UCLouvain
Centre for Research on the Epidemiology of Disasters CRED

Extreme weather events in Europe

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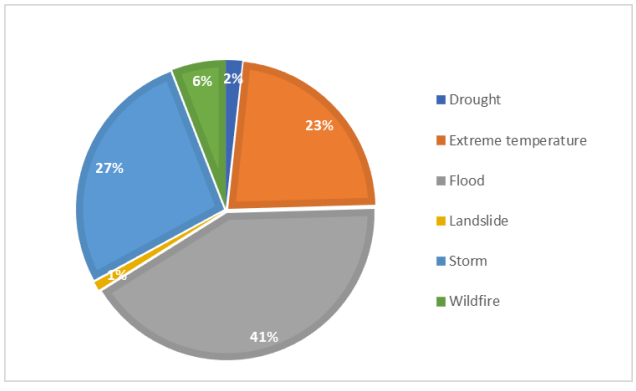
This year and particularly last summer, Europe was affected by extreme weather events, unexpected in terms of their impact. First, July was marked by dramatic floods in Germany and Belgium, killing over 200 persons, making this the deadliest event for either country this year so far, while affecting thousands of others and costing over 20 billion US$. In addition, at least ten wildfires have destroyed hundreds of thousands of hectares, particularly in Greece, France, Spain, and in some Balkans countries, while the area affected by wildfires in Siberia (Russia) reaches over 17 million hectares. These wildfires were caused by extreme drought and heat (one of the worst in decades for the Mediterranean region), reaching temperature of over 45 °C, leading to burnt properties and leaving a disastrous landscape.

Disasters by type, over time and by location

Focusing on the last 20 years (2001-2020), there were 999 natural disaster events in Europe, of which 951 were weather-related, meaning they belonged to the disaster subgroups meteorological, hydrological or climatological. Combined, these events killed over 150,000 people, affected over 11 million others and costed over 217 billion US$*.
Figure 1 shows the occurrence by disaster type, and the three most prevalent ones are floods (41%), storms (27%) and extreme temperatures (23%). If we look at the number of events per calendar year, there is no clear trend visible (Fig. 2). Figure 3 shows the number of events by country.

Fig.1. Occurrence of weather-related disasters by type, 2001-2020



*Converted into US current value

Fig. 2. Number of weather-related disasters in Europe by year

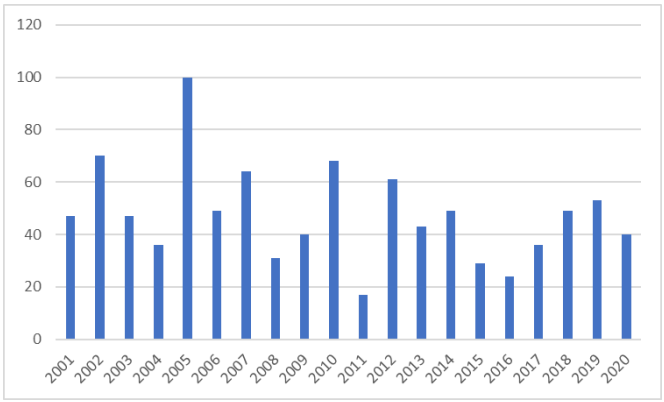
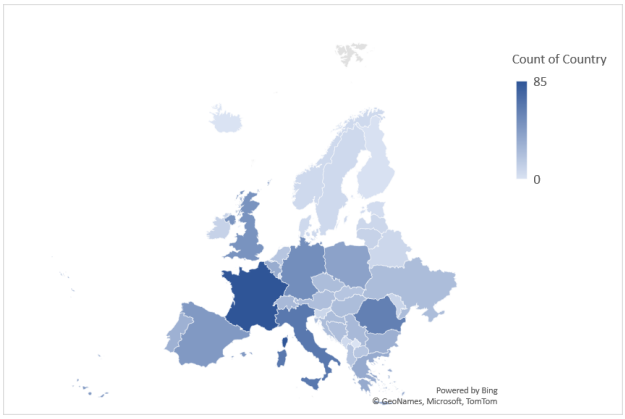


Fig. 3. Number of weather-related disasters by country over the period 2001-2020



Russia is not included in this map, but had 82 disasters over this period.

Disaster deaths

Focusing on mortality, most deaths were caused by extreme temperatures over the last 20 years, with a total of 146,000 registered deaths due to heatwaves and 3,800 due to cold waves. In comparison, the total number of deaths due to floods in Europe over the same period was of 2,142. Similar to the number of events over time, there is no clear trend visible for mortality. Overall, the number of deaths is largely affected by the number of registered heatwave deaths. For example, nearly half of all disaster deaths in Europe over the period 2001-2020 were caused by the 2003 heatwave, which affected various European countries.

All figures presented in the CRED CRUNCH from "EM-DAT: The OFDA/CRED International Disaster Database"
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Heatwave deaths in Europe are generally established by calculating excess mortality, i.e. the additional number of people that died on top of what you would expect during a comparable period without a heatwave. This is different for other disaster types, where the number of deaths directly attributed to that event are counted. Due to these methodological differences, it is not recommended to compare the impact of different disaster types by solely looking at number of deaths, as this will not lead to valid insights. Table 1 reports the two events with the highest impact in terms of mortality for the four most frequently occurring disaster types (floods, storms, extreme temperatures, wildfires).

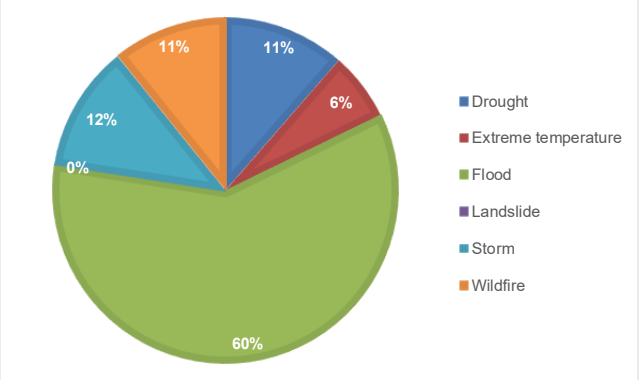
Table 1. Top two deadliest events by most frequent disaster types in Europe over period 2001-2020

Disaster Type	Countries	Time period	Total deaths
Flood	Russia	July 2012	172
	Russia	August 2002	117
Storm	France (Xynthia)	February-March 2010	53
	Canary Isl.	November 2005	19
Heat Wave	15 EU Countries	July-August 2003	72,210
	Russia	June-August 2010	55,736
Wildfire	Greece	July 2018	100
	Greece	August 2007	65

Total affected

When looking at people affected by disasters in Europe, the impact is very different to deaths. Although more than half of all weather-related disaster deaths were caused by extreme temperatures, the proportion of affected is only 6% (Fig. 4). In contrast, more than half of people affected were caused by floods (more than 6.6 million). Other disaster types having a large impact of the number of people affected are storms, droughts (both 1.3 million), and wildfires (1.2 million). The number of people affected by lanslides in Europe is minimal, resulting in less than 1%.

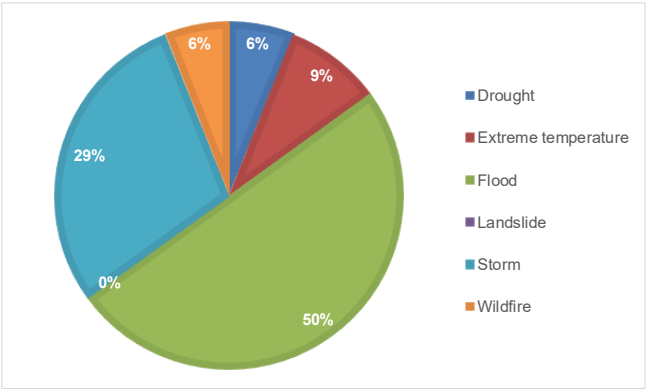
Fig. 4. Total affected by weather-related disasters in Europe, by type, 2001-2020



Total economic losses

In terms of economic losses, the proportion by type is fairly similar to the total affected. Floods contribute the most in terms of economic losses (50%), followed by storms (29%), as shown in Fig. 5. The fraction of all other weather-related disasters combined thus constitutes only 21%.

Fig. 5. Total economic losses by weather-related disasters in Europe, by disaster type, 2001-2020.



CRED updates and recent publications

- Huang, Kai-Sen ; He, Ding-Xiu ; Huang, De-Jia ; Tao, Qian-Lan ; Deng, Xiao-Jian ; Zhang, Biao ; Mai, Gang ; Guha-Sapir, Debarati. *Changes in ischemic heart disease mortality at the global level and their associations with natural disasters: A 28-year ecological trend study in 193 countries*. In: *PLOS ONE*, Vol. 16, no.7, p. e0254459 (2021)
- Siman-Tov, Maya ; Vanderplanken, Kirsten ; Guha-Sapir, Debarati ; van Loenhout, Joris ; Adini, Bruria. *Does Ethnic Diversity Impact on Risk Perceptions, Preparedness, and Management of Heat Waves?*. In: *Frontiers in Public Health*, Vol. 9, p. 9p. (2021)
- van Loenhout, Joris ; Vanderplanken, Kirsten ; Scheen, Bénédicte ; Van den Broucke, Stephan ; Aujoulat, Isabelle. *Determinants of adherence to COVID-19 measures among the Belgian population: an application of the protection motivation theory*. In: *Archives of Public Health*, Vol. 79, no.74, p. 15p. (2021).