.1**

2003 to 2022   in 2023
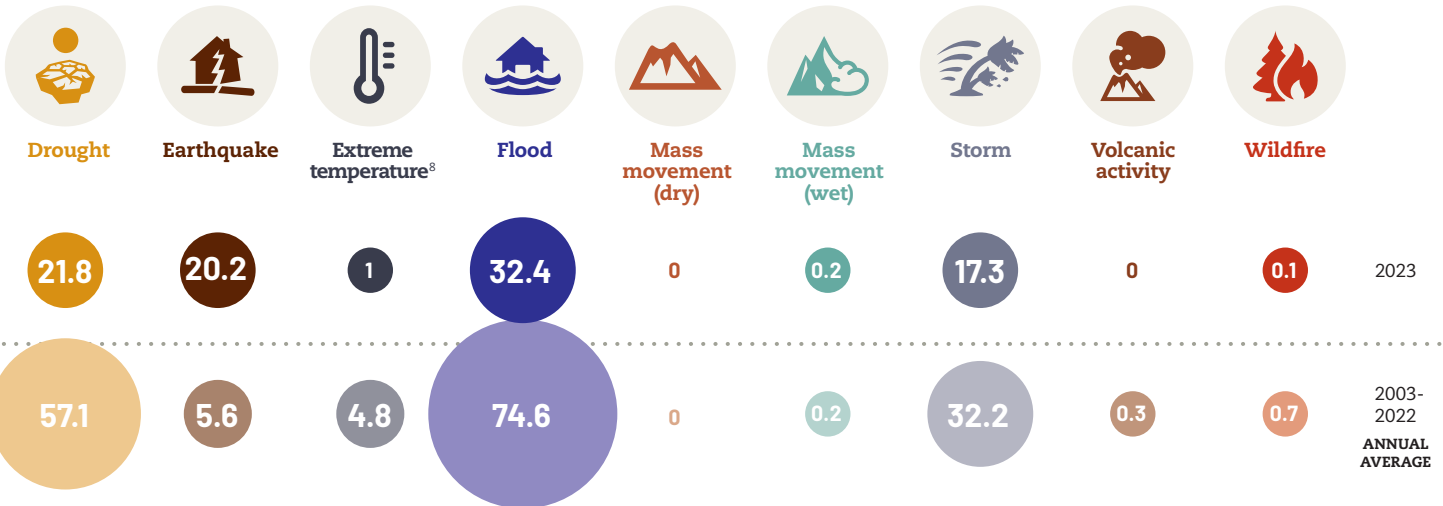
	Drought	Earthquake	Extreme temperature[8]	Flood	Mass movement (dry)	Mass movement (wet)	Storm	Volcanic activity	Wildfire	
2023	21.8	20.2	1	32.4	0	0.2	17.3	0	0.1	2023
2003-2022 ANNUAL AVERAGE	57.1	5.6	4.8	74.6	0	0.2	32.2	0.3	0.7	2003-2022 ANNUAL AVERAGE

Table 2

Top 10 Total Affected – 2023

Indonesia	Drought	18.8 million	India	Tropical Storm Michaung	4.4 million
India	Flood	10.2 million	Tanzania	Flood	2.9 million
Türkiye	Earthquake	9.2 million	Somalia	Flood	2.5 million
Syrian Arab Rep.	Earthquake	8.8 million	Malawi	Tropical Storm Freddy	2.3 million
Guatemala	Flood	4.4 million	Philippines	Flood	2.1 million

17   Sum of people injured, homeless, and otherwise affected.

Economic Losses [18]

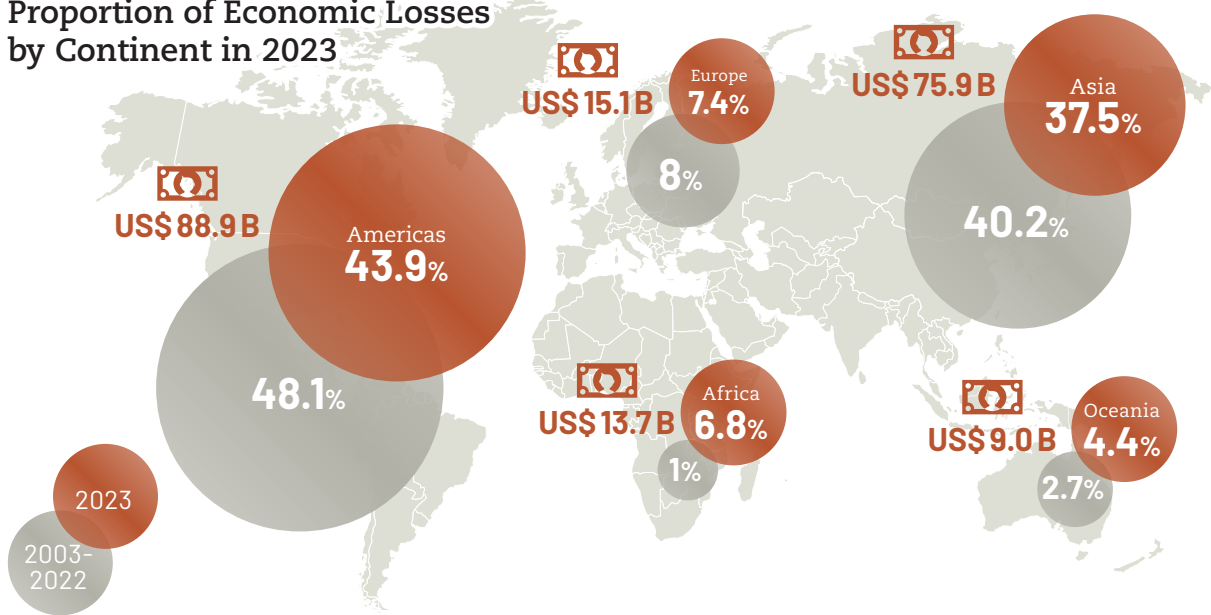## Proportion of Economic Losses by Continent in 2023

US$ 15.1 B — Europe 7.4% / 8%

US$ 75.9 B — Asia 37.5% / 40.2%

US$ 88.9 B — Americas 43.9% / 48.1%

US$ 13.7 B — Africa 6.8% / 1%

US$ 9.0 B — Oceania 4.4% / 2.7%

2023
2003-2022

Economic Losses (US$ billion) by Disaster Type: 2023 Compared to the 2003-2022 Annual Average

196.3 2003 to 2022 < 202.7 in 2023

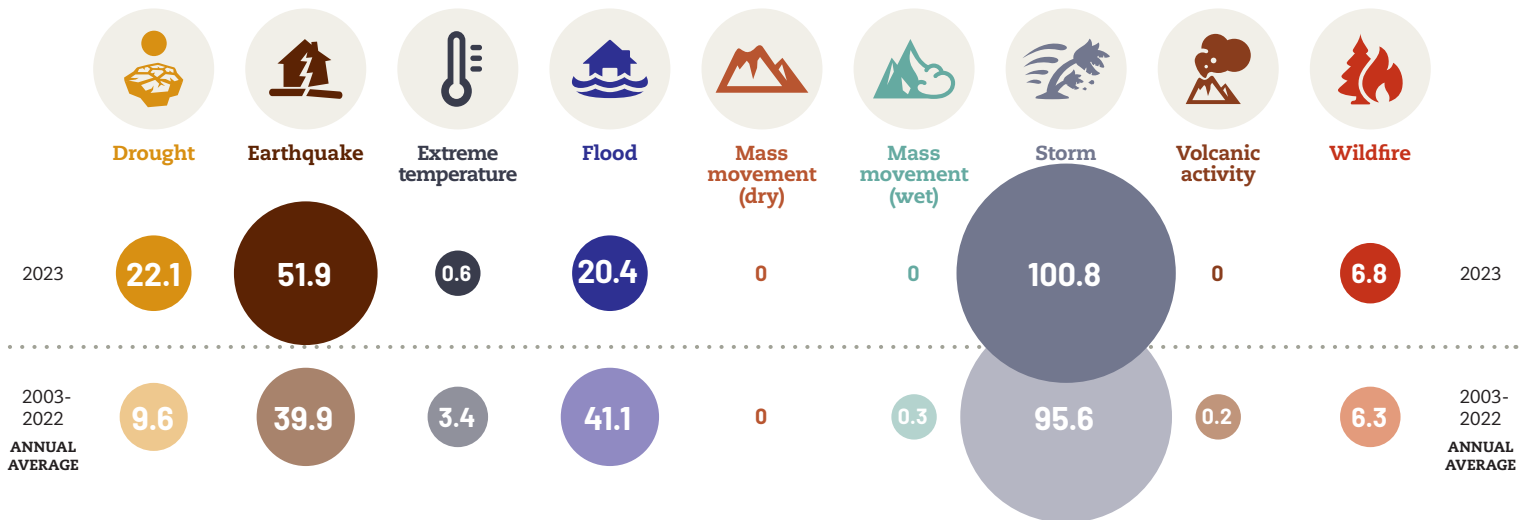|	Drought	Earthquake	Extreme temperature	Flood	Mass movement (dry)	Mass movement (wet)	Storm	Volcanic activity	Wildfire	
2023	22.1	51.9	0.6	20.4	0	0	100.8	0	6.8	2023
2003-2022 ANNUAL AVERAGE	9.6	39.9	3.4	41.1	0	0.3	95.6	0.2	6.3	2003-2022 ANNUAL AVERAGE

Top 10 Economic Losses - 2023

	Country	Disaster	Loss		Country	Disaster	Loss
🏠	Türkiye	Earthquake	34 billion	🏛	Syrian Arab Rep.	Earthquake	8.9 billion
🌀	China	Tropical Storm Doksuri	25 billion	🏛	Morocco	Earthquake	7.0 billion
🍚	USA	Drought	14.5 billion	🌀	Lybia	Storm Daniel	6.2 billion
🌀	Mexico	Tropical Storm Otis	12 billion	🌀	USA	Storm	6 billion
🏠	Italy	Flood	9.8 billion	🔥	USA	Wildfire (Lahaina)	5.5 billion

18   Historical figures for economic losses are adjusted using the annual consumer price index (CPI) from OECD.

About EM-DAT

The Emergency Events Database (EM-DAT), which has been maintained by the Centre for Research on the Epidemiology of Disasters (CRED) since 1988, aims to archive significant disasters and support future disaster risk reduction strategies. EM-DAT provides information to support humanitarian action at both the national and international level, enabling rational decision-making in disaster preparedness.

The EM-DAT database offers evidence-based information to assess the vulnerability of communities to disasters, thus assisting policymakers in prioritizing. EM-DAT contains information on the occurrence and impacts of over 26,000 disasters related to natural and technological hazards from 1900 to the present day, compiled from various sources, including information from UN agencies, national governments, NGOs, research institutes, and the media. The sources are prioritized and used based on their reliability. It is important to note that historical data may contain biases. For more information on the database and to access the data and its documentation, please go to the EM-DAT website.

A disaster in EM-DAT is defined as "a situation or event that overwhelms local capacity, necessitating a request for external assistance at the national or international level; it is an unforeseen and often sudden event that causes great damage, destruction and human suffering." This annual report includes only disasters attributed to natural hazards, except biological and extra-terrestrial hazards, and excludes technological hazards recorded in EM-DAT. To be included in EM-DAT, a disaster must meet at least one of the following criteria:

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

The data contained in this report is subject to change as new sources of information become available. We promote the unrestricted use of the information in this report, provided that the appropriate and complete citation is included as follows: CRED. 2023: Disasters in Numbers. Brussels: CRED, 2024.

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