

Centre for Research on  
the Epidemiology of  
Disasters (CREd)

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Université  
catholique  
de Louvain

# Annual Disaster Statistical Review 2015

## The numbers and trends

Debarati Guha-Sapir, Philippe Hoyois and  
Regina Below





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## About CRED

The Centre for Research on the Epidemiology of Disasters (CRED) has been active for more than 40 years in the fields of international disaster and conflict health studies. CRED promotes research, training and technical expertise on humanitarian emergencies - with a particular focus on relief, rehabilitation and development. It was established in Brussels in 1973 at the School of Public Health of the Catholic University of Louvain (UCL) as a non-profit institution with international status under Belgian law. In 1980, CRED became a World Health Organization (WHO) collaborating centre as part of the WHO's Global Program for Emergency Preparedness and Response. Since then, CRED has increased its international network substantially and continues to collaborate closely with numerous UN agencies, inter-governmental and governmental institutions, non-governmental organizations, research institutes and universities.

## Objective

The Centre promotes research and provides an evidence base for the international community, both on the burden of disease and health issues related to disasters and conflicts. CRED also provides training for field managers, students, relief personnel and health professionals in the management of short and long-term humanitarian emergencies. In doing so, CRED hopes to improve preparedness and responses to these humanitarian emergencies.

## CRED's focus

CRED's research focuses on all humanitarian and emergency situations with a major impact on human health. These include all types of natural and human-made disasters - such as earthquakes, floods and storms -, as well as longer-term disasters - such as famines and droughts -, and situations creating a mass displacement of people – for example, civil strife and conflicts.

The Centre focuses on the health aspects and burden of disease arising from disasters and complex emergencies. CRED also promotes research on the broader aspects of humanitarian crises, such as human rights and humanitarian law, socio-economic and environmental issues, early warning systems, the special needs of women and children, and mental health care.

The Centre is actively involved in stimulating debate on the effectiveness of various humanitarian interventions. It encourages scientific and policy discussions on existing and potential interventions, as well as their impacts on acute and chronic malnutrition, human survival, morbidity, infectious diseases and mental health.

The CRED team works in four main areas:

- Natural disasters and their impacts
- Civil strife and conflict epidemiology
- Database and information support
- Capacity building and training

## The CRED team

The Centre is composed of a multinational and multidisciplinary team including experts in medicine and public health, informatics and database management, psychology, nutritional sciences, sociology, economics and geography. The working languages are English and French.



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## ***Executive Summary***

In 2015, 376 natural triggered disasters were registered. After the lowest number since the beginning of the century in 2014 (330), this increase could be a sign of a reversal in the trend to decline in the annual number of disasters since 2005, even if the 2015 number remains below its average annual for the period 2005-2014 (380). Last year natural disasters made still 22,765 deaths, a number largely below the annual average for years 2005-2014 (76,416), and made 110.3 million victims worldwide, also below the 2005-2014 annual average (199.2 million) (see Figure 1). Like the other indicators, with estimates placing economic damages at US\$ 70.3 billion, natural disasters costs were, in 2015, significantly below their decennial average of US \$ 159.7 billion.

The increase in the number of reported natural disasters in 2015, was mostly due to a higher number of climatological disasters: 45 compared with the 2005-2014 annual average of 32, an increase of 41%. The number of meteorological disasters (127) was 2% above its decadal average (125) while, inversely, the number of hydrological disasters (175) and of geophysical disasters (29) were, both, 9% below their 2005-2014 annual average of, respectively, 192 and 32. As each year since 2005, the number of hydrological disasters still took by far the largest share in natural disaster occurrence in 2015 (46.5%, for a mean proportion of 50.6% for the period 2005-2014), followed by meteorological disasters (33.8% versus a decadal mean proportion of 32.7%), while climatological disasters (12% versus an annual mean proportion of 8.3%) overpassed geophysical disasters (7.7% for a 2005-2014 mean proportion of 8.4%)

Over the last decade, China, the United States, India, the Philippines and Indonesia constitute together the top 5 countries that are most frequently hit by natural disasters. In 2015, with 36 natural disasters reported, China experienced its third highest number of natural disasters of the last decade, 20% above its 2005-2014 annual average of 30. The country was affected by a variety of disasters types, including 17 storms, 13 floods and landslides, 5 earthquakes and one drought. The number of natural disasters in the United States (28) was as high as in 2013, and 33% above its decadal annual average of 21. With 21 disasters, its third highest number since 2005, India is 24% below its 2005-2014 annual average of 27. Inversely, with respectively 15 and 10 natural disasters, the Philippines and Indonesia knew their 4<sup>th</sup> and 2<sup>nd</sup> lowest numbers since 2005, below their respective annual average of 18 and 14.

In 2015, the number of people killed by disasters (22,765) was the lowest since 2005, way below the 2005-2014 annual average of 76,416 deaths which, however, takes into account two years with more than 200,000 people reported killed, each time mostly attributable to major catastrophes: the cyclone Nargis in Myanmar in 2008 (138,366 deaths) and the earthquake in Haiti in 2010 (225,570 deaths). But even after exclusion of these disasters, the number of deaths in 2015 remains below a recomputed 2005-2014 annual average of 40,022 deaths.

At a more detailed level, it appears that, in 2015, earthquakes and tsunamis killed the most people (9,526) however far below a 2005-2014 annual average of 42,381. Extreme temperatures made 7,418 deaths, the second highest number since 2005 but far below the peak of 2010 (57,064). Inversely, the number of deaths from floods (3,449) and storms (1,260) were, both, the lowest since 2005, far below their 2005-2014 annual averages (5,933 and 17,769, respectively).

Amongst the top 10 countries in terms of disaster mortality in 2015, six countries are classified as low-income or lower-middle income economies (see World Bank income classification), and accounted for 67.6% of global reported disaster mortality. Four disasters killed more than 1,000 people in 2015: the Gorkha earthquake in Nepal of April (8,831 deaths) and three heat waves in France between June and August (3,275 deaths), in India in May (2,248 deaths) and in Pakistan in June (1,229 deaths).

The number of victims in 2015 (110.3 million) was the second lowest since the decade, far below its 2005-2014 annual average (196.3 million). It must be noted that the four years with the lowest number of victims since 2005 are the four last years, 2012 to 2015, far below the 200 million victims reported between 2007 and 2011. This decrease is mainly explained by the lower human impact of floods, whose number of victims (36.1 million) was the second lowest since 2005, 58.4% below its 2005-2014 annual average (86.9 million) and of storms with a number of victims (10.4 million) 70.2% below its decade's average (34.9 million). The number of victims of climatological disasters (54.3 million) was near its 2005-2014 average (56.7 million). Geophysical disasters made 8.1 million victims, a number lightly below the 8.6 million annual average, but however the second highest since 2005, after the very high peak of 2008 (47.7 million).

Nine countries of the top ten countries in terms of number of victims were low or lower-middle income countries, accounting for 69.9% of the victims of 2015. The natural events that accounted for more than 10 million victims were two droughts in DPR Korea in June and July (18 million victims) and in Ethiopia, from September (10.2 million) and floods in India in July and August (13.7 million). Twenty other disasters (10 droughts, 5 floods, 4 storms and one earthquake) had severe human impacts ranging from 1 to 9 million victims.

The estimated economic losses from natural disasters in 2015 (US\$ 70.3 billion) was the third lowest since 2005 and 56 % below the annual 2005-2014 damages average (US\$ 159.8 billion). The lowering in the amount of damages come from geophysical (US\$ 6.7 billion; -86.0% compared to the 2005-2014 average), meteorological disasters (US\$ 33.4 billion; -51.7% compared to the 2005-2014 average) and hydrological disasters (US\$ 21.3 billion; -38% compared to the 2005-2014 average). Damages from earthquakes were the second lowest since 2005, and represent 8.7% of all disaster costs. Those from storms and floods were, both at their third lowest since 2005, contributing, respectively, to 47.4 and 30.3% of all disaster costs. These three disaster types are at the origin of almost all these costs. On their side, damages from climatological disasters (US\$ 8.9 billion) were, in 2015, very near their 2005-2015 annual average (US\$ 8.8 billion), however if in this disaster category, damages from droughts and from wildfires were, both, the fourth lowest since 2005, costs of droughts (US\$ 5.8 billion) were slightly below their decadal average (US\$ 6.4 billion) while those from wildfires (US\$ 3.1 billion) were 27.9% above their 2005-2014 annual average.

In the top ten countries for economic damages, six were high or upper-middle income countries which accounted for 70.7% of the total economic losses while the share of the four low and lower-middle income countries in this total was of 17.6%.

The costliest natural disaster in 2015 was the Gorkha earthquake, in Nepal, which cost US\$ 5.7 billion to the country, while typhoon Mujigae impacted China for a total of US\$ 4.2 billion economic losses. Twenty-one other disasters (9 storms, 7 floods, 3 droughts and 2 wildfires)

accounted for damages ranging from US\$ 1 to 3 billion. The total costs of these 23 disasters represent 61.2% of all reported damages in 2015.

Looking at the distribution of disasters across continents, it appears that Asia was most often hit (44.4%), followed by the Americas (25.5%), Africa (16.5%), Europe (7.2%) and Oceania (6.4%). This regional distribution of disaster occurrence is, in 2015, not very different from the profile observed between 2005 and 2014. However, the share of Europe in the distribution is half its 2005-2014 mean proportion, while the share of Oceania is, in 2015, twice its average.

Asia accounted in 2015 for 62.7% of worldwide reported disaster victims (against 80.6% for the 2005-2014 decade's average), while Africa accounted for 28.0% (against 13.1% on average for the 2005-2014 period) and the Americas for 7.0% (against 5.8% on average for 2005-2014). Oceania accounted for 2.2% of all natural disasters victims (against 0.1% for 2005-2014 average) and Europe for only 0.21% (against 0.35% according to the 2005-2014 average).

With 49.1% of worldwide natural disaster reported costs, Asia suffered the most damages in 2015, followed by the Americas (36.7%) and Europe (6.8%). A share of 5.1% of global disaster damages was reported for Oceania and of 2.4% for Africa. In spite of some differences in the proportions, the ranking of the continents according to their contribution to the total reported damages is similar from the one observed over the last decade, where Asia had the most damages, followed by the Americas and Europe. However, when compared to its 2005-2014 average, the amount of damages in Africa was significantly above its 2005-2014 annual average of 0.34%.

EM-DAT's global approach to the compilation of disaster data continuously provides us with valuable information and trends on the occurrence of natural disasters and their impacts on society. However, the development of guidelines and tools for the creation of national and sub-national disaster databases; for the compilation of standardized, interoperable disaster occurrence and impact data remain priorities for the strengthening of tools helping to benchmark and orientate effective disaster risk reduction programs.

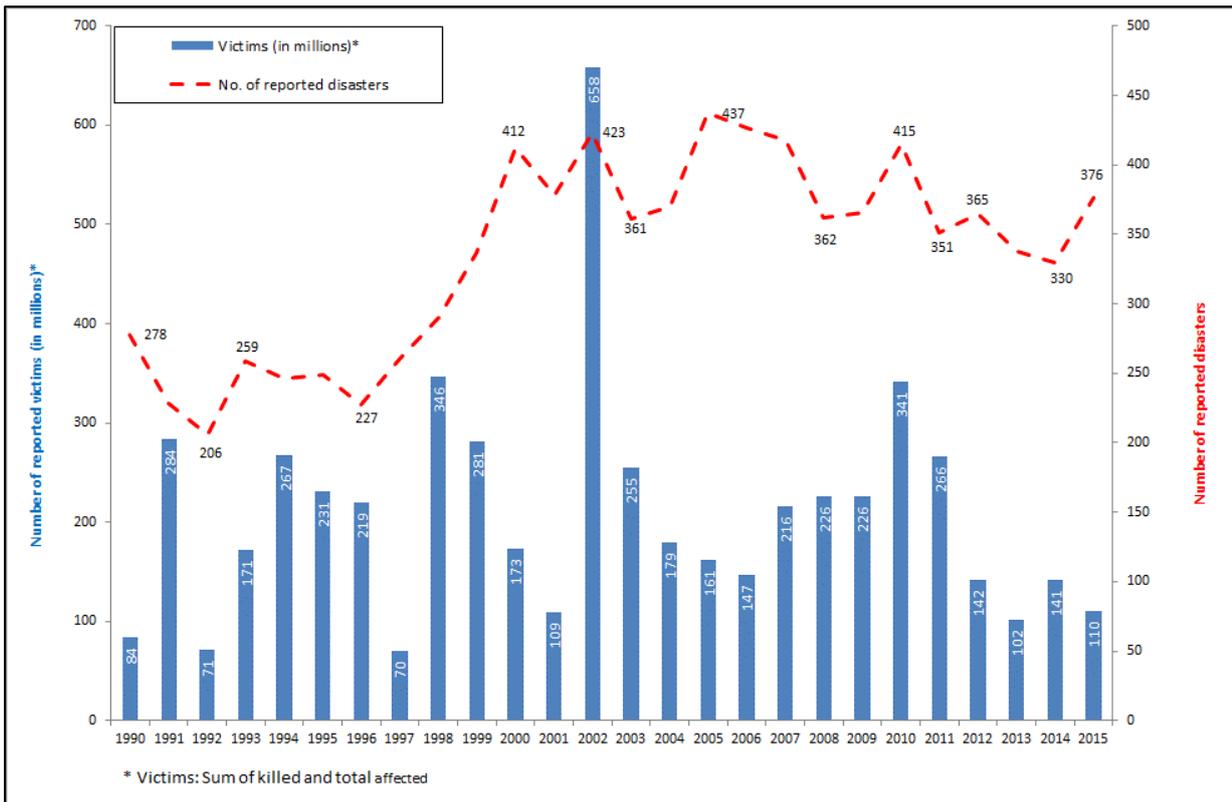


Figure 1 - Trends in occurrence and victims

# Chapter 1

## About EM-DAT: The International Disaster Database

- What is EM-DAT?
- Database classification, definitions, criteria and content
- Methodology



# 1. About EM-DAT: the International Disaster Database

## 1.1 What is EM-DAT?

In 1988, with the sponsorship of the United States Agency for International Development’s Office of Foreign Disaster Assistance (USAID/OFDA), CRED launched EM-DAT, a worldwide database on disasters. This database contains essential core data on the occurrence and impact of over 13 800 natural and 8 200 technological disasters across the globe, dating from 1900 to the present day. The data are compiled from various sources, including UN agencies, non-governmental organizations, insurance companies, research institutes and press agencies. Priority is given to data from UN agencies, followed by OFDA, governments and the International Federation of Red Cross and Red Crescent Societies. This prioritization reflects the quality and value of the data, while also acknowledging that most reporting sources do not cover all disasters, or have political limitations that can affect the figures. The entries are constantly reviewed for redundancy, inconsistencies and incompleteness. The database’s main objectives are to assist humanitarian action at both the national and international level; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting.

## 1.2 Database classification, definitions, criteria and content

CRED defines a disaster as “a situation or event that overwhelms local capacity, necessitating a request at the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering”. EM-DAT distinguishes between two generic categories for disasters - natural and technological. Technological disasters are not included in this publication. Figure 2 shows the classification of natural disaster subgroups and their main types. Disaster definitions can be found in Annex 1. For a disaster to be entered into the database, 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.



Figure 2 – Natural disaster subgroup classification

EM-DAT includes the following fields:

<b>DISNO:</b>	Unique disaster number for each disaster event (8 digits: 4 digits for the year and 4 digits for the disaster number; i.e. 1995-0324)
<b>Country:</b>	Country (ies) in which the disaster occurred
<b>Disaster generic group:</b>	Two groups are distinguished in EM-DAT – natural and technological disasters
<b>Disaster sub-group:</b>	Six sub-groups of natural disasters have been defined: geophysical, hydrological, meteorological, climatological, biological and extra-terrestrial
<b>Disaster main type and sub-type:</b>	Description of the disaster according to a pre-defined classification (for example, type: flood; sub-type: flash flood)
<b>Date (start and end):</b>	Date when the disaster occurred and ended (month/day/year)
<b>Total Deaths :</b>	Number of people who lost their life because the event happened (it includes also the missing people based on official figures)
<b>Injured:</b>	Number of people suffering from physical injuries, trauma or an illness requiring immediate medical treatment as a direct result of a disaster
<b>Homeless:</b>	Number of people whose house is destroyed or heavily damaged and therefore need shelter after an event
<b>Affected:</b>	Number of people requiring immediate assistance during a period of emergency; this may include displaced or evacuated people
<b>Total affected:</b>	Sum of injured, homeless and affected
<b>Victims:</b>	Sum of total deaths and total affected
<b>Estimated damage:</b>	Global figure of the economic impact of a disaster; it is given in current US dollars.
<b>Additional fields:</b>	Other geographical information (such as latitude and longitude, location), value and scale of the events (such as the Richter scale value for an earthquake), the international status (OFDA response, request for international assistance, disaster/emergency declaration), the aid contribution (in US dollars), and the different sectors affected.

### 1.3 Methodology

In EM-DAT and in this report, data are considered at the country level for two reasons: first, it is at this level that they are usually reported; and second, it allows the aggregation and disaggregation of data. Annex 2 shows the list of countries per continent. In order to facilitate the comparison over time for the analyses of this report, the event start date has been used as the disaster reference date.

In EM-DAT, the number of total deaths includes those confirmed dead and those missing and presumed dead. People affected are those requiring immediate assistance during a period of emergency (e.g. requiring basic survival assistance such as food, water, shelter, sanitation and immediate medical help). People reported injured or homeless are aggregated with those affected to produce the total number of people affected. In this report, the number of victims is used as a measure of the human impact of a disaster. The number of victims is the sum of persons reported killed and the total number of persons reported affected.

The economic impact of a disaster usually consists of direct consequences on the local economy (e.g. damage to infrastructure, crops, housing) and indirect consequences (e.g. loss of revenues, unemployment, market destabilization). In EM-DAT, the registered figure corresponds to the estimated value of the direct damage caused by the event, expressed in current US dollars. In this report, damages were converted into 2015 dollar values for easier comparison. Estimates of disaster damages must be treated with caution because of (a) the financial value of infrastructures, which is much higher in high-income countries than in middle- and low-income countries (World Bank classification of economies); and (b) the low reporting rates of direct losses, which is nonetheless better for large disasters.

Droughts are often multi-year disasters, therefore, their impact over time has to be taken into account. Bearing in mind that data on deaths and economic damage from drought are infrequently reported, CRED has adopted the following rules regarding the data for multi-year droughts: (a) the total number of deaths reported for a drought is divided by the number of years for which the drought persists. The resulting number is registered for each year of the drought duration; (b) the same calculation is done for the reported economic damages; and (c) for the total number of people reported to be affected, CRED considers that the same number is affected each year that the disaster persists.

In the computation of annual averages, the fact that some disasters begin at the end of a year and may last some weeks or months into the following year has to be taken into account. In such cases, CRED has adopted the following new rules: (a) regarding the number of people reported affected, the total number is recorded for both the start year and the end year; (b) for the number of people reported as killed by sudden onset disasters (earthquakes, flash floods, landslides, etc..) all those killed are registered according to “start year” of the disaster; (c) for the numbers of people reported as killed by slow-onset disasters, the total of all those killed is divided and half is attributed to each year of persistence; (d) reported economic damages are always attributed to the end year of the disaster. This is because damage is related to both the strength of a disaster and its duration.

The CRED/EM-DAT team continuously strives to improve its data reporting methodologies and the EM-DAT database as a whole.



# Chapter 2

## What did 2015 bring?



## 2. What did 2015 bring?

In the year 2015, natural disasters once again had a devastating impact on human society. Worldwide, 376 reported natural disasters caused the death of 22,765 people, made 110.3 million victims and caused US\$ 70.3 billion damages.

Compared to years 2005-2014, the number of disasters was near its decadal annual average (380) while the numbers of deaths, victims and the amounts of damages were, respectively, 70.2%, 43.7% and 56.0% below their annual average of 76,416 deaths, 196.3 million victims and US\$ 159.8 billion.

One hundred and seventeen countries and territories (54%) were hit by disasters in 2015. The five most often hit countries were China, the United States, India, the Philippines and Indonesia, which accounted for 29.3% of total disaster occurrence in 2015 (see Figure 3). Year after year, these countries appear prominently in the list of countries experiencing the highest number of disaster events.

When considering the countries of the top ten for the number of disasters, it appears that six of them experienced in 2015 a year among the worst since 2005. In Chile, the number of 7 disasters was the highest since the beginning of the period under review. In the USA (28 disasters) and Pakistan (10 disasters), 2015 was the second worst year since 2005. It was the third one in India (21 disasters), Australia (8 disasters) and Japan (8 disasters), while China (36 disasters) knew its fourth worst year. The number of disasters in Bangladesh was close to its 2005-2014 annual average, while the number of 15 disasters in the Philippines and of 10 in Indonesia were, respectively, the fifth and the second lowest since 2005.

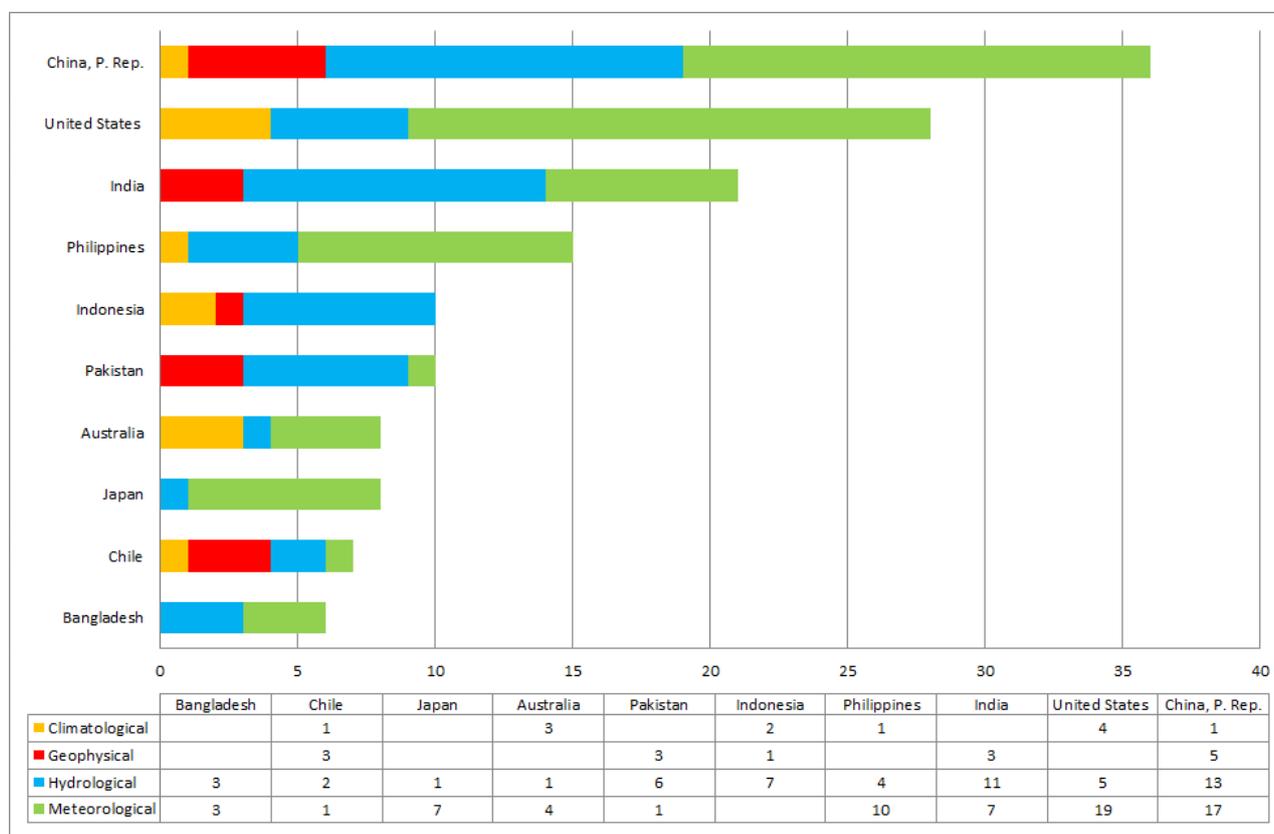


Figure 3 – Top 10 countries by number of reported events in 2015

As in previous years, the main burden of disaster impacts was carried by a small number of countries in 2015. The countries that made up the top 10 ranking in terms of disaster mortality in 2015 represented 87.4% of total disaster mortality, while the top 10 countries for the number of victims represented 73.3% of all reported number of victims and the top 10 countries for damages accounted for 88.4% of all costs from natural disasters in 2015 (see Figures 4, 5 and 6).

Among the top 10 countries in terms of disaster mortality in 2015, 4 are located in Southern Asia and one in East Asia; the five accounting for 67% of the 2015 disaster mortality (see Figure 4). Two were located in Western Europe, and, each, one in Northern America, South America and Eastern Africa. In terms of their total population, four top ten countries had more than 100 million inhabitants in 2015, accounting for 43.6% of the world population and 26.8% of all deaths, while one had a population between 50 and 100 million inhabitants (0.9% of world population and 14.5% of all deaths) and the five others a population between 10 to 50 million inhabitants, accounting for 1.4% of the world population and 46.2% of all deaths. Six countries are classified as low-income or lower-middle income countries and accounted for 67.6% of the total reported disaster mortality, the four high-income or upper-middle income economies accounting for a share of 19.8%.

Four disasters killed more than 1000 people in 2015, accounting for 69.9% of all 2015 deaths: the Gorkha earthquake in Nepal, in April (8,831 deaths) and three heat waves in France (3,275 deaths), India (2,248 deaths) and Pakistan (1,229 deaths) (See Table 1). Since 2005, Nepal, France and Malawi had their most deadly year in 2015, while Belgium and Guatemala their second, India and Pakistan their third and Afghanistan its fourth. Inversely, in 2015, China knew its least deadly year.

When looking at disaster mortality relative to the number of inhabitants in a country, the figure is rather different (See Figure 4). Two countries (Dominica and the Bahamas) are located in the Caribbean, two in the Pacific region (Micronesia and Vanuatu), two in Western Europe (France and Belgium), one in Western Africa (Cabo Verde), one in Eastern Africa (Malawi) and one in South America (Guatemala). Five had a population between 50 and 100 million inhabitants, while the last five were all islands and had a population of less than 100,000 inhabitants. Six out of these top 10 countries are classified as lower-middle income or low-income economies according to the World Bank income classification of which three are islands, as two of the four upper-middle or high income remaining countries.

In six cases, the high mortality rates reported for a country were attributable to only one disaster: 5 storms - hurricane Erika in Dominica (41.3/100,000), Joaquin in the Bahamas (8.5/100,000) and Fred in Cabo Verde (1.7/100,000), typhoon Maysak in Micronesia (4.8/100,000) and cyclone Pam in Vanuatu (4.2/100,000) - and one heatwave in Belgium (3.6/100,000). In the four other countries, 98 to 99% of all deaths are also attributable to one disaster: the Gorkha earthquake in Nepal (30.97/100,000), a heat wave in France (5.09/100,000), a landslide of hydrological origin in Guatemala (2.14/100,000) and a flood in Malawi (1.61/100,000).

Country	Disaster distribution	No. of deaths	Country	Disaster distribution	Deaths per 100,000
Nepal		9034	Dominica		41.28
India		3391	Nepal		31.68
France		3295	Bahamas		8.50
Pakistan		1892	France		5.12
China		492	Micronesia Fed.		4.79
Afghanistan		433	Vanuatu		4.16
Belgium		410	Belgium		3.63
Guatemala		352	Guatemala		2.15
United States		316	Cabo Verde		1.73
Malawi		283	Malawi		1.64

Figure 4 – Top 10 countries in terms of disaster mortality in 2015 and distributed by disaster type

Table 1 – Top 10 natural disasters by number of deaths in 2015

Event	Country	No. of deaths
Earthquake, April	Nepal	8,831
Heat wave, June	France	3,275
Heat wave, May	India	2,248
Heat wave, June	Pakistan	1,229
Heat wave, June	Belgium	410
Landslide, October	Guatemala	350
Flood, November	India	325
Riverine flood, July	India	293
Earthquake, October	Pakistan	280
Riverine flood, January	Malawi	278
	<b>Total</b>	<b>17,519</b>

The top 10 list in terms of disaster victims is shared by 7 Asian countries (3 in the Southern region, 2 in the South-East region, two in the Eastern region) and 3 African ones, all from the eastern region (Ethiopia, Malawi and Somalia) (See Figure 5). In absolute number, the seven Asian countries account for 55.3% of all victims. When considering the total number of inhabitants, four top ten countries had more than 100 million inhabitants in 2015, accounting for 40.2% of the world population and 25.7% of all victims, while two had a population between 50 and 100 million inhabitants (2.1% of world population and 17.6% of all victims) and the four

others a population between 10 to 50 million inhabitants, accounting for 1.12% of the world population and 29.9% of all victims.

With nine countries in the list, low-income and lower-middle income economies dominate, accounting for a total of 69.9% of all 2015 victims. Among countries figuring in this top ten, DPR Korea, Myanmar, Somalia, Nepal experienced their highest number of victims since 2005, Ethiopia the second highest and Malawi the third highest. Inversely, in China, 2015 made the least number of victims since 2005.

Top ten countries by number of victims was the highest for climatological disasters (36.2 million victims or 66.7% of all victims from climatological disasters), followed by hydrological disasters (30.2 million victims or 83.4% of their victims), meteorological disasters (8.6 million victims or 73.5% of their victims) and geophysical disasters (5.8 million victims or 71.6% of their victims). Droughts, floods, storms and earthquakes are the main contributors to these results, while the human impact of wildfires, landslides, extreme temperatures and volcanic activities remains marginal.

In each top ten countries, except Bangladesh and China, only one disaster caused 70% to 100% of all victims. It was the case for four droughts in DPR Korea (100%), Ethiopia (100%), Malawi (81.3%) and Somalia (78.7%); two floods in Myanmar (99.8%) and India (82.8%); the Gorkha earthquake in Nepal (99.9%) and the typhoon Koppu/Lando in the Philippines (72.1%). In Bangladesh, the cyclone Komen made 64.1% of the country victims and a flood 34.7%. In China, the typhoon Soudelor/Hanna made 41.8% of all country victims and a flood 16.7%.

In 2015, 3 disasters made more than 10 million victims for a total of almost 42 million or 38.0% of all victims from natural disasters: two droughts in DPR Korea and Ethiopia made, respectively, 18 and 10 million victims and one flood in India accounted for almost 14 million victims (See Table 2). Twenty disasters made 1 to 9 million victims for a total of 50.5 million or 45.8% of all victims: 10 droughts in Somalia (4.7 million victims), Malawi (2.8), South Africa (2.7), Niger (2.6), Papua New Guinea (2.0), Vietnam (1.8), Kenya (1.6), Zimbabwe (1.5), Guatemala (1.3) and Haiti (1.0); five floods in Myanmar (9.0 million victims), India (1.8), Pakistan (1.5), Bangladesh (1.4) and Sri Lanka (1.1); four storms in the Philippines (typhoon Koppu/Lando: 2.9 million), Bangladesh (cyclone Komen: 2.6), China (typhoon Soudelor/Hanna: 1.6) and the winter storm Huda in Lebanon (1.0). The Gorkha earthquake in Nepal (5.6 million victims) was the only one to make at least 1 million victims.

The top ten countries by numbers of victims as a percentage of their total population highlights completely different story (See Figure 5). Four countries are located in the Pacific region, two in Eastern Asia, two in Eastern Africa, one in the Caribbean and one in South America. Six countries have more than 2.5 million inhabitants: one has more than 25, 3 between 10 and 25, 1 between 5 to 10 million and 1 between 2.5 and 5, while 2 countries have between 100,000 and 500,000 inhabitants and 2 less than 100,000 inhabitants. Seven out of these top 10 countries are classified as lower-middle income or low-income economies according to the World Bank income classification. Five countries are islands states, Vanuatu, Micronesia, Papua New Guinea being lower-middle income economies, and Tuvalu and Dominica upper-middle economies. The two African countries were low income economies.

In eight countries, only one disaster was responsible for the (almost) totality of victims. It's the case for 3 storms: 71.04% of the population of Vanuatu suffered from cyclone Pam as well as

46.5% of Tuvalu’s population, while hurricane Erika affected 39.4% of Dominica’s population and typhoon Maysak 33.5% of the population of the Federated State of Micronesia; 3 droughts affected 71.6% of the population of DPR Korea, 26.63% of Papua New Guinea’s population; and one flood which affected 25.9% of Guyana’s population.

Country	Disaster distribution	No. Victims (millions)	Country	Disaster distribution	Victims/pop. (%)
Korea (D.P.R.)		18.00	Korea (D. P. R.)		71.57
India		16.56	Vanuatu		71.04
Ethiopia		10.41	Somalia		55.35
Myanmar		9.02	Tuvalu		46.52
Somalia		5.97	Dominica		39.38
Nepal		5.65	Micronesia Fed.		33.51
Bangladesh		4.03	Mongolia		32.61
Philippines		4.02	Papua New Guinea		26.63
China (P. R.)		3.78	Guyana		25.94
Malawi		3.44	Malawi		19.98

Figure 5 – Top 10 countries by victims in 2015 and distributed by disaster type

Table 2 – Top 10 natural disasters by number of victims in 2015

Event	Country	Victims (in millions)
Drought, June-July	Korea (D. P. R.)	18.00
Flood, July-August	India	13.71
Drought, September-December	Ethiopia	10.20
Riverine flood, July-August	Myanmar	9.00
Earthquake, April	Nepal	5.65
Drought, August-December	Somalia	4.70
Typhoon Koppu (Lando), October	Philippines	2.90
Drought, October-December	Malawi	2.80
Drought, January-December	South Africa	2.70
Cyclone Komen, July	Bangladesh	2.60
<b>Total</b>		<b>72.26</b>

Six Asian countries appear in the top ten of countries by economic losses (2 in the Eastern region, 2 in the South-East region and 2 in the Southern region), while only two in the Americas (in Northern and in South America), one in Northern Europe and one in Oceania (See Figure 6).

The 10 countries accounted for 88.4% of all 2015 natural disasters reported damages: United States had the largest share (30.3%) while it was of 46.6% for the 6 Asian countries and of 11.5% for the remaining 3 countries. Four countries are classified as high income countries, two as upper-middle income, three as lower-middle income and one as low income.

In terms of countries wealth, the USA and China, the two largest economies of the world, representing, respectively, 24.4% and 14.8% of world GDP in 2015, reported the largest shares of damages of, respectively, 30.3% and 26.6% of all damages. Four countries had a 2015 GDP comprised between US\$ 1,000 to 5,000 billion, representing a share of 14.1% of the world GDP and reported 15.4% of all damages. Three countries had a 2015 GDP between US\$ 100 and 1,000 billion, for a share of 1.9% of world GDP but reported 8.7% of all damages, while with 0.03% of the 2015 world GDP, Nepal was the poorest country of the top ten but, with the Gorkha earthquake, contributed to 7.4% of all reported damages.

In the USA and China, the costliest disaster accounted for, respectively, 14.2% and 22.7% of the total reported damages. In each of the other top ten countries, only one disaster accounted for at least 50% of all reported damages, which gives an idea of the impact they can have on the economy of a country.

The 2015 costliest disaster, the Gorkha earthquake, cost US\$ 5.2 billion to Nepal, and 21 of the 22 disasters (10 storms, 7 floods, 3 droughts and 2 wildfires) which made damages between US\$ 1 to 4 billion occurred in the top ten countries: 8 in the USA, 5 in China, 2 in the United Kingdom and one in India, Chile, the Philippines, Japan, Australia, Indonesia. The last occurred in South Africa which ranks 12th in the list of countries sorted by amount of reported damages.

When ranked according to the 2015 damages as a percentage of their GDP, the geographical distribution of the countries is completely different (See Figure 6). No region dominates strongly the others: two countries of the top ten are located in Asia (South-Eastern and Southern), two in the Pacific region, two in the Caribbean, two in Eastern Africa, one in Southern Europe and one in South America. Two countries had a 2015 GDP between 0.3 and 0.4% of the world GDP; in four countries the GDP was between 0.01% and 0.03% of world GDP and in the last four it was below 0.01%. Two countries are classified as high income economies, two as upper-middle income economies, three as lower-middle income economies and three as low income economies. Four countries are islands states, of which Vanuatu and Micronesia are lower-middle income economies.

In seven out of ten countries, reported damages are attributable to only one disaster which had a severe impact of the country's economy. In each of the four islands countries, only one storm made major damages: hurricane Erika in Dominica, cyclone Pam in Vanuatu, typhoon Maysak in Micronesia and hurricane Joaquin in the Bahamas. In the Philippines, more than three quarter of reported damages were attributable to typhoon Cham/Home while seven other storms accounted for 19% of all damages. In Madagascar, the tropical storm Chedza accounted for 78% of reported damages and the tropical storm Fundi for the remaining 22%. All reported damages from Malawi and Macedonia were, both, caused by only one flood while, in Chile, such a disaster accounted for the half of reported damages.

Country	Disaster distribution	Damages (US\$ Bn.)	Country	Disaster distribution	% of GDP
United States		21.28	Dominica		89.78
China (P.R.)		18.66	Vanuatu		55.14
Nepal		5.23	Nepal		24.78
India		3.99	Malawi		5.94
Chile		2.93	Micronesia Fed.		3.46
Australia		2.76	Chile		1.21
United Kingdom		2.42	Bahamas		1.01
Philippines		1.94	Macedonia (F. Y. R.)		0.86
Japan		1.65	Philippines		0.66
Indonesia		1.25	Madagascar		0.46

Figure 6 – Top 10 countries by damages in 2015 and distributed by disaster type

Table 3– Top 10 natural disasters by economic damages in 2015

Event	Country	Damages (in 2015 US\$ bn.)
Earthquake, April	Nepal	5.23
Typhoon Mujigae, October	China (P. R.), Philippines	4.24
Winter storm, February	United States of America	3.03
Flash flood, May	United States of America	2.73
Drought, May-October	China (P. R.)	2.49
Typhoon Chan-Home	Philippines, China (P. R.), Japan, Taiwan (China)	2.46
Flood, November	India	2.22
Riverine flood, June	China (P. R.)	2.02
Drought, January-December	United States of America	1.82
Tropical cyclone Joaquin, October	United States of America, Bahamas	1.81
<b>Total</b>		<b>29.56</b>

When looking at the level of country economies, in five of the six top ten ranking, low and lower-middle income countries are overrepresented, in absolute numbers and according to their share in the world economy (38% of all countries and territories). They are less present in the ranking for total economic damages but it can be easily explained by the higher value associated with buildings and infrastructures in wealthier countries. And, anyway, they are represented, in this specific ranking, in proportion of their share in the world economy. With only one disaster causing the most deaths, affecting the most people or accounting for the most

damages in many countries, the vulnerability to natural disasters of low and lower-middle income countries appears clearly from these tables. The number of deaths per 100,000 inhabitants; of victims as a percentage of the total population and of amounts of damages as a percentage of GDP made also clear that small countries as well as islands countries are also more likely to have to face disaster impacts which regularly outperform their response capabilities. To find ways to mitigate the shocks that natural hazards may have on populations and economies of these different countries is a challenge which can only be considered in a permanent and long-term way.

# Chapter 3

## How different was 2015?



## 3. How different was 2015?

### 3.1. General overview

#### 3.1.1. Occurrence

The number of reported natural disasters in 2015 (376) showed an increase of 13.9% compared to 2014's number (330), near the annual average disaster occurrence for 2005-2014 (380). This increase makes 2015 a year of break, compared with the four previous years which showed a decrease of disaster numbers worldwide. In 2015, the number of climatological disasters (45) was the highest since 2005, 42% above its 2005-2014 annual average (31.5) and the one of hydrological disasters (127) the fifth highest, although near its annual average (124.5). Inversely, the number of geophysical disaster (29) was the third lowest since 2005, 9% below its 2005-2014 annual average (31.9) and the number of hydrological disasters (175) the fourth lowest, also 9% below its annual average. It should be noted however, that the number of hydrological disasters went back, in 2015, to its level of 2011, signal of a possible trend turnaround?

#### 3.1.2. Deaths

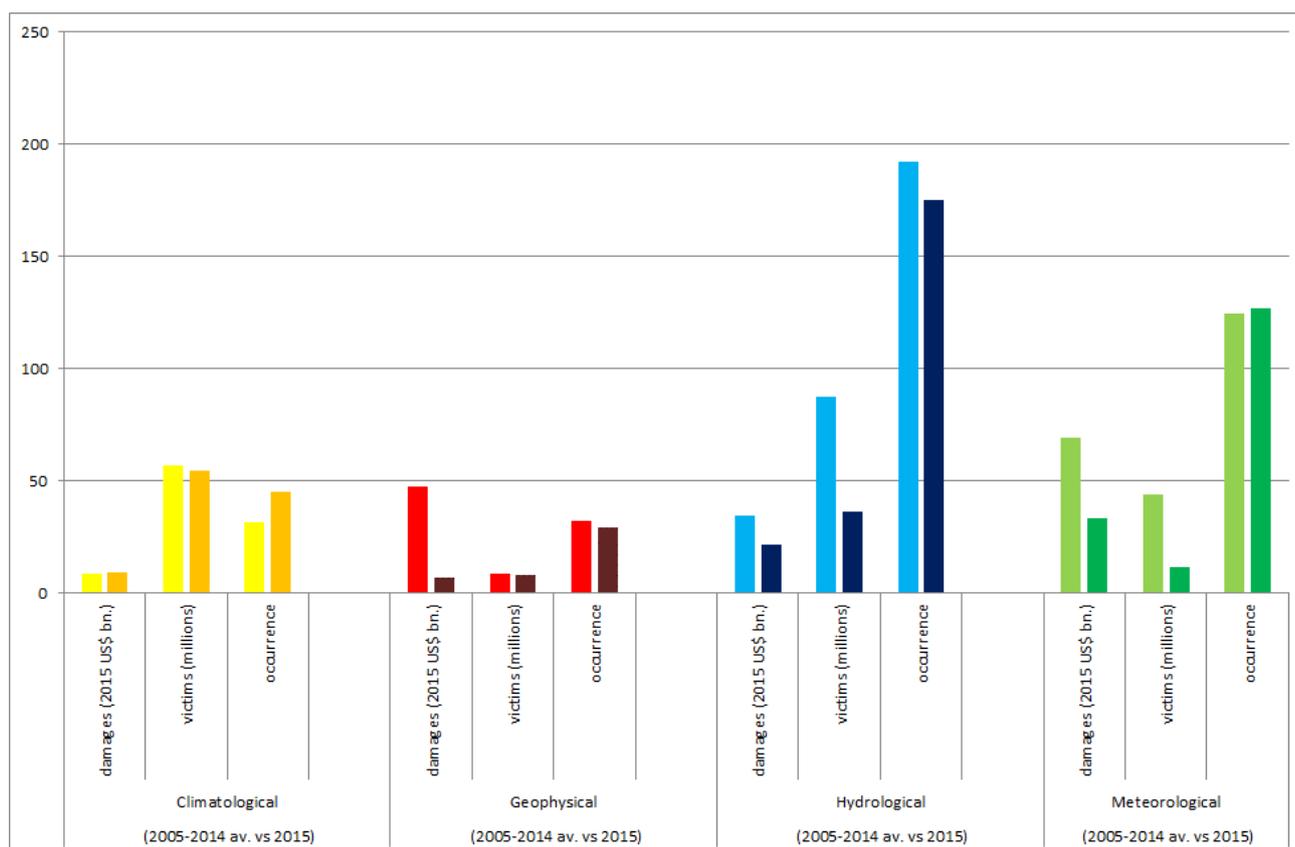
The number of people killed by disasters in 2015 (22,765) was significantly above its value for 2014 (7,959) but remained below its 2005-2014 annual average (76,416) which is strongly influenced by the peaks of 2010 (307,758), year of Haiti's earthquake, and 2008 (235,310) when cyclone Nargis hit Myanmar. When these two years were excluded of the computation, the annual average for the period falls to 27,636, a mean number of deaths remaining significantly above to the one of 2015. For each disaster type, the number of deaths was, in 2015, above its 2005-2014 annual average.

#### 3.1.3. Victims

The number of reported victims in 2015 (110.3 million) was the second lowest of the decade remaining however 9.8% above the number of victims of 2013 (101.5 million), the lowest since 2005. Compared to the decade's annual average of 196.8 million victims, their number was 56% below in 2015. However, this decrease is mainly associated with hydrological and meteorological disasters, from which the numbers of victims were in 2015, respectively, 60% and 75% below their 2005-2014 annual average.

#### 3.1.4. Damages

The estimated economic losses from natural disasters in 2015 (US\$ 70.3 billion) were the third lowest since 2005, 56% below the damages annual average for years 2005-2014 and far below those reported in 2011 (2015US\$ 406.3 billion), year of the tsunami in Japan and the large flood in Thailand and 2005 (2015US\$ 269.2 billion), year of hurricane Katrina. Compared to their 2005-2014 annual average, 2015 costs from geophysical (US\$ 6.7 billion), hydrological (US\$ 21.3 billion) and meteorological (US\$ 33.4 billion) disasters showed a decrease of, respectively, 85.9, 61.6 and 44.4 per cent. On the other hand, damages from climatological disasters (US\$ 8.9 billion) were very close to their annual average (US\$ 8.8 billion).



**Figure 7 – Natural disaster impacts by disaster sub-group: 2015 versus 2004-2015 annual average**

## 3.2. Hydrological disasters

### 3.2.1. Occurrence

Hydrological disasters (156 floods and 19 mass movements of hydrological origin) still took the largest share in natural disaster occurrence in 2015: 46.5% to compare, however, to a proportion of 50.6%, on average, for the years 2005-2014. The two most hit countries by floods were China (12) and India (10) but these numbers of occurrence remained, for both countries, very near their 2005-2014 annual average (11 and 10 respectively). Inversely, 5 countries experienced, in 2015, a number of hydrological disasters unexpectedly high compared to their annual average occurrence of 2005-2014: with, respectively, 3 and 2 floods Uruguay and New Zealand experienced in 2015 as many disasters as during the 10 previous years, and in Albania, Macedonia and Iran the number of floods in 2015 was at least 5 times superior to its 2005-2014 annual average. The 19 mass movements of hydrological origin accounted for 11% of all 2015 hydrological disasters, for 9%, on average, in the 2005-2014 decade. Belize and the UK experienced, each, 3 disastrous landslides, a number respectively 3 and 1.5 times superior to their 2005-2014 annual average, while with 2 disastrous landslides each, the Czech Republic and Fiji Islands, a number 5 and 2.2 times higher than each country annual average.

### 3.2.2. Deaths

The number of deaths from hydrological disasters (4,449) was the third lowest since 2005, 35% below its 2005-2014 annual average (6,847). However, it was the lowest of the decade for

floods (3,449), 42% below its annual average (5933), while the one from mass movements of hydrological origin (1,000), the third highest since 2005, remained near its annual average (914). Deaths from floods were significantly high in 2015 in Malawi (278), Chile (178), Georgia (40) and Iraq (58), such numbers being 10 to 100 times higher than their respective 2005-2014 annual average. The number of deaths from mass movements of hydrological origin in Mali (350) and the Bahamas (318) were, in 2015, 21 and 8 times higher than their 2005-2014 annual average.

### 3.2.3. Victims

In terms of total number of victims in 2015 (36.2 million), they were 59% below their 2005-2014 annual average (87.3 million) and represented a share of 32.8% of all disaster victims in 2015, compared to an annual average share of 44.5% for the 2005-2014 decade. In 2015, 99.8% of victims suffered from floods, a share very near the 99.6% mean proportion for years 2005-2014. In Myanmar and Macedonia the number of victims from hydrological disasters was, in 2015, more than 100 times superior to its 2005-2014 annual average and, in R. D. Congo, Albania, Somalia and Sierra Leone, more than 10 times. Inversely, some countries with 2005-2014 high annual mean numbers of victims, reported in 2015 very low numbers, such as China (1.4 million victims from floods in 2015 versus an annual mean number of 51 million), the Philippines (230,000 victims in 2015 versus an annual average of almost 2 million), the USA (20,000 victims against a 2005-2014 average of 1.1 million), Nigeria (100,000 victims versus an annual mean of almost 900,000) or Vietnam (15,000 victims against a 2005-2014 average of 750,000). Compared to their 2005-2014 annual average of victims from mass movements of hydrological origin, two countries experienced high numbers in 2015: India (9,000 victims versus an annual average of 574) and Colombia (441 victims versus an annual average of 106)

### 3.2.4. Damages

A total of US\$ 21.3 billion damages from hydrological disasters were reported in 29 countries out of 82 having experienced such disasters in 2015. This total amount represents 30.3% of all reported damages in 2015, above the 20.6% mean proportion for the 2005-2014 decade. The share of damage attributable to floods (more than 99%) was, in 2015, similar to the one of the previous decade. Costs from floods were, in 2015, the third lowest since 2005, being 38% below their 2005-2014 annual average, but remaining largely above the two lowest of 2006 (US\$ 9.9 billion) and 2009 (US\$ 9.1 billion). Among the 6 countries reporting more than US\$ 1 billion damages from floods in 2015, 3 experienced costs higher than their 2005-2014 annual average: the USA (US\$ 3.4 billion damages in 2015 versus an annual average of 2.7 billion), Chile (US\$ 1.5 billion versus an annual mean cost of 2 million) and Japan (US\$ 1.4 billion versus a mean annual damage amount of 149 million). Inversely, the amount of damages was in 2015 around 23% below their 2005-2014 annual average in China (2015 US\$ 7.1 billion damages versus an annual mean of 9.3 billion), India (2015 US\$ 2.9 billion against an average of 3.7 billion) and the United Kingdom (2015 US\$ 1.2 billion versus 1.6 billion on average).

## 3.3. Meteorological disasters

### 3.3.1. Occurrence

Meteorological disasters (115 storms and 12 extreme temperatures) represented 33.8 % of the total disaster occurrence in 2015, very near their mean proportion for the 2005-2014 decade (125). However, the number of storms was the second highest since 2005 (130), 17% above its

2005-2014 annual average while the number of extreme temperatures was the second lowest since 2008 (11), 54% below its annual average. Compared to their 2005-2014 annual average, the number of storms showed a significant increase in the five countries which were the most hit by such meteorological disasters in 2015. This increase in numbers was of at least 60% in the USA, China, India and Japan, but of only 20% in the Philippines. With 2 storms occurring in 2015, compared to only one between 2005 and 2014, Egypt, the state of Palestine and Somalia knew a particularly stormy year as Lebanon, Syria and Yemen which experienced, respectively, 3, 2 and 2 storms in 2015, after being saved from such disasters since 10 years.

### 3.3.2. Deaths

In 2015, meteorological disasters killed 8,678 people, representing 38.1 % of all deaths from natural disasters in the year. However, this global figure hides great differences. The number of deaths from extreme temperatures (7,418) was the second highest since 2005, but remained far above the almost 56,000 reported for one only heatwave in the Russian Federation at that time. Deaths from heatwaves in three countries France (3,275 deaths), India (2,248) and Pakistan (1,229) accounted for 91% of all extreme temperatures deaths. Moreover, these numbers of deaths were multiplied by a factor 2 in France, a factor 4 in India and a factor 9 in Pakistan compared to their previous highest level in the 2005-2014 period. Inversely, last year, the number of deaths from storms (1,260) was the lowest since 2005, and the 100 deaths from the 2015 deadliest storm which occurred in India were very far from the 140,985 people killed by the cyclone Nargis in Myanmar in 2008. Five countries, India, the USA, the Philippines, China and Bangladesh reported more than 100 deaths from storms in 2015, all countries, with the exception of India, showing a significant decrease of their number of deaths from storms in 2015 compared to their 2005-2014 annual average. The 33 deaths from hurricane Joaquin in the Bahamas and the 30 from hurricane Erika in Dominica were significantly above the 2005-2014 annual average of these two countries of, respectively, 0.3 and 0.2 deaths.

### 3.3.3. Victims

The 2015 number of victims of meteorological disasters (11.7 million) was 73.3% below its annual average for years 2005-2014. People victims of storms represent 89% of all victims from meteorological disasters in 2015, compared to an annual mean proportion of 80% during the ten previous years. Seventy-eight percent of all victims from storms lived in four countries. The typhoon Koppu (Lando) affected almost three million people in the Philippine, the cyclone Komen 2.6 million in Bangladesh, the typhoon Soudelor (Hanna) 1.6 million in China and the storm Huda 1 million in Lebanon. Such numbers of victims are far from the 30 million reported for typhoon Bilis in China in 2006 or from the most severe storms which hit the Philippines in 2013 (typhoon Haiyan (Yolanda): 16 million victims) and the Bangladesh in 2007 (cyclone Sidr: 9 million). With 965,000 victims, severe winter conditions were the most affecting extreme temperature disaster in 2015, which is far from the 77 million victims made by severe winter conditions in China in 2008. It should be noted that, in 2015, the only human impact data available on heatwaves are numbers of deaths, the numbers of affected populations are unknown.

### 3.3.4. Damages

Damages from meteorological disasters (US\$ 33.4 billion) were 52% below their 2005-2014 average and were for more than 99% attributable to storms (US\$ 33.3 billion). The 2015 amount

of their damages is the fourth lowest since the beginning of the period under review, very far from the US\$ 232 billion cost of 2005, year of hurricane Katrina (US\$ 156 billion), Rita (US\$ 20 billion) and Wilma (US\$ 17 billion). Damages from the two costliest storms of 2015, the typhoon Mujigae in China (US\$ 4.2 billion) and a winter storm in the USA (US\$ 3 billion) remained far from the costs of hurricane Katrina (US\$ 156.3 billion) in the USA or typhoon Haiyan in the Philippines in 2013 (US\$ 10.2 billion).

The cold wave which hit Peru between May and September was the only extreme temperature cost reported in 2015 and made US\$ 94 million damages. Its amount was the fourth lowest reported for extreme temperatures since 2005, far below the US\$23.9 billion from extreme winter conditions in China in 2008. It must be noted that, in this country, this cold wave was the first extreme temperature disaster for which costs were reported since 2005.

### **3.4. Climatological disasters**

#### **3.4.1. Occurrence**

In 2015, the number of climatological disasters (45) was the highest since 2005, taking a share of 11.9% in all natural disasters occurrence, above the share of 8.3% per year on average for 2005-2014. The number of droughts (34) was by far, the highest since 2005; being 50% above the annual average of previous decade (24). The number of wildfires (11) was the third highest, but far from the peak of 18 in 2007. Among the 19 countries which experienced at least 5 droughts between 2005 and 2014, 10 knew a new drought in 2015. In 2015, with 3 wildfires Australia found its peak of 2006 while, with the same number of wildfires, the USA experienced one of their bad years but remained below the 2013 peak of 5 wildfires.

#### **3.4.2. Deaths**

The total number of deaths from climatological disasters represents 3.5% of all disaster deaths in 2015, compared to an annual mean proportion of 2.8% for the period 2005-2014. However, deaths from droughts are very rarely reported and wildfires make few deaths, compared to earthquakes, storms or floods. In 2015, the deadliest drought occurred in Paraguay and is said to have killed 24 people, to compare with the 20,000 deaths reported for a drought in Somalia in 2010-2011. In Russia, the wildfires killed 30 people while the deadliest one occurred in Australia in 2009 and made 180 deaths.

#### **3.4.3. Victims**

With 53.8 million victims droughts represent 99% of climatological disasters victims, in 2015 as during years 2005-2014. This number for 2015 is fifth highest since 2005 but remains near the decadal annual average of 56.5 million victims. However, droughts took, in 2015, a share of 48.8% of total disaster victims, to be compared to a 28.8% annual average for the period 2005-2014. In 2015, two droughts made 18 million victims in the DPR Korea and 10.2 million in Ethiopia, far from the 60 million victims in China in 2009-2010 and the 35 million from another drought, also in China, in 2010-2011, but ranking them at the fifth and sixth places for the number of victims from droughts since 2005. The 1.75 million victims from drought in Vietnam in 2015 was more than 40 times superior to its 2005-2014 annual average of 410,000. The number of victims from wildfires in 2015 (494,000) was the second highest since 2005 and is almost attributable to Indonesia (410,000). Among the 7 countries which endured wildfires in 2015, the number of victims was significantly higher than its 2005-2014 annual average in

Indonesia, DR Congo, Canada and Russia, while inversely, it was significantly lower in the USA, Australia and Chile.

#### 3.4.4. Damages

Among climatological disasters, damages from droughts are poorly reported, due to a lack of standardized methods for quantifying and reporting losses. They were available for 26% of droughts in 2015 and for 24% for years 2005-2014. The reporting of damages from wildfires, is, by contrast, clearly better, with damages reported for 64% of these disasters in 2015 and 49% during the decade 2005-2014. In 2015, the reported damages from climatological disasters (US\$ 8.9 billion) were near their 2005-2014 annual average (US\$ 8.8 billion) but, although damages from droughts and from wildfires were in 2015, both, the fourth highest since 2005, this figure hides an amount of damages for droughts (US\$ 5.8 billion) below its 2005-2014 annual average (US\$ 6.4 billion) while, damages from wildfires (US\$ 3.1 billion) overpassed the decadal annual average (US\$ 2.4 billion). The costliest droughts of 2015 occurred in three countries and represented 91% of all reported damages. In China (US\$ 2.5 billion) the amount of damages was below the US\$ 3.5 billion reported in 2006 but near the US\$ 2.6 billion of a drought in 2010-2011 and from the 2.5 billion reported in 2014. In the USA (US\$ 1.8 billion), drought costs were very below the US\$ 21 and 8 billion reported in 2012 and 2011, respectively. The drought reported in South Africa, which continued in 2016 and cost more than US\$ 1 billion in 2015 was the first reported for this country since 2005. Compared to their 2005-2014 annual average (US\$ 2.4 billion), costs of wildfires (US\$ 3.1 billion) saw a growth of 28% in 2015. Those in California in the USA cost US\$ 1.6 billion, to be compared with the US\$ 2.9 and 2.3 billion, reported for the same state in 2007 and 2008, respectively. In Indonesia wildfires cost US\$ 1 billion in 2015, while a total of US\$ 360 million was reported for Australia. Such amounts remain far below the more than US\$ 2 billion, reported in 2005, for Spain, Portugal and Greece, each.

### 3.5. Geophysical disasters

#### 3.5.1. Occurrence

In 2015, 21 geophysical disasters (earthquakes/tsunamis, volcanic activities and mass movements of geological origin) were registered, representing a share of 7.7% of total disaster occurrence, near to their decade's annual average of 8.2%. The number of disasters from earthquakes (21) was the second lowest since 2005, 17 % below its 2005-2014 annual average, while, inversely, the number of disasters from volcanic activities (7) was 17% above its annual average. Disasters from mass movements of geophysical origin are rare events and only one occurred in 2015, which is in line with their 2005-2014 average occurrence. With 5 earthquake disasters, China was the country the most hit in 2015, as it was in the period 2005-2014, and this number was similar to the decadal annual average (5.1). Three disasters from earthquakes occurred in India, as much as the whole 2005-2014 period, and 2 in Nepal, for only one in this country between 2005 and 2014. Afghanistan and Pakistan experienced 2 earthquakes, each; such numbers being around three times their annual average. Among countries with high earthquakes frequencies, Indonesia experienced only one disaster, for an annual average of 3, while Iran wasn't hit in 2015 against an annual average of 2.3. Two disasters from volcanic activities occurred in, both, Ecuador and Chile, countries which, respectively, experienced 3 and 2 such disasters from 2005 to 2014. No such disasters occurred in 2015 in Indonesia, Colombia and the Philippines, three countries with, respectively, 13, 7 and 7 disasters from volcanic activities reported between 2005 to 2014.

### 3.5.2. Deaths

Compared to their annual average for years 2005-2014 (42,381), deaths from geophysical disasters (9,526) were significantly less frequent in 2015, and were, as previous years, practically all attributable to earthquakes. The deadliest earthquake occurred in Nepal, killing 8,831 people. Such a number made it the fourth lethal since 2005, far below the 222,570 deaths in Haiti in 2010, the 87,476 in China in 2008, the 73,338 in Pakistan in 2005 and the 19,846 deaths from the tsunami in Japan in 2011.

### 3.5.3. Victims

Geophysical disasters made 8.1 million victims, a share of 7.38% of all disaster victims and a number below their 8.6 million annual 2005-2014 average of victims. Victims of earthquakes (7.2 million) were the second highest since 2005, but far below the 47.7 million of 2008, the year of the Sichuan earthquake in China. With 5.6 million victims, the Gorkha earthquake, in Nepal in 2015, was the second most affecting earthquake since 2005, behind the Sichuan one. The number of victims in Pakistan (500,000) remained near its annual average (548,000). Those from earthquakes in Afghanistan, Kyrgyzstan and Tajikistan were above their annual average, while those from China, Indonesia and India were significantly below their annual average. The tsunami in Chile in September made 682,000 victims, to compare to the 389,000 from the Japanese tsunami in 2011. Cotopaxi and Tungurahua volcanic activity, in Ecuador, made 800,000 and 130,000 victims, placing these disasters at the first and fifth rank of the number of victims from volcanic activity since 2005; the Tungurahua, already, in 2006 (300,000 victims), the Karthala in the Comoros in 2005 (245,000 victims) and the Merapi in Indonesia in 2010 (137,000 victims) holding the second, third and fourth ranks.

### 3.5.4. Damages

Reported damages amounted to US\$ 6.7 billion, a decrease of 86% from the decennial annual average of US\$ 47.4 billion. These disasters took a share of 9.5% of the total natural disasters damages of 2015, compared to a share of 29.7% on average from 2005 to 2014. The Gorkha earthquake, in Nepal, cost US\$ 5.2 billion (86% of all earthquake damages in 2015). It was the tenth damaging earthquake since 2005, but remained far below the US\$ 96.4 billion damages from the Sichuan earthquake in China in 2008 or the 33.6 billion costs of the one in Chile in 2010. The tsunami in Chile made US\$ 800 million damages, and appears the second costliest since 2005, very below the staggering US\$ 228 billion costs from the 2011 Tohoku tsunami in Japan but above the US\$ 455 million of the tsunami which hit the Sizuola and Tokyo provinces in Japan in 2009. The Calbuco volcano ash fall made US\$ 600 million damages in Chile in 2015, which place it at the first place, largely before the US\$ 181 million costs from the Tungurahua in 2006. Since 2005, year after year, the numbers of meteorological, climatological and geophysical disasters tend to remain relatively stable, while the number of hydrological disasters show a tendency to decrease in the first years of the decade and stabilize in the last years, to be confirmed in the future. Inversely, the contribution of each of the disasters types to numbers of people killed, numbers of victims and amounts of damages vary considerably from one year to another, reflecting the high variability and diversity of disaster's impacts over time.



## Regional analysis

- Africa
- Americas
- Asia
- Europe
- Oceania



## 4. Regional analysis

### 4.1. General overview

#### 4.1.1. Numbers of disasters

In 2015, 376 natural disasters occurred worldwide, compared to 380 for the 2005-2014 average. In three continents, the absolute number of disasters was near its average, except in Europe, where it was divided by a factor 2, and in Oceania, where it almost doubled. Across continents, Asia was most often hit (44.4%), followed by the Americas (25.5%), Africa (16.5%), Europe (7.2%) and Oceania (6.4%).

When considering disaster's types absolute numbers, all were near their 2005-2014 average, except for climatological disasters which appeared to be somewhat more frequent in 2015 than in the previous 10 years.

#### 4.1.2. Numbers of victims

Compared to their annual average numbers of victims for years 2005 to 2015, the absolute numbers of victims decreased significantly in the Americas, Asia and Europe, while increasing in Africa and in Oceania. In this last continent, the number of victims was, in 2015, almost 12 times superior to its 2005-2014 average.

The decrease in the number of victims in the Americas is directly linked with a significant reduction of hydrological and meteorological disasters victims, while geophysical disasters made significantly more victims. In Asia and in Europe, compared to their 2005-2014 average, the numbers of victims decreased significantly for all disasters types. In Oceania, the growth in the number of victims is almost totally linked to climatological disasters while the number of meteorological disasters victims showed also a significant difference with its 2005-2014 annual average.

Asia accounted in 2014 for 62.7% of worldwide reported disaster victims (against 80.6% for the 2005-2014 decade's average), while Africa accounted for 28.0% (against 13.1% on average for the 2005-2014 period) and the Americas for 7% (against 6% on average for 2005-2014). Oceania accounted for 2.2% of all natural disasters victims (against 0.1% for 2005-2014) and Europe for 0.2% (against 0.4% according to the 2005-2014 average).

#### 4.1.3. Amounts of reported damages

Compared to their 2005-2014 average, the amount of damages decreased significantly in all continents - except in Africa where damages were, in 2015, multiplied by a factor 3 compared to their average for the previous 10 years – and for all disasters types, except climatological ones whose reported damages remained stable.

In Africa, meteorological but especially climatological disasters explain, both, the increasing disasters costs. In the other continents, the overall decrease in costs hides, in Asia, an increase in the amounts of damages from climatological disasters, while, in Oceania, the growth in global costs is mainly due to their significant increase in climatological and meteorological disasters.

With 49.1% of worldwide natural disaster reported costs, Asia suffered the most damages in 2015, followed by the Americas (36.7%) and Europe (6.7%). A share of 5.1% of global disaster damages was reported for Oceania and of 2.4% for Africa. In spite of some differences in the proportions, the ranking of the continents according to their contribution to the total reported damages is similar from the one observed over the last decade, where Asia had the most damages, followed by the Americas and Europe. However, when compared to their respective 2005-2014 averages, the amount of damages in Africa and in the Oceania differed significantly, the increase of costs being much larger in Africa.

**Table 4– Natural disaster occurrence and impacts: regional figures**

<b>No. of Natural Disasters</b>	<b>Africa</b>	<b>Americas</b>	<b>Asia</b>	<b>Europe</b>	<b>Oceania</b>	<b>Global</b>
<b>Climatological 2015</b>	15	15	6	1	8	45
<i>Avg. 2005-2014</i>	12.7	9.7	7.3	8.0	1.5	39.2
<b>Geophysical 2015</b>	1	8	20	0	0	29
<i>Avg. 2005-2014</i>	1.9	6.6	19.6	1.7	2.1	31.9
<b>Hydrological 2015</b>	33	40	79	19	4	175
<i>Avg. 2005-2014</i>	44.8	37.9	82.8	21.8	5.0	192.3
<b>Meteorological 2015</b>	13	33	62	7	12	127
<i>Avg. 2005-2014</i>	8.5	34.9	45.0	23.8	4.6	116.8
<b>Total 2015</b>	62	96	167	27	24	376
<i>Avg. 2005-2014</i>	67.9	89.1	154.7	55.3	13.2	380.2
<b>No. Victims (millions)*</b>	<b>Africa</b>	<b>Americas</b>	<b>Asia</b>	<b>Europe</b>	<b>Oceania</b>	<b>Global</b>
<b>Climatological 2015</b>	27.96	3.95	20.34	0.01	2.07	54.32
<i>Avg. 2005-2014</i>	22.44	4.11	30.19	0.13	0.00	56.87
<b>Geophysical 2015</b>	0.00	1.64	6.50			8.14
<i>Avg. 2005-2014</i>	0.04	1.01	7.45	0.02	0.07	8.58
<b>Hydrological 2015</b>	2.76	1.76	31.46	0.20	0.02	36.20
<i>Avg. 2005-2014</i>	3.05	4.59	79.15	0.39	0.09	87.28
<b>Meteorological 2015</b>	0.19	0.32	10.84	0.03	0.29	11.67
<i>Avg. 2005-2014</i>	0.26	1.75	41.35	0.16	0.04	43.56
<b>Total 2015</b>	30.92	7.67	69.14	0.23	2.38	110.34
<i>Avg. 2005-2014</i>	25.79	11.46	158.15	0.70	0.20	196.30
<b>Damages (2015 US\$ Bn.)*</b>	<b>Africa</b>	<b>Americas</b>	<b>Asia</b>	<b>Europe</b>	<b>Oceania</b>	<b>Global</b>
<b>Climatological 2015</b>	1.05	3.45	3.85	0.14	0.42	8.91
<i>Avg. 2005-2014</i>	0.06	5.18	1.53	1.83	0.30	8.90
<b>Geophysical 2015</b>	0.00	1.41	5.28			6.69
<i>Avg. 2005-2014</i>	0.00	4.70	37.87	2.13	2.70	47.41
<b>Hydrological 2015</b>	0.47	4.95	12.67	2.52	0.68	21.29
<i>Avg. 2005-2014</i>	0.40	5.37	21.65	5.82	1.31	34.55
<b>Meteorological 2015</b>	0.15	15.99	12.68	2.09	2.47	33.37
<i>Avg. 2005-2014</i>	0.09	48.80	14.32	4.56	1.13	68.90
<b>Total 2015</b>	1.67	25.81	34.49	4.74	3.56	70.27
<i>Avg. 2005-2014</i>	0.55	64.05	75.37	14.33	5.45	159.75

Some totals in the table may not correspond to the cells addition due to rounding.

\* Values < 0.005 are displayed as zeros.

## 4.2 Africa

### 4.2.1. Numbers of disasters

Africa suffered from 62 natural disasters in 2015, a number above its 68 2005-2014 annual average, but climatological and meteorological disasters appeared more frequent in 2015, compared to their 2005-2014 annual average. Inversely, geophysical disasters were significantly less frequent in 2015. With 6 disasters, Somalia was the country the most hit.

### 4.2.2. Numbers of victims

The number of victims (30.9 million) was above the annual average number of disaster victims during 2005-2014 (25.8 million) and, like previous years, is almost completely attributable to climatological disasters with a total of almost 28 million victims. Seven droughts, on a total of fifteen, made more than one million victims each, accounting for a total of 93.3% of their total number, with a drought in Ethiopia (10.2 million) accounting, alone, for 36.5% of this total.

Hydrological disasters (2.8 million victims) are the second contributors to the total numbers of victims and two floods in Somalia (900,000 victims) and Malawi (639,000 victims) accounted for 55.7 % of hydrological disasters victims. With 174,000 victims, the cyclone Chedza, in Madagascar, was the meteorological disaster with the most severe human impact in Africa in 2015. With almost 10.5 million victims Ethiopia accounted for one third of the total of victims.

### 4.2.3. Amounts of reported damages

The estimation of natural disaster damages in Africa remains extremely challenging as data are often poorly reported or lacking altogether and, in 2015, damages were reported for only 11 natural disasters (18%). The costliest was a drought in South Africa which US\$ 1 billion reported damages; a flood in Malawi cost almost US\$ 400 million and a storm in Egypt US\$ 100 million.

## 4.3 Americas

### 4.3.1. Numbers of disasters

The Americas suffered in 2015 from 96 natural disasters, a number near the 2005-2014 annual average of 89 disasters. Hydrological disasters (41.7%) were the most frequent followed by meteorological (34.4%) and climatological (15.6%) disasters, while geophysical disasters remaining less frequent (8.3%).

Compared to their annual average distribution during years 2005-2014, disasters' types distribution shows a different profile in 2015, with the number of climatological and geophysical disasters being multiplied by a factor 1.6 and 1.2, respectively. Inversely, the number of hydrological and meteorological disasters remained near their 2005-2014 annual average. United States accounted for 29.2% of all natural disasters in the Americas in 2015.

### 4.3.2. Numbers of victims

In 2015, the total number of victims from natural disasters (7.7 million) was 33% below its 2005-

2014 annual average. The decrease in the number of victims was essentially due to meteorological (320,000 victims; -82% compared to the 10 previous year annual average) and hydrological (1.8 million; -62%) disasters. The number of victims from geophysical disasters (1.64 million) was 63% above its 2005-2014 annual average, while the number of victims of climatological disasters (almost 4 million) was very near its previous years average (4.1 million).

Two droughts affected a significant numbers of people in Guatemala (1.3 million) and Haiti (1 million) and four other, affecting more than 100.000 people for a total of 1.6 million, occurred in Honduras, El Salvador, Nicaragua and Cuba. Six floods made more than 100,000 victims in Brazil, Guyana, Chile, Bolivia, Peru and Paraguay for a total of 1.5 million, or 84.4% of all hydrological disasters victims. A cold wave, in Peru, made 201,000 victims and 5 storms a total of almost 89,000. Guyana (1.4 million victims) and Haiti (1.1 million) were the countries with the most victims.

#### 4.2.3. Amounts of reported damages

In 2015, disaster damages in the Americas (US\$ 25.8 billion) were 60 percent below their annual average for the 2005-2014 period (US\$ 64 billion). It must be noted that USA accounted for 81.6% of all costs reported for the Americas. Mainly, important decreases in costs were observable for damages from climatological disasters (US\$ 3.5 billion, -33%) but chiefly from geophysical (US\$ 1.4 billion, -70%) and meteorological (US\$ 16 billion, -67%) disasters. Damages reported for hydrological disasters (almost US\$ 5 billion) were very near their 2005-2014 annual average (US\$ 5.4 billion).

The costliest disaster in the Americas was a winter storm in the USA (US\$ 3 billion), while tropical cyclone Joaquin cost US\$ 1.7 billion. Three other storms, all occurring in the USA, cost more than one US\$ billion for a total of 3.5 billion. Flash floods in Mid and South-West of the USA in May cost US\$ 2.7 billion and in 3 provinces in the North of Chile 1.5 billion. The damages from the flood in the Mississippi watershed in December were estimated to US\$ 600 million. The drought in California (USA) made damages of US\$ 1.8 billion and wild fires in the same state, in September, 1.4 billion.

## 4.4 Asia

### 4.4.1. Numbers of disasters

The number of disasters in Asia in 2015 (167) was near its 2005-2014 annual average (155). The number of climatological (6) and hydrological (79) disasters were near their previous 10 years average, while the number of geophysical disasters (20) was equivalent of it (19.6). Inversely, the number of meteorological disasters (62) shows an increase of almost 30%, compared to its 2005-2014 annual average (48). China (36), India (21), Philippines (15), Indonesian and Pakistan (10, each), were the countries the most hit in 2015, accounting together for 55 % of all disasters

### 4.4.2. Numbers of victims

The number of victims in Asia in 2015 (69 million) was far below the 2005-2014 annual average (158 million) and a decrease was observed for all disaster types: meteorological: 10.8 million, -74% compared to the 41.5 million of the previous 10 years annual average; hydrological: 31.5

million, -60%; climatological: 20.3 million; -33% and geological: 6.5 million; -13 %.

The disasters with the largest human impacts in Asia in 2015, were floods which, in India and Myanmar in July and August, made respectively 13.7 and 9 million victims. Four other floods in India, Pakistan, Bangladesh and Sri Lanka made more than one million victims, each, for a total of 5.9 million. All these floods accounted for 91% of all victims from floods.

A drought, in D.P.R. Korea, had the second largest human impact and made 18 million victims. Another drought made 1.8 million victims in Vietnam. The earthquake in Nepal in April made 5.6 million victims and accounted for 86.8% of all geophysical disasters Asian victims in 2015. The cyclones Koppu (Lando) in the Philippines (almost 2.9 million victims), Komen in Bangladesh (2.6 million), Soudelor (Hanna) in China (1.6 million) and the winter storm Huda in Lebanon (1 million) accounted for 74% of all meteorological victims in Asia. Four countries, D.P.R. Korea (18 million victims), India (16 million), Myanmar (9 million) and Nepal (5.6 million) accounted for 70.3% of natural disaster victims in Asia in 2015.

#### 4.4.3. Amounts of reported damages

Only 12 (37.5%) countries of the 32 which suffered natural disasters in Asia in 2015 have a rate of reporting damages superior to 50%.

Disaster damages in Asia in 2015 (US\$ 34.5 billion) were 54% below their annual average for years 2005 to 2014 (2015 US\$ 75.4 billion). Compared to their previous 10 years annual average (2015 US\$ 39.8 and 21.7 billion, respectively), a decrease of 86% of reported damages appears for geophysical disasters (US\$ 5.3 billion) and of 41% for hydrological disasters (US\$ 12.7 billion) while the decrease is only of 11% for meteorological disasters (US\$ 12.7 billion). Only costs of climatological disasters increased significantly from a 2005-2014 annual average of 2015US\$ of 1.5 billion to US\$ 3.9 billion in 2015.

Damages reported for China (US\$ 18.7 billion) accounted for 54% of all reported costs in Asia while the share of the earthquake in Nepal was of 6.9%. The earthquake in Nepal (US\$ 5.2 billion) was the costliest disaster in Asia in 2015 and the only earthquake with damages reported. The typhoon Mujigae, in China (US\$ 4.2 billion) was the second costliest. Two other meteorological disasters cost more than US\$ 1 billion: Chan-Home in the Philippines (US\$ 1.5 billion) and Soudelor-Hanna in China (US\$ 1.3 billion). These three typhoon accounted for 55.1% of all reported costs from meteorological disasters. A drought in China cost US\$ 2.5 billion and a wild fire in Indonesia US\$ 1 billion, these two disasters accounting for 89.7% of all climatological costs.

## 4.5 Europe

### 4.5.1. Numbers of disasters

The number of reported disasters in Europe (27) was half of its annual average disaster occurrence from 2005 to 2014 (55). The decrease varies according to the types of disasters. No geophysical disasters were reported in 2015 while, in average, almost 2 occurred annually during the years 2004-2015. The number of climatological disasters (1) was 69% below its 2005-2014 annual average (3); the decrease was of 76% for meteorological disasters (7 disasters in 2015

versus, in average, 29 in the period 2005-2014) but only of 13% for hydrological disasters (19 in 2015 versus 22 in average for years 2005-2014).

With four disasters, Italy suffered the most in 2015, followed by Albania and the Republic of Macedonia with 3 disasters each. Two natural disasters were reported for France, the Russian Federation, Spain and the United Kingdom.

#### 4.5.2. Numbers of victims

In 2015, the number of victims (0.23 million) also decreased significantly of 67% below its 2005-2014 annual average (0.70 million) and concerned all types of natural disasters. With no occurrence, geophysical disasters made no victims compared to an annual average of 24,000. With 6,000 victims in 2015 for an annual average of 129,000 in years 2005-2014, climatological disasters showed the highest decrease (-95%). The decrease was of 82% for meteorological disasters (28,000 victims in 2015 versus an annual average of 158,000) and of 48% for hydrological disasters (200,000 victims in 2015 versus a 387,000 annual average in years 2005-2014).

Three floods disasters in the republic of Macedonia, the United Kingdom and Albania made, respectively, 100,000; 48,000 and 42,000 victims, accounting for 81% of the total number of European victims. Storm Desmond (Ted) made more than 15,600 victims in the United Kingdom. Four floods, one extreme winter condition, one wild fire and one heat wave made also more than 1,000 victims for a total of 27,321.

#### 4.5.3. Amounts of reported damages

Damages from natural disasters in Europe were reported for only 9 disasters of a total of 27. The total amount of these damages (US\$ 4.7 billion) were, in 2015, 67% below their average annual for the 10 previous years (US\$ 14.3 billion) and the third lowest since 2005, far below the peaks of more than US\$ 20 billion reported for years 2013, 2012, 2010 and 2007.

Climatological disasters damages (US\$ 138 million) were 92% below their 2005-2014 annual average (US\$ 1.7 billion), while the decrease of costs from hydrological disasters was of 57% (US\$ 2.5 billion versus an annual average of US\$ 5.8 billion for years 2005-2014), and the one from meteorological disasters of 55% (US\$ 2.1 billion in 2015 versus an annual average of US\$ 4.7 billion for the 10 previous years). With no occurrence, damages from geophysical disasters were inexistent compared to an annual average of US\$ 2.1 billion.

The two costliest natural disasters occurred in the United Kingdom. In December the flood consecutive to storms Eva and Franck made damages of US\$ 1.2 billion and a same amount was attributable to the damages from the storm Desmond (Ted). A flash flood in France cost US\$ 924 million and a storm in Italy US\$ 869 million. Two flash floods in Italy and a wild fire in the Russian Federation cost, each, more than US\$ 100 million.

## 4.6 Oceania

### 4.6.1. Numbers of disasters

In 2015, the number of disasters in Oceania (24) was almost 2 times superior to its 2005-2014 annual average (13). The total number of climatological disasters (5 droughts and 3 wildfire) was multiplied by a factor 5.7 compared to its annual average for years 2005-2014 (1.4), and the

number of meteorological disasters (12) by a factor 2.6 (2005-2014 annual average: 4.7). Inversely, four floods were reported against an annual average of 5. None geophysical disaster occurred in this region in 2015.

#### 4.6.2. Numbers of victims

The number of victims from climatological disasters (2.1 million) exploded compared to its annual average for 2005-2014 (20,000) but is related to the drought in Papua New Guinea which made 2 million victims. Numbers of victims from droughts in Samoa, Solomon Islands and Tonga are unknown. In Australia, one forest fire made 348 victims and two land fires 137 and 134.

The number of victims of meteorological disasters (291,000) was multiplied by a factor 7.1 compared to its annual 2005-2014 average (41,000) but it is strongly related to the cyclone Pam which made 188,000 victims in Vanuatu, 44,000 in the Solomon Islands, 9,200 in Papua New Guinea, 4,600 at Tuvalu and 1,500 at Kiribati. The typhoon Maysak made 35,000 victims in Micronesia.

The number of victims of hydrological disasters (21,000) decreased of 76% compared to its 2005-2014 annual average (89,000) and is related to the 20,000 victims of a flood in Papua New Guinea, while two floods in New Zealand made 400 and 100 victims. The total number of victims from one flood in Australia was not reported.

#### 4.6.3. Amounts of reported damages

In 2015, in Oceania, damages were reported for 13 natural disasters on 24. Their total reported cost (US\$ 3.6 billion) was 35% below its 2005-2014 annual average (US\$ 5.5 billion).

The costliest disaster was a storm which made damages of US\$ 1.3 billion in Australia while cyclone Marcia made damages for US\$ 546 million in the same country. Cyclone Pam for almost US\$ 450 million in Vanuatu only; the amounts of damages it made in the Solomon Islands, Papua New Guinea, Tuvalu and Kiribati were not reported. Cyclones Lam and Olwyn made damages of, respectively, US\$ 78 and 57 million in Australia and typhoon Maysak of US\$ 11 million in Micronesia. The damages from the cyclone Raquel in the Solomon Islands and of the typhoon Soudelor (Hanna) in the Northern Mariana Islands were unreported.

A flash flood in the Queensland and New South Wales provinces in Australia made damages of US\$ 400 million, while two floods in New Zealand cost, respectively, US\$ 171 and 100 million. The cost of the flood which made 20,000 victims in Papua New Guinea remains unreported. Among climatological disasters, the three wild fires in Australia made damages for a total of US\$ 351 million. Damages from droughts were only reported for Papua New Guinea (US\$ 60 million).

### 4.7. Distribution of natural disasters between continents

A comparison between continents of the occurrence and impacts of natural disasters in 2015 is shown in Figure 8. In 2015, climatological disasters were as frequent in the Americas as in Africa (33.3%) and it was followed by Oceania (17.8%), Asia (13.3%) and Europe (2.2 %). Their human impact was the most important in Africa (51.5% of victims), followed by Asia (37.4%). Compared to these two continents, the percent share of reported victims was extremely low in the Americas

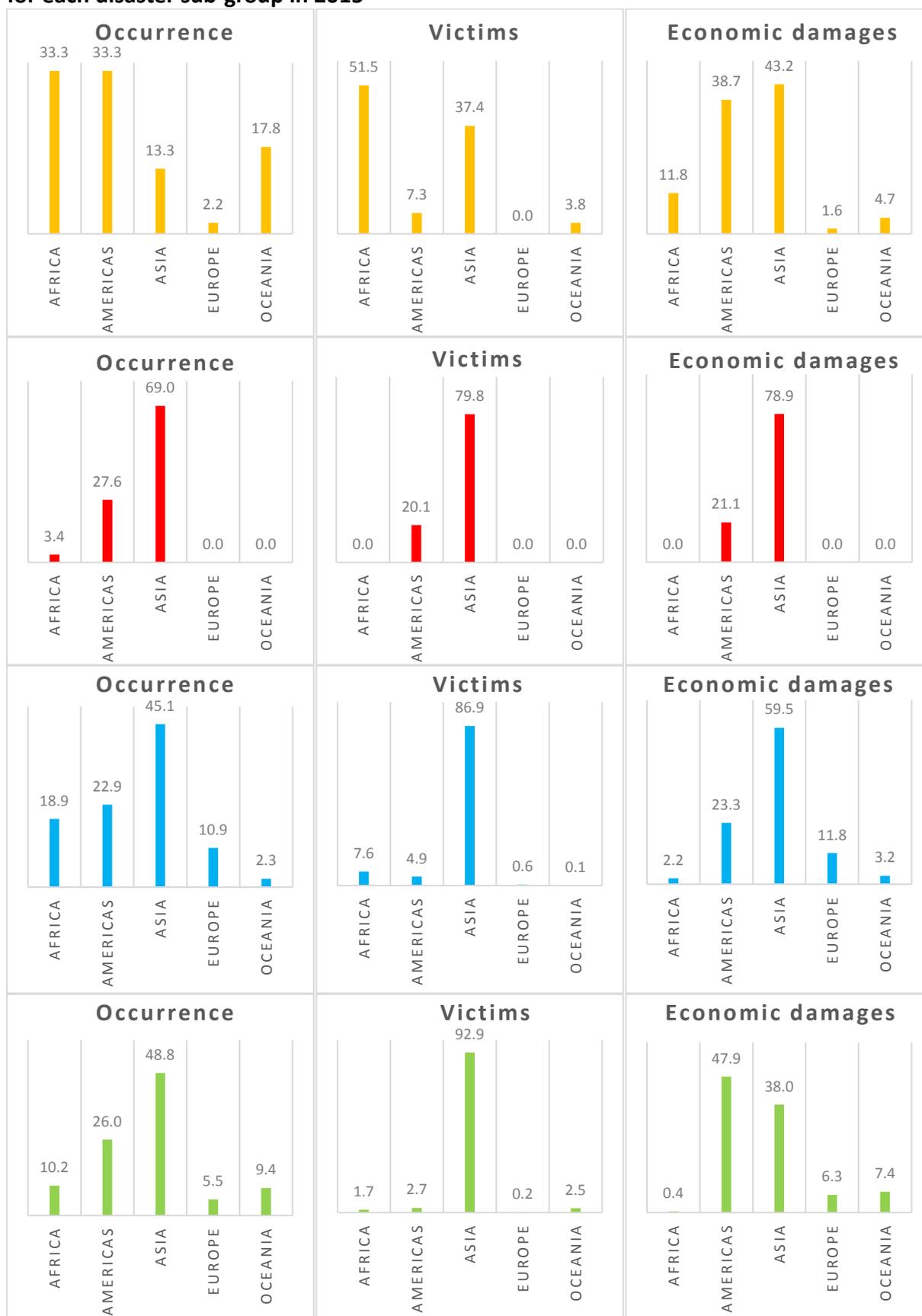
(7.3%), Oceania (3.8%) and Europe (0.01%). Damages from climatological disasters were essentially reported in Asia (43.2%) and in the Americas (38.7%). Comparatively, the share of reported costs in Africa (11.8%), Oceania (4.7%) and Europe (1.6%), appear very low.

More than two third of geophysical disasters (69%) occurred in Asia and 27.6% in the Americas, while Africa accounted for 3.5%. Europe and Oceania were unaffected. The number of victims was essentially concentrated on two continents: Asia (79.8%) and the Americas (20.1%). The residual number of victims lived in Africa (0.03%). Almost four fifths of reported damages occurred in Asia (78.9%), the remaining costs occurring in the Americas (21.1%). No damages have been reported in Africa.

The occurrence of hydrological disasters was more distributed between continents: Asia supports the greatest share (45.1%), followed by the Americas (23.9%), Africa (18.9%), Europe (10.9%) and Oceania (2.3%). The number of victims was highly concentrated, with Asia accounting for 86.9 % of all victims, while the share of the four other continents was very low: 7.6% for Africa, 4.9% for the Americas, 0.6% for Europe 0.1% for Oceania. Reported damages were more concentrated on three continents: Asia accounted for 59.5% of costs, the Americas for 23.3% and Europe 11.8%, while the share of damages reported for Oceania (3.2%) and Africa (2.2%) was low.

The occurrence of meteorological disasters was predominately distributed between two continents: Asia (48.8%) and the Americas (26.0%), while the shares of Africa (10.2%), Oceania (9.5%) and Europe (5.5%) appear significantly below. Almost all victims lived in Asia (92.9%), the shares of the four other continents was practically residual: 2.7% for the Americas, 2.5% for Oceania, 1.7% for Africa and 0.2% for Europe. Damages were mainly concentrated in Asia (47.9%) and the Americas (38.0%) while the shares of Oceania (7.4%), Europe (6.5%) and Africa (0.5%) were low or extremely low.

**Figure 8 - Percent share of reported occurrence, victims and economic damages by continent for each disaster sub-group in 2015**



\*Percentages ≤ 0.05 are displayed as zero. Legend: Orange: Climatological – Red: Geophysical – Blue: Hydrological – Green: Meteorological events.



## ANNEX 1: Definitions<sup>16</sup>

<i>Term</i>	<i>Definition</i>
<b>Airburst</b>	An explosion of a comet or meteoroid within the Earth's atmosphere without striking the ground.
<b>Animal Incident</b>	Human encounters with dangerous or exotic animals in both urban and rural environments.
<b>Ash Fall</b>	Fine (less than 4 mm in diameter) unconsolidated volcanic debris blown into the atmosphere during an eruption; can remain airborne for long periods of time and travel considerable distance from the source.
<b>Avalanche</b>	A large mass of loosened earth material, snow, or ice that slides, flows or falls rapidly down a mountainside under the force of gravity. Snow Avalanche: Rapid downslope movement of a mix of snow and ice. Debris Avalanche: The sudden and very rapid downslope movement of unsorted mass of rock and soil. There are two general types of debris avalanches - a cold debris avalanche usually results from an unstable slope suddenly collapsing whereas a hot debris avalanche results from volcanic activity leading to slope instability and collapse.
<b>Bacterial Disease</b>	An unusual increase in the number of incidents caused by the exposure to bacteria either through skin contact, ingestion or inhalation. Examples include salmonellae, MSRA (Staphylococcus aureus), and vibrio cholerae, among others
<b>Biological hazard</b>	A hazard caused by the exposure to living organisms and their toxic substances (e.g. venom, mold) or vector-borne diseases that they may carry. Examples are venomous wildlife and insects, poisonous plants, and mosquitoes carrying disease-causing agents such as parasites, bacteria, or viruses (e.g. malaria).
<b>Climatological hazard</b>	A hazard caused by long-lived, meso- to macro-scale atmospheric processes ranging from intra-seasonal to multi-decadal climate variability
<b>Coastal Erosion</b>	The temporary or permanent loss of sediments or landmass in coastal margins due to the action of waves, winds, tides, or anthropogenic activities.
<b>Coastal Flood</b>	Higher-than-normal water levels along the coast caused by tidal changes or storms that result in flooding which can last from days to weeks.
<b>Cold Wave</b>	A period of abnormally cold weather. Typically a cold wave lasts two or more days and maybe aggravated by high winds. The exact temperature criteria for what constitutes a cold wave vary by location.
<b>Convective Storm</b>	A type of meteorological hazard generated by the heating of air and the availability of moist and unstable air masses. Convective storms range from localized thunderstorms (with heavy rain and/or hail, lightning, high winds, tornadoes) to meso-scale, multi-day events.
<b>Debris Flow, Mud Flow, Rock Fall</b>	Types of landslides that occur when heavy rain or rapid snow/ice melt and send large amounts of vegetation, mud, or rock downslope by gravitational forces.
<b>Derecho</b>	Widespread and usually fast-moving windstorms associated with convection/convective storm. Derechos include downburst and straight-line winds. The damage from derechos is often confused with the damage from tornadoes.
<b>Disease</b>	Either an unusual, often sudden, increase in the number of incidents of an infectious disease that already existed in the region (e.g., flu, E. coli) or the appearance of an infectious disease previously absent from the region (e.g., plague, polio).
<b>Drought</b>	An extended period of unusually low precipitation that produces a shortage of water for people, animals, and plants. Drought is different from most other hazards in that it develops slowly, sometimes even over years, and its onset is generally difficult to detect.

<sup>16</sup> These definitions have been established by IRDR Disaster Loss Data (DATA group): "IRDR (2014) Peril classification and hazard glossary (IRDR DATA Publication n°1). Beijing: IRDR.

	Drought is not solely a physical phenomenon because its impacts can be exacerbated by human activities and water supply demands. Drought is therefore often defined both conceptually and operationally. Operational definitions of drought, meaning the degree of precipitation reduction that constitutes a drought, vary by locality, climate and environmental sector.
<b>Earthquake</b>	Sudden movement of a block of the Earth's crust along a geological fault and associated ground shaking.
<b>Energetic Particles</b>	Emissions from solar radiation storms consisting of pieces of matter (e.g., protons and other charged particles) moving at very high speed. The magnetosphere and atmosphere block (solar) energetic particles (SEP) from reaching humans on Earth but they are a danger to life in outer space and pose a radiation hazard to aircraft travelling at high altitudes.
<b>Epidemic</b>	Either an unusual, often sudden, increase in the number of incidents of an infectious disease that already existed in the region (e.g., flu, E. coli) or the appearance of an infectious disease previously absent from the region (e.g., plague, polio).
<b>Expansive Soil</b>	Earthen material, particularly clays that upon wetting, freezing, or drying will alternately expand or contract causing damage to foundations of buildings and other structures. Shrinkage is generally referred to as subsidence or desiccation.
<b>Extraterrestrial hazard</b>	A hazard caused by asteroids, meteoroids, and comets as they pass near-earth, enter the Earth's atmosphere, and/or strike the Earth, and by changes in interplanetary conditions that effect the Earth's magnetosphere, ionosphere, and thermosphere.
<b>Extratropical Storm</b>	A type of low-pressure cyclonic system in the middle and high latitudes (also called- mid-latitude cyclone) that primarily gets its energy from the horizontal temperature contrasts (fronts) that exist in the atmosphere. When associated with cold fronts, extratropical cyclones may be particularly damaging (e.g., European winter/windstorm).
<b>Extreme Temperature</b>	A general term for temperature variations above (extreme heat) or below (extreme cold) normal conditions.
<b>Extreme winter conditions</b>	Damage caused by snow and ice. Winter damage refers to damage to buildings, infrastructure, traffic (especially navigation) inflicted by snow and ice in the form of snow pressure, freezing rain, frozen waterways, etc.
<b>Fire following Earthquake</b>	Urban fires triggered by earthquakes. Particularly susceptible areas include densely spaced , wooden buildings that dominate local architecture, and where the earthquake has damaged or ruptured water and gas pipelines. Small local fires have the potential to merge into conflagrations destroying many city blocks.
<b>Flash Flood</b>	Heavy or excessive rainfall in a short period of time that produce immediate runoff, creating flooding conditions within minutes or a few hours during or after the rainfall.
<b>Flood</b>	A general term for the overflow of water from a stream channel onto normally dry land in the floodplain (riverine flooding), higher-than-normal levels along the coast and in lakes or reservoirs (coastal flooding) as well as ponding of water at or near the point where the rain fell (flash floods).
<b>Fog</b>	Water droplets that are suspended in the air near the Earth's surface. Fog is simply a cloud that is in contact with the ground.
<b>Forest Fire</b>	A type of wildfire in a wooded area.
<b>Frost, Freeze</b>	Frost is the consequence of radiative cooling resulting in the formation of thin ice crystals on the ground or other surfaces in the form of needles, feathers, scales, or fans. Frost occurs when the temperature of surfaces is below freezing and water vapor from humid air forms solid deposits on the cold surface. Freeze occurs when the air temperature is at (32°F/0°C) or below over a widespread area for a climatologically significant period of time. Use of the term is usually restricted to advective situations or to occasions when wind or other conditions prevent frost. Frost and freeze are particularly damaging during the crop growing season.

<b>Fungal disease</b>	Exposure to fungi either through skin contact, ingestion or inhalation of spores resulting in an unusual increase in the number of incidents. Examples are fungal pneumonia, fungal meningitis, etc.
<b>Geomagnetic Storm</b>	A type of extraterrestrial hazard caused by solar wind shockwaves that temporarily disturb the Earth's magnetosphere. Geomagnetic storms can disrupt power grids, spacecraft operations, and satellite communications.
<b>Geophysical hazard</b>	A hazard originating from solid earth. This term is used interchangeably with the term geological hazard.
<b>Glacial Outburst Lake</b>	A flood that occurs when water dammed by a glacier or moraine is suddenly released. Glacial lakes can be at the front of the glacial (marginal lake) or below the ice sheet (subglacial lake).
<b>Ground Movement</b>	Surface displacement of earthen materials due to ground shaking triggered by earthquakes or volcanic eruptions
<b>Hail</b>	Solid precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter.
<b>Heat Wave</b>	A period of abnormally hot and/or unusually humid weather. Typically a heat wave lasts two or more days. The exact temperature criteria for what constitutes a heat wave vary by location.
<b>Ice Jam Flood</b>	The accumulation of floating ice restricting or blocking a river's flow and drainage. Ice jams tend to develop near river bends and obstructions (e.g., bridges).
<b>Impact</b>	A type of extraterrestrial hazard caused by the collision of the Earth with a meteorite.
<b>Insect Infestation</b>	The pervasive influx, swarming and/or hatching of insects affecting humans, animals, crops, and perishable goods. Examples are locusts and African Bees.
<b>Lahar</b>	Hot or cold mixture of earthen material flowing on the slope of a volcano either during or between volcanic eruptions.
<b>Landslide following Earthquake</b>	Independent of the presence of water, mass movement may also be triggered by earthquakes.
<b>Lava Flow</b>	The ejected magma that moves as a liquid mass downslope from a volcano during an eruption.
<b>Lightning</b>	A high-voltage, visible electrical discharge produced by a thunderstorm and followed by the sound of thunder.
<b>Liquefaction</b>	The transformation of (partially) water-saturated soil from a solid state to a liquid state caused by an earthquake. Liquefaction reduces the strength and stiffness of soil causing buildings to topple over.
<b>Mass Movement</b>	Any type of downslope movement of earth materials.
<b>Meteorological hazard</b>	A hazard caused by short-lived, micro- to meso-scale extreme weather and atmospheric conditions that last from minutes to days.
<b>Parasitic Disease</b>	Exposure to a parasite – an organism living on or in a host – causes an unusual increase in the number of incidents. Exposure to parasites occurs mostly through contaminated water, food or contact with insects, animals (zoonotic), pets, etc. Examples are malaria, chagas disease, giardiasis and trichinellosis.
<b>Prion Disease</b>	A type of biological hazard caused by prion proteins. Prion diseases or transmissible spongiform encephalopathies (TSEs) are a family of rare progressive neurodegenerative disorders that affect both humans and animals characterized by long incubation periods and neural loss. Examples are Bovine Spongiform Encephalopathy (BSE), Creutzfeldt-Jakob-Disease (CJD), Kuru, etc.

<b>Pyroclastic Flow</b>	Extremely hot gases, ash, and other materials of more than 1,000 degrees Celsius that rapidly flow down the flank of a volcano (more than 700 km/h) during an eruption.
<b>Radio Disturbance</b>	Triggered by x-ray emissions from the Sun hitting the Earth's atmosphere and causing disturbances in the ionosphere such as jamming of high and/or low frequency radio signals. This affects satellite radio communication and Global Position Systems (GPS).
<b>Rain</b>	Water vapor condenses in the atmosphere to form water droplets that fall to the Earth.
<b>Riverine Flood</b>	A type of flooding resulting from the overflow of water from a stream or river channel onto normally dry land in the floodplain adjacent to the channel.
<b>Rogue Wave</b>	An unusual single crest of an ocean wave far out at sea that is much higher and/or steeper than other waves in the prevailing swell system.
<b>Sandstorm, Dust Storm</b>	Strong winds carry particles of sand aloft, but generally confined to less than 50 feet (15 m), especially common in arid and semi-arid environments. A dust storm is also characterized by strong winds but carries smaller particles of dust rather than sand over an extensive area.
<b>Seiche</b>	A standing wave of water in a large semi- or fully-enclosed body of water (lakes or bays) created by strong winds and/or a large barometric pressure gradient.
<b>Shockwave</b>	A type of extraterrestrial hazard caused by the explosion (airburst) or impact of meteorites that generate energy shockwaves capable of shattering glass, collapsing walls, etc. A shockwave carries energy from a disturbance through a medium (solid, liquid, gas) similar to a wave though it travels at much higher speed.
<b>Sinkhole</b>	Collapse of the land surface due to the dissolving of the subsurface rocks such as limestone or carbonate rock by water.
<b>Snow, Ice</b>	Precipitation in the form of ice crystals/snowflakes or ice pellets (sleet) formed directly from freezing water vapor in the air. Ice accumulates when rain hits the cold surface and freezes.
<b>Space Weather</b>	A general term for extraterrestrial weather conditions driven by solar eruptions such as geomagnetic storms, radio disturbances, and solar energetic particles.
<b>Storm Surge</b>	An abnormal rise in sea level generated by a tropical cyclone or other intense storms.
<b>Subsidence</b>	Subsidence refers to the sinking of the ground due to groundwater removal, mining, dissolution of limestone (e.g., karst, sinkholes), extraction of natural gas, and earthquakes.
<b>Tornado</b>	A violently rotating column of air that reaches the ground or open water (waterspout).
<b>Tropical Cyclone</b>	A tropical cyclone originates over tropical or subtropical waters. It is characterized by a warm-core, non-frontal synoptic-scale cyclone with a low pressure center, spiral rain bands and strong winds. Depending on their location, tropical cyclones are referred to as hurricanes (Atlantic, Northeast Pacific), typhoons (Northwest Pacific), or cyclones (South Pacific and Indian Ocean).
<b>Tsunami</b>	A series of waves (with long wavelengths when traveling across the deep ocean) that are generated by a displacement of massive amounts of water through underwater earthquakes, volcanic eruptions or landslides. Tsunami waves travel at very high speed across the ocean but as they begin to reach shallow water they slow down and the wave grows steeper.
<b>Viral disease</b>	A type of biological hazard where an unusual increase in the number of incidents is caused by the exposure to a virus either through skin contact, ingestion or inhalation. Examples are dengue fever, Hepatitis A, HIV/AIDS, avian influenza, and Ebola.
<b>Volcanic Activity</b>	A type of volcanic event near an opening/vent in the Earth's surface including volcanic eruptions of lava, ash, hot vapor, gas, and pyroclastic material.
<b>Wave Action</b>	Wind-generated surface waves that can occur on the surface of any open body of water such as oceans, rivers, and lakes, etc. The size of the wave depends on the strength of the

	wind and the traveled distance (fetch).
<b>Wildfire</b>	Any uncontrolled and non-prescribed combustion or burning of plants in a natural setting such as a forest, grassland, brush land, or tundra which consumes the natural fuels and spreads based on environmental conditions (e.g., wind, topography). Wildfires can be triggered by lightning or human actions.
<b>Wind</b>	Differences in air pressure resulting in the horizontal motion of air. The greater the difference in pressure, the stronger the wind. Wind moves from high pressure toward low pressure.
<b>Winter Storm, Blizzard</b>	A low pressure system in winter months with significant accumulations of snow, freezing rain, sleet, or ice.. A blizzard is a severe snow storm with winds exceeding 35 mph (56 km/h) for three or more hours producing reduced visibility (less than .25 mile (400 m).

## ANNEX 2: List of countries per continent

AFRICA		
Algeria	Gambia (the)	Rwanda
Angola	Ghana	Saint Helena, Ascension and Tristan da Cunha
Benin	Guinea	Sao Tome and Principe
Botswana	Guinea-Bissau	Senegal
Burkina Faso	Kenya	Seychelles
Burundi	Lesotho	Sierra Leone
Cameroon	Liberia	Somalia
Cabo Verde	Libya	South Africa
Central African Republic	Madagascar	South Sudan
Chad	Malawi	Sudan (the)
Comoros (the)	Mali	Swaziland
Congo (the)	Mauritania	Tanzania, United Republic of
Congo (the Democratic Republic of)	Mauritius	Togo
Cote d'Ivoire	Mayotte	Tunisia
Djibouti	Morocco	Uganda
Egypt	Mozambique	Western Sahara
Equatorial Guinea	Namibia	Zambia
Eritrea	Niger (the)	Zimbabwe
Ethiopia	Nigeria	
Gabon	Reunion	

AMERICAS		
Anguilla	Ecuador	Peru
Antigua and Barbuda	El Salvador	Puerto Rico
Argentina	Falkland Islands (Malvinas)	Saint Barthélemy
Aruba	French Guiana	Saint Kitts and Nevis
Bahamas (the)	Greenland	Saint Lucia
Barbados	Grenada	Saint Martin (French part)
Belize	Guadeloupe	Saint Pierre and Miquelon
Bermuda	Guatemala	Saint Vincent and the Grenadines
Bolivia (Plurinational State of)	Guyana	Suriname
Brazil	Haiti	Trinidad and Tobago
British Virgin Islands	Honduras	Turks and Caicos Islands (the)
Canada	Jamaica	Uruguay
Cayman Islands (the)	Martinique	Venezuela (Bolivarian Republic of)
Chile	Mexico	United States of America
Colombia	Montserrat	Virgin Islands (British)
Costa Rica	Netherlands Antilles	Virgin Islands (U.S)
Cuba	Nicaragua	
Dominica	Panama	
Dominican Republic (the)	Paraguay	

ASIA		
Afghanistan	Korea (the Democratic Republic of)	Sri Lanka
Armenia	Korea (the Republic of)	Syrian Arab Republic
Azerbaijan	Kuwait	Taiwan (Province of China)
Bahrain	Kyrgyzstan	Tajikistan
Bangladesh	Laos People's Democratic Republic (the)	Thailand
Bhutan	Lebanon	Timor-Leste
Brunei Darussalam	Macao	Turkey
Cambodia	Malaysia	Turkmenistan
China	Maldives	United Arab Emirates (the)
Cyprus	Mongolia	Uzbekistan
Georgia	Myanmar	Viet Nam
Hong Kong	Nepal	Yemen
India	Palestine, State of	
Indonesia	Oman	
Iran (Islamic Republic of)	Pakistan	
Iraq	Philippines (the)	
Israel	Qatar	
Japan	Saudi Arabia	
Jordan	Singapore	
Kazakhstan		

EUROPE		
Aland Islands	Gibraltar	Montenegro
Albania	Greece	Netherlands (the)
Andorra	Guernsey	Norway
Austria	Holy See	Poland
Azores Islands	Hungary	Portugal
Belarus	Iceland	Romania
Belgium	Ireland	Russian Federation (the)
Bosnia and Herzegovina	Italy	San Marino
Bulgaria	Jersey	Serbia
Canary Islands	Latvia	Slovakia
Channel Islands	Liechtenstein	Slovenia
Croatia	Lithuania	Spain
Czech Republic (the)	Luxembourg	Svalbard & Jan Mayen Islands
Denmark	Macedonia (the Former Yugoslav Republic)	Sweden
Estonia	Malta	Switzerland
Faroe Islands	Man, Isle of	Ukraine
Finland	Moldova (the Republic of)	United Kingdom of Great Britain and Northern Ireland (the)
France	Monaco	
Germany		

## OCEANIA

<p>American Samoa Australia Cook Islands (the) Fiji French Polynesia Guam Kiribati Marshall Islands (the) Micronesia (Federated States of)</p>	 <p>Nauru New Caledonia New Zealand Niue Norfolk Island Northern Mariana Islands (the) Palau Papua New Guinea Pitcairn</p>	<p>Samoa Solomon Islands Tokelau Tonga Tuvalu Vanuatu Wallis and Futuna</p>
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