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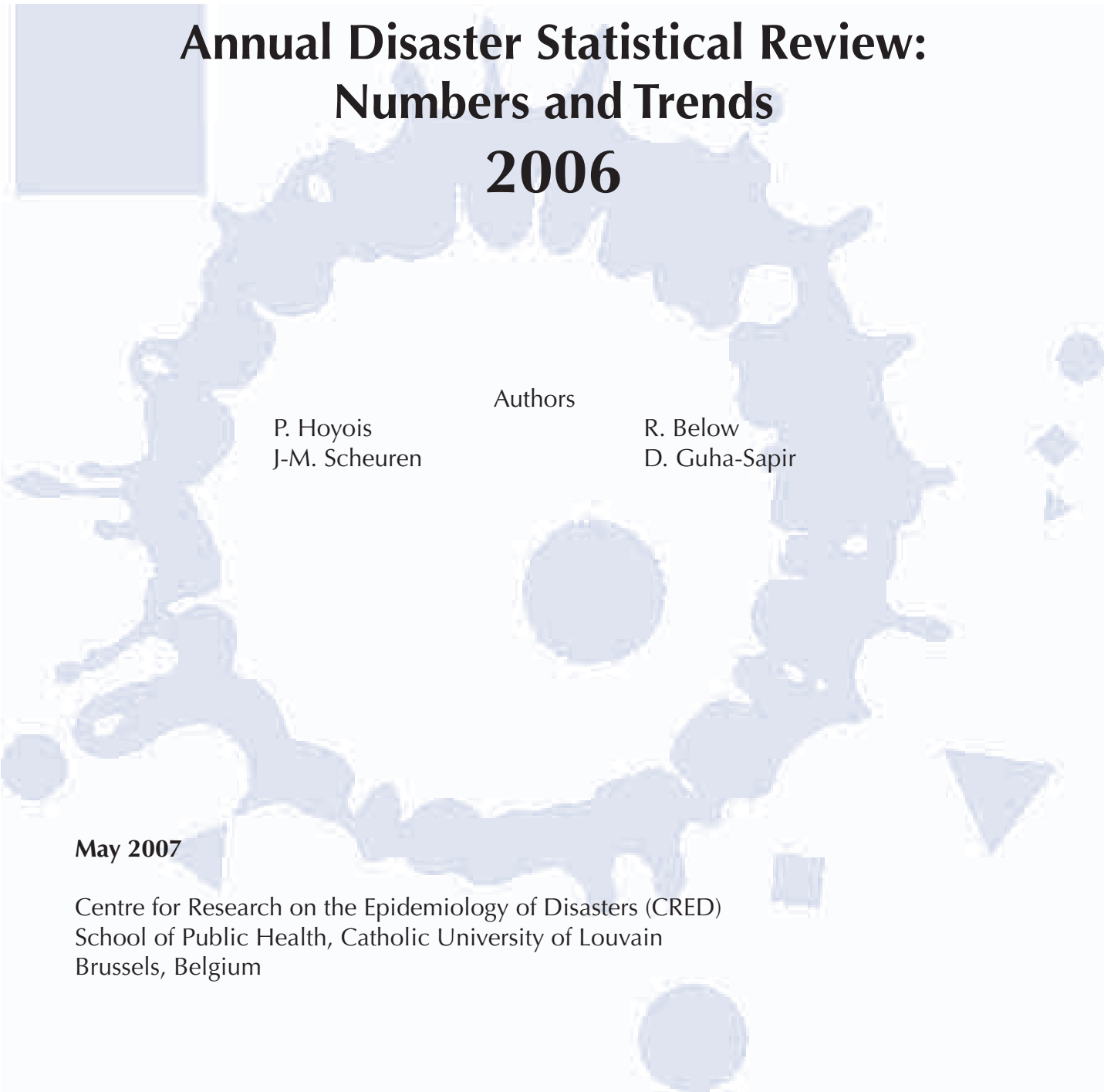
Annual Disaster Statistical Review: Numbers and Trends 2006

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Brussels, May 2007



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The Centre for Research on the Epidemiology of Disasters (CRED) is based at the Catholic University of Louvain (UCL), Brussels. CRED promotes research, training and information dissemination on international disasters, with a special focus on public health, epidemiology and social-economic factors. It aims to enhance the effectiveness of developing countries' responses to, and management of, disasters. It works closely with non-governmental and multilateral agencies and universities throughout the world.

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We encourage the free use of the contents of this report with appropriate and full citation.

About CRED and our partners

The Centre for Research on the Epidemiology of Disasters (CRED) has been active for more than 30 years in the fields of international disaster and conflict health studies, with research and training activities linking relief, rehabilitation and development. It was established in Brussels in 1973 at the School of Public Health of the Université catholique de 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 WHO's Global Programme for Emergency Preparedness and Response. Since then, CRED has increased its international network substantially and collaborates closely with numerous UN agencies, inter-government and governmental institutions, non-governmental organizations, research institutes and universities.

Objective

The Centre promotes research and provides an evidence base on the burden of disease and related health issues to the international community, to improve preparedness and responses to humanitarian emergencies.

CRED trains field managers, students, relief personnel and health professionals in the management of short and long-term humanitarian emergencies.

CRED's Focus

The CRED team works in four main areas:

- ▶ Natural Disasters and their Impacts
- ▶ Health & Conflict Epidemiology
- ▶ Database & Information Support
- ▶ Capacity Building & Training

CRED's research focuses on all humanitarian and emergency situations with major impacts on human health. These include all types of natural and man-made disasters, such as earthquakes, floods or windstorms; longer-term disasters such as famines and droughts; and situations creating mass displacement of people such as civil strife and conflicts.

The two main areas of focus of the Centre are on health aspects and the burden of disease arising from disasters and complex emergencies; however, CRED also promotes research in the broader aspects of humanitarian crises. This includes issues of 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 debates on the effectiveness of various humanitarian interventions. It encourages scientific and policy discussions on existing and potential interventions and their impacts on acute and chronic malnutrition, human survival, morbidity, infectious diseases and mental health.

Our Team

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

CREd's partners

International Agencies

United Nations Office for the Coordination of Humanitarian Affairs (OCHA)
International Strategy for Disaster Reduction (ISDR)
United Nations Children's Fund (UNICEF)
United Nations Development Program (UNDP)
United Nations High Commission for Refugees (UNHCR)
United Nations Food and Agriculture Organization (FAO)
United Nations Population Fund (UNFPA)
United Nations World Meteorological Organisation (WMO)
World Health Organization (WHO)

Government/Multilateral Agencies

Canadian International Development Agency (CIDA)
European Commission
European Centre for Disease Prevention and Control (ECDC)
National Oceanic and Atmospheric Administration (NOAA)
United Kingdom Department for International Development (DFID)
United States Agency for International Development (USAID)
United States Centers for Disease Control and Prevention (CDC)
United States Government Accountability Office (GAO)
United States Department of State
World Bank

Non-governmental Organizations

Action Contre la Faim (ACF)
American Red Cross (ARC)
Asian Disaster Reduction Center (ADRC)
Citizens' Disaster Response Center (CDRC)
Concern
Goal
InterAction
International Federation of Red Cross and Red Crescent Societies (IFRC)
International Medical Corps (IMC)
International Rescue Committee (IRC)
Mercy Corps
Médecins sans Frontières (MSF)
Save the Children Fund (SCF)
Sphere Project
Tearfund
World Vision

Private companies

Munich Reinsurance Company
Swiss Reinsurance Company

Research Institutions

Columbia University, United States
Fao Institute of Applied International Research, Norway
Harvard University, Harvard Humanitarian Initiative (HHI), United States
Johns Hopkins University, United States
London School of Hygiene & Tropical Medicine, United Kingdom
University of Heidelberg, EVAPLAN, Germany
University of Tulane, School of Public Health and Tropical Medicine, United States
Karolinska Institutet, Department of Public Health Sciences, Sweden
University of Indonesia, Jakarta, Indonesia
University of Delhi, New Delhi, India

Others

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Saint Luc University Hospital, Belgium



Introduction

Every year, the Centre for Research on the Epidemiology of Disasters (CRED) reports on the effects of disasters on human populations. This first *Annual Disaster Statistical Review* is an analysis of the disaster figures in 2006 compared to 2005 and 2000-04. CRED has been publishing statistics on disasters every year since 1998 thanks to the generous support of the United States Agency for International Development Office of Foreign Disaster Assistance (USAID/OFDA). This support has allowed us to maintain CRED's Emergency Events database, EM-DAT, which contains essential core data on the occurrences and effects of disasters in the world from 1900 until today. The main objective of EM-DAT is to inform humanitarian initiatives at national and international levels. It also rationalizes decision-making for disaster preparedness, as well as provides an objective base for vulnerability assessment and priority setting.

Since 1998, we have learned that a consolidated, rapidly produced statistical overview is much more than a number crunch: it is an invaluable tool for both planning and advocacy. The 2006 disaster figures remind us once more that *all* countries and *all* human populations are vulnerable to disasters.

In 2006, we observed a return to a kind of 'normality' after the major events of the last few years. Even though the disasters in 2006 have not captured as much attention as those of the recent past, it is important to remember that they *have had* devastating impacts. Every day, lives are irreparably damaged and destroyed by disasters. In 2006, there were 427 reported natural disasters that killed more than 23,000 people, affected almost 143 million others, and were the cause of more than US\$ 34.5 billion in economic damages.

The figures in 2006 show that Asia remains the continent most hit by disasters, with over 44% of all reported disasters occurring in the region. Over 119 million people have been killed or affected by these extreme events, which were responsible for more than US\$ 25 billion in economic damages. The two deadliest disasters in 2006 were the Indonesian earthquake that killed 5,778 people in May and Typhoon Durian in the Philippines which resulted in 1,399 deaths in December.

The 2006 numbers remind us that it is not just developing countries that are severely affected by disasters. Four European countries – France, the Netherlands, Belgium and the Ukraine – rank among the top 10 countries most affected by deadly disasters, taking 3rd, 5th, 6th and 9th place respectively. France registered 1,388 deaths, the Netherlands 1,000 and Belgium 940, all due to the heat wave in July 2006. In the Ukraine, 801 people were killed by a cold wave in January.

In terms of disaster occurrence, the figures show an increase in the number of floods, with 235 reported events accounting for 55% of all disasters registered in 2006. Floods and windstorms continued to be the two major causes of economic damage. When combined, these two extreme events caused more than US\$ 25.1 billion in economic losses.

In January 2007, winds from the Atlantic of up to 216 kilometres (133 miles) per hour swept across Europe from Britain into Russia, killing around 40 people. Hundreds of thousands of homes in several countries were affected as winds ripped up trees and power lines. This shows that even countries with the best early warning systems are still vulnerable.

There is increasingly conclusive evidence which confirms that global climate change will have an impact on the occurrence and magnitude of extreme events. These impacts are envisaged to increase human vulnerability to natural disasters, thus emphasizing the need for improved measures of preparedness in every part of the world.

By analysing the data over time, we can confirm and report disaster trends. Through better understanding of these trends and patterns of disasters impacts, we can better target the allotted resources. We will continue to publish these numbers annually with the hope that policymakers and politicians will continue to integrate disaster preparedness, mitigation and prevention measures into their planning to reduce the vulnerability of human populations to disasters.

We hope this *Annual Disaster Statistical Review* proves useful. If you have any comments, criticisms or suggestion, please contact us at CRED.

D. Guha-Sapir
Director



1. EM-DAT: The International Disaster Database

1.1. What is EM-DAT?

Since 1988, with the sponsorship of the United States Agency for International Development's Office of Foreign Disaster Assistance (OFDA), CRED has maintained EM-DAT, a worldwide database on disasters. It contains essential core data on the occurrence and effects of more than 15,000 disasters in the world from 1900 to the present. The database is 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 is not a reflection of the quality or value of the data ; rather, it reflects that most reporting sources do not cover all disasters or some sources may have political limitations that could affect the figures. The entries are constantly updated and reviewed for redundancies, inconsistencies and incomplete data. CRED consolidates and updates data on a daily basis and a further check is made at monthly intervals. Revisions are made annually at the end of the calendar year.

The database's main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting.

1.2. Data definitions

Definition

CRED defines a disaster as "a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering".

Criteria

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 people or more reported affected
- Declaration of a state of emergency
- Call for international assistance

Content

EM-DAT includes the following fields:

DISNO: A unique disaster number for each disaster event (8 digits: 4 digits for the year and 4 digits for the disaster number – for example, 19950324).

Country: Country(ies) in which the disaster occurred.

Disaster group : Two groups of disasters are distinguished in EM-DAT – natural disasters and technological disasters (as defined below).

Disaster type and subset: Description of the disaster according to a pre-defined classification (for example, type: Wind storm and subset: Cyclone).

Date (start and end): The date when the disaster occurred and ended (month/day/year).

Killed: Persons confirmed dead and persons missing and presumed dead.

Injured: People suffering from physical injuries, trauma or an illness requiring immediate medical treatment as a direct result of a disaster.

Homeless: People needing immediate assistance for shelter.

Affected: People requiring immediate assistance during a period of emergency; (can also include displaced or evacuated people).

Total affected: Sum of injured, homeless and affected.

Estimated damage: Several institutions have developed methodologies to quantify these losses. However, there is no standard procedure to determine a global figure for economic impact. Estimated damage is given in US dollars.

Additional fields: Other geographical information (location, latitude and longitude), the value and scale of the events (such as the Richter scale value for an earthquake), the international status (OFDA/EU response, request for international assistance, disaster/emergency declaration), the aid contribution (in US dollars), as well the sectors affected.

1.3. Methodology

The number of people killed includes persons confirmed as dead and persons missing and presumed dead. People affected are those requiring immediate assistance during a period of emergency (i.e., requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance). People reported injured or homeless are aggregated with those reported affected, to produce a total number of people 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 damage value at the moment of the event and usually only to the direct damage, expressed in US\$ (current prices).

EM-DAT distinguishes two generic categories for disasters: natural and technological. These are then divided into 15 main categories, each covering more than 50 sub-categories. For the production of the tables, natural disasters are split into two groups:

→ **Hydrometeorological disasters:** avalanches/landslides, droughts/famines, extreme temperatures, floods, forest/scrub fires, windstorms and other disasters, such as insect infestations and wave surges.

→ **Geophysical disasters:** earthquakes, tsunamis and volcanic eruptions.

Technological disasters comprise three groups:

→ **Industrial accidents:** chemical spills, collapses of industrial infrastructure, explosions, fires, gas leaks, poisoning and radiation.

→ **Transport accidents:** by air, rail, road or water means of transport.

→ **Miscellaneous accidents:** collapses of domestic/non-industrial structures, explosions and fires.

In EM-DAT and in this report, data are considered at country level for two reasons: first, it is at this level that they are commonly reported; and second, because it makes the aggregation and disaggregation of data possible. For droughts or food insecurities, which are often multi-years disasters, long-term impact must also be taken into account. Therefore, CRED has adopted the following rules:

- ▶ Total number of deaths (infrequently) reported for a drought, is divided by its number of years of persistence. The resulting number is registered for each year of persistence.
- ▶ The same computation is done for the (rare) economic damages reported.
- ▶ For the total number of people reported to be affected, we considered that such a number was repeated each year.

Some disasters begin at the end of a year and may persist weeks or months during the following year. In this case, we adopted the same rule for the number of people reported to be affected. For deaths, we distinguished between sudden onset (earthquakes, flash floods, landslides, etc.) and slow onset (wildfires, some floods, extreme temperatures, etc.) disasters. In the case of sudden onset, the deaths are registered according to the “start year” of the disaster. In the case of slow onset, the number of deaths is divided by two and each half is attributed to each year of persistence. The same rule is used for people reported injured. Reported economic damages are always attributed to the “end year” of the disaster because only after the disaster has concluded can the full amount of damages be reasonably estimated.

By using these rules, some data bias correction is attempted. However, these rules do not produce perfect data. CRED continuously strives to improve its data reporting methodologies and the EM-DAT database as a whole.

2. Time trends of natural disasters: 1987-2006

Over time, natural disasters are not stationary and may exhibit various kinds of trends, cycles, or seasonal patterns. The evolutions of these patterns can be summarized and made evident by using trend lines showing the long-term movements in natural disasters time series data. These trend lines model the relationship between time and natural disaster. Usually, such models search for the best representation of the data. In this analysis we were less interested in the complete accuracy of the data than in an overall rough assessment of the tendency of numbers to increase or decrease during the period under examination. The more subtle shapes of the rises or drops in the numbers were not taken into account. The linear trend lines that we present in the following figures demonstrates simply the general orientation of the numbers.

2.1. Global overview

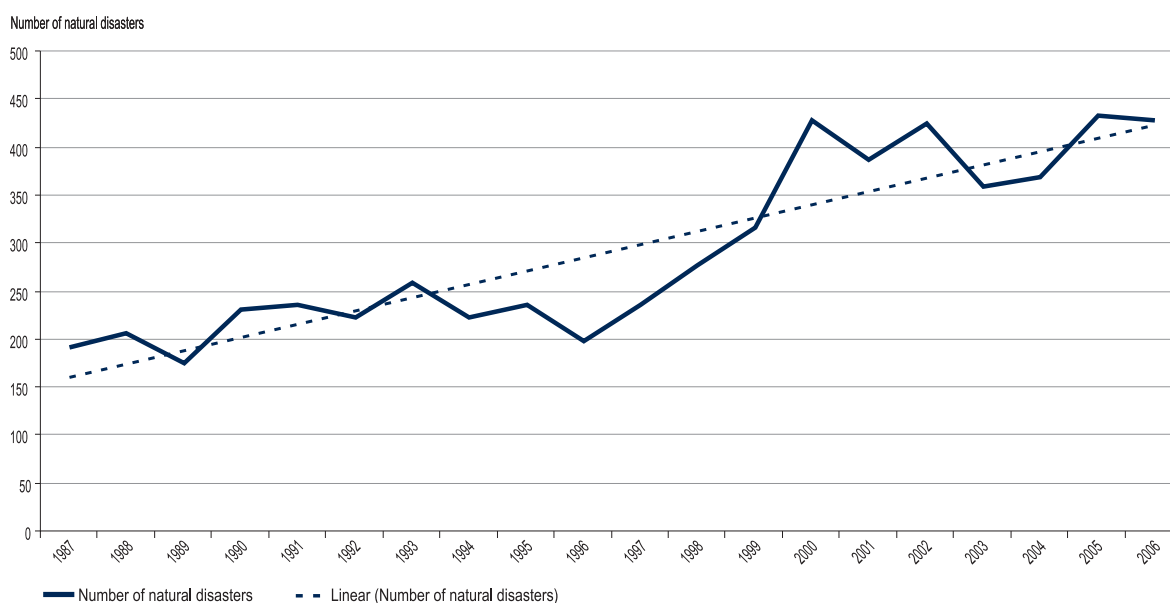


Figure 1 – Natural disaster occurrence (1987-2006)

- ▶ Two periods can be distinguished: 1987-1997, with the number of disasters varying generally between 200 and 250 ; and 2000-2006, with the number of disasters increasing by nearly a multiple factor of two. An increase of this magnitude can be partially explained by increased reporting of disasters, particularly by press organizations and specialized agencies.



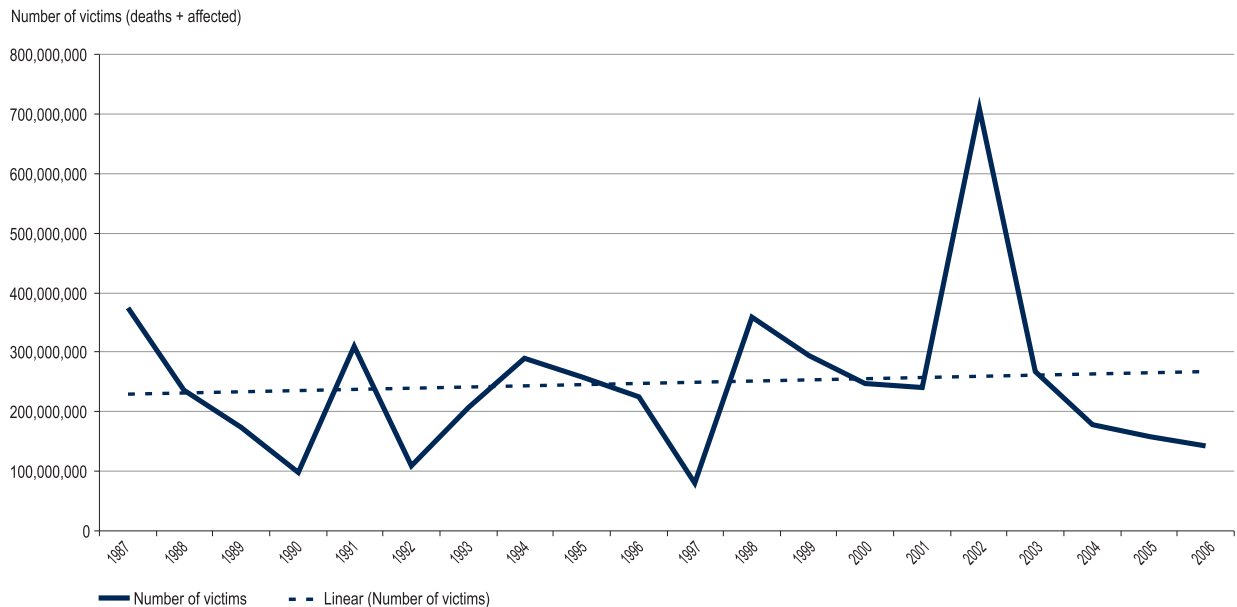


Figure 2 – Numbers of victims of natural disasters (1987-2006)

- ▶ In this analysis, we present numbers of victims (persons killed plus persons affected) rather than separate numbers of people killed and people affected. We chose this option because both developing and developed countries vary significantly in these numbers. For example, the numbers of deaths from earthquakes are usually highest in developing countries and lowest in the developed countries. The inverse is true for the numbers of affected. The number of victims gives a more realistic figure when we wish to understand the global human impact of natural disasters.
- ▶ During the period examined, the number of victims ranged between 100,000,000 and 300,000,000 persons in almost all years.
- ▶ Highest figures can be attributed to hydrometeorological disasters:
 - In 1987, one drought affected 300 million people in India.
 - In 1991, one flood affected 210 million people in China.
 - In 1994, one flood affected 78 million people and one drought 80 million people in China,
 - In 1998, one flood affected 200 million people in China.
 - In 2002, one drought affected 300 million people in India, another affected 60 million people in China; a wind storm affected 100 million people in China; and a flood affected 60 million people in China.
- ▶ The high variability in the number of victims is corrected by the linear time-trend, which shows a slow increase over time.

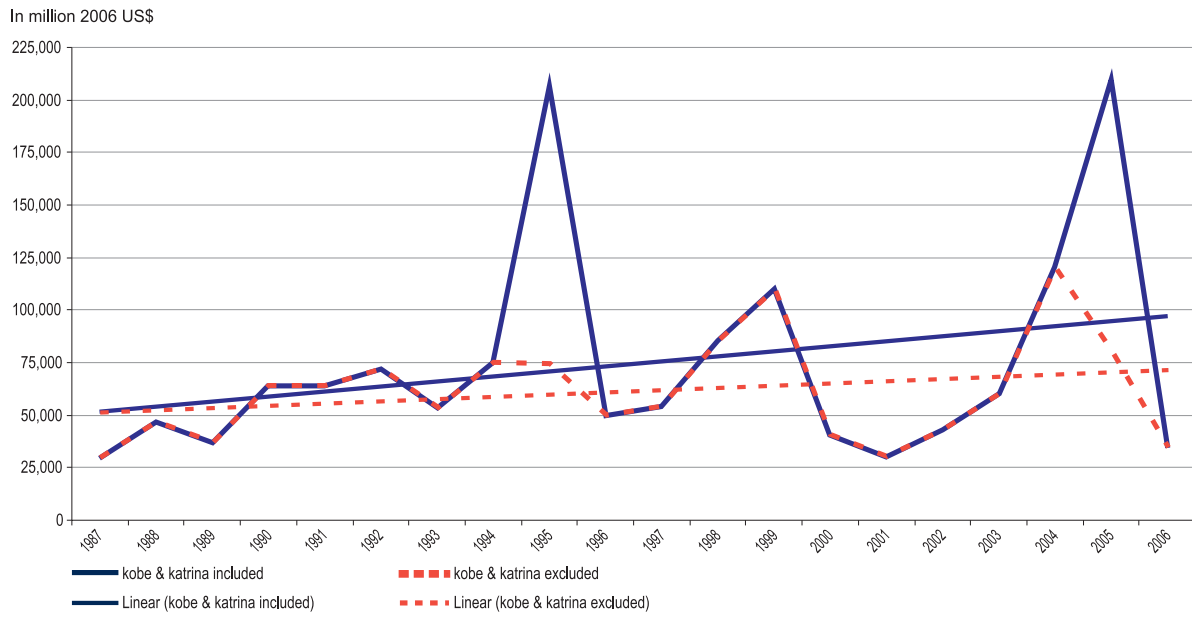


Figure 3 – Economic damages due to natural disasters (1987-2006)

- ▶ Two disasters have had a major impact on the trend of economic damages : the earthquake of Kobe in 1995 and Hurricane Katrina in 2005.
- ▶ The two linear time-trends show an increase over time.

2.2. Global overview by disaster group

The categories used by CRED to distinguish natural disasters have been aggregated in two main categories.

Hydrometeorological disasters include :

- ▶ Floods, landslides, mudflows, avalanches, tidal waves.
- ▶ Windstorms, including typhoons, cyclones and hurricanes, storms, winter storms, tropical storms and tornadoes.
- ▶ Droughts, extreme temperatures, wildfires and complex disasters associated with droughts.

Geological disasters include earthquakes, volcanic eruptions and tsunamis.

2.2.1. Hydrometeorological disasters

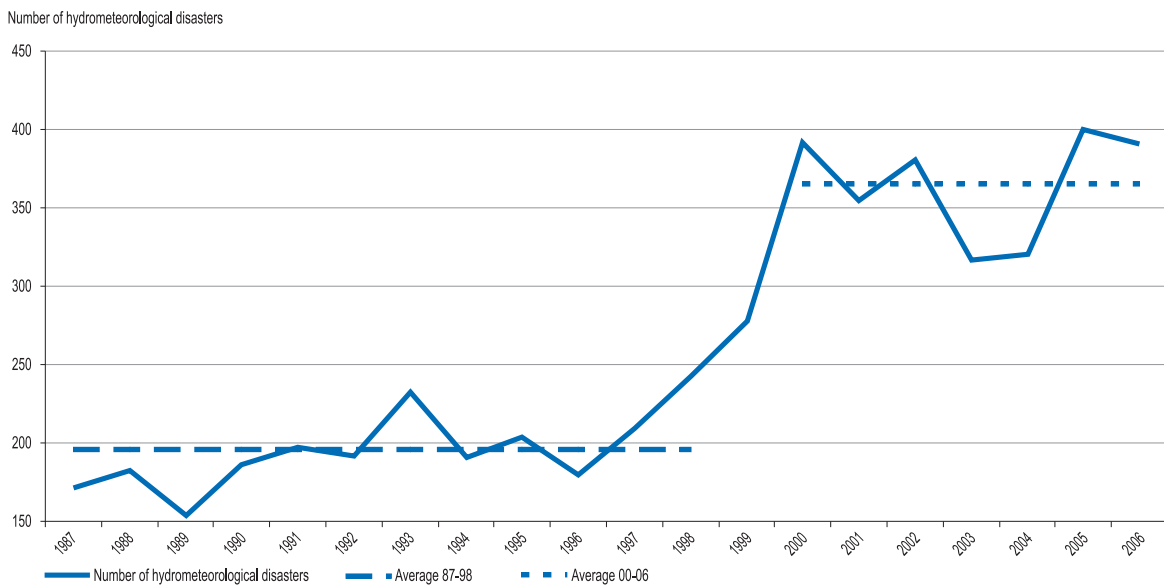


Figure 4 – Occurrence of hydrometeorological disasters: 1987-2006 with averages for periods 1987-1998 and 2000-2006

- ▶ During the period 1987-2006, hydrometeorological disasters show a significant increase.
- ▶ The years 1998, 1999 and 2000 reflect a turning point and an escalation in the number of disasters reported, with 1999 showing the most dramatic inflection. Accordingly, for purposes of comparing the two periods, data for 1999 has been excluded.
- ▶ For 1987-1998, the average number of hydrometeorological disasters reported was 195; for the years 2000-2006, this number increased by 187% to an average of 365.

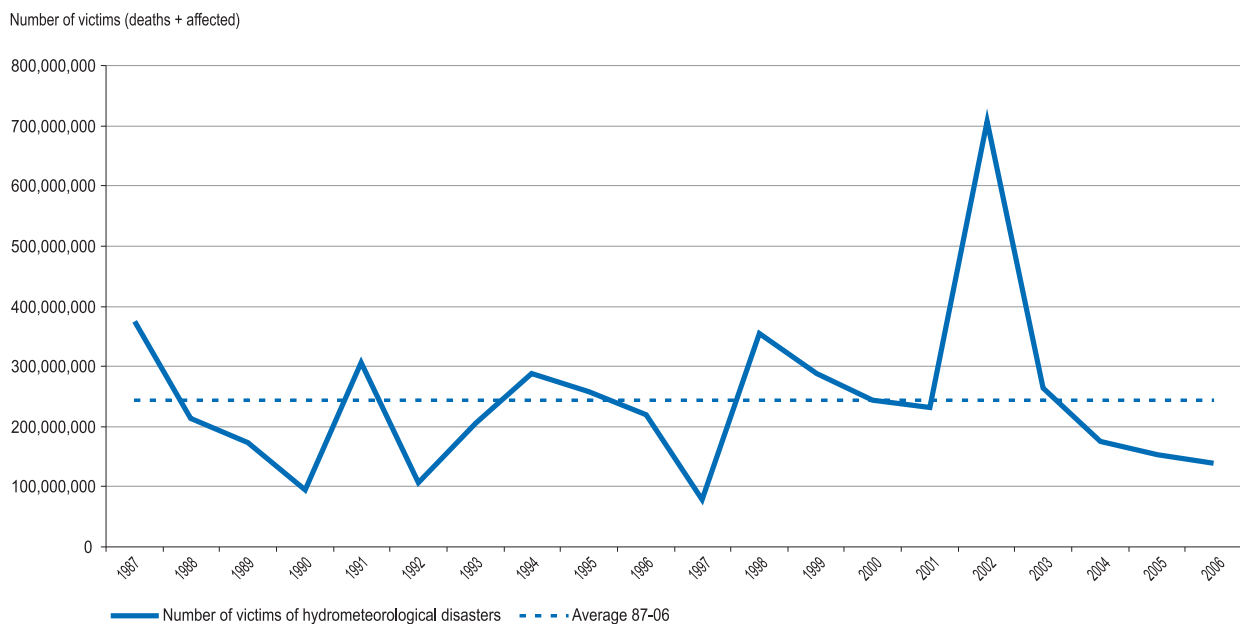


Figure 5 – Victims of hydrometeorological disasters

- ▶ In most of the cases, especially with annual aggregated data, the shapes of the figures are determined by the total number of affected persons. The much smaller number of persons killed only marginally influenced the shapes of the figures.
- ▶ The years with the highest numbers are generally explained by very large disasters vast numbers of people.
- ▶ In 1987, one drought affected 300 million people in India.
- ▶ In 1991, one flood affected 210 million people in China.
- ▶ In 1994, one flood affected 78 million people and one drought affected 80 million people, in China
- ▶ In 1998, one flood affected 200 million people in China.
- ▶ In 2002, one drought affected 300 million people in India, and one drought affected 60 million people in China; a wind storm affected 100 million people in China; and a flood affected 60 million people in China

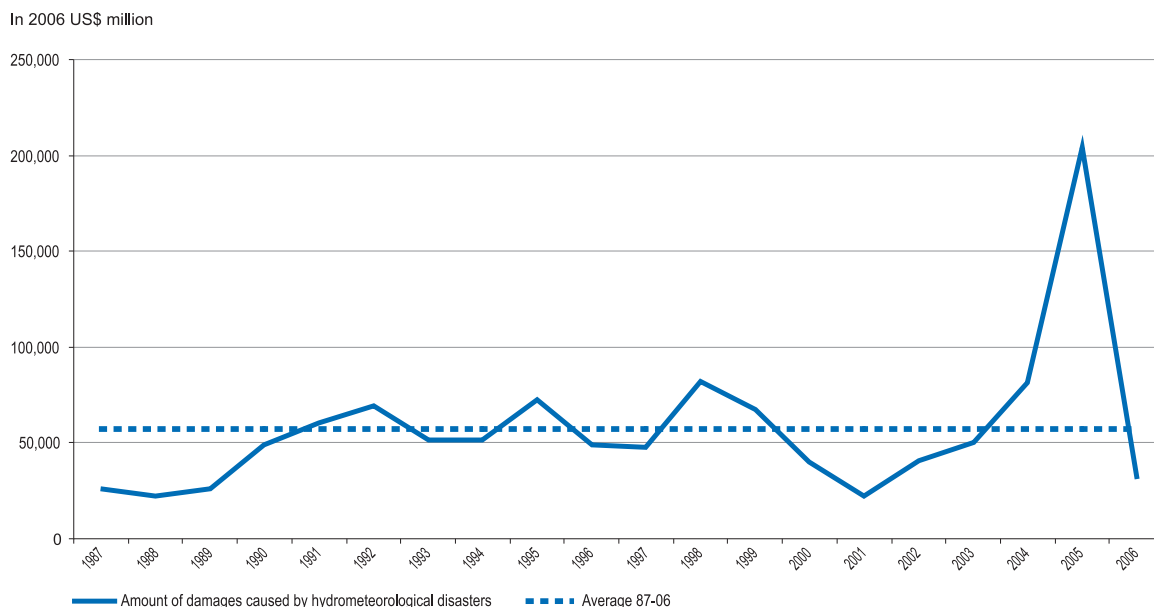


Figure 6 – Damages caused by hydrometeorological disasters (in 2006 US\$ million)

- ▶ Hurricane Katrina (2005) resulted in the highest damages ever reported for a hydrometeorological disaster: almost US\$ 129 billion. The same year, two other hurricanes, Wilma and Rita, caused damages estimated at more than US\$ 21 billion and 16 billion, respectively. Even with the Katrina data removed, 2005 remained a very costly year.
- ▶ Other costly years were 1992 with Hurricane Andrew (US\$ 38 billion), 1995 with a flood in China (US\$ 19.8 billion) and a tornado in the US (US\$ 13.2 billion), 1998 with a flood in China (US\$ 37 billion), and 2004 with Hurricane Charley (US\$ 16 billion).
- ▶ Compared to 2005, damages reported in 2006 were among the lowest of the entire period.

2.2.2. Geological disasters

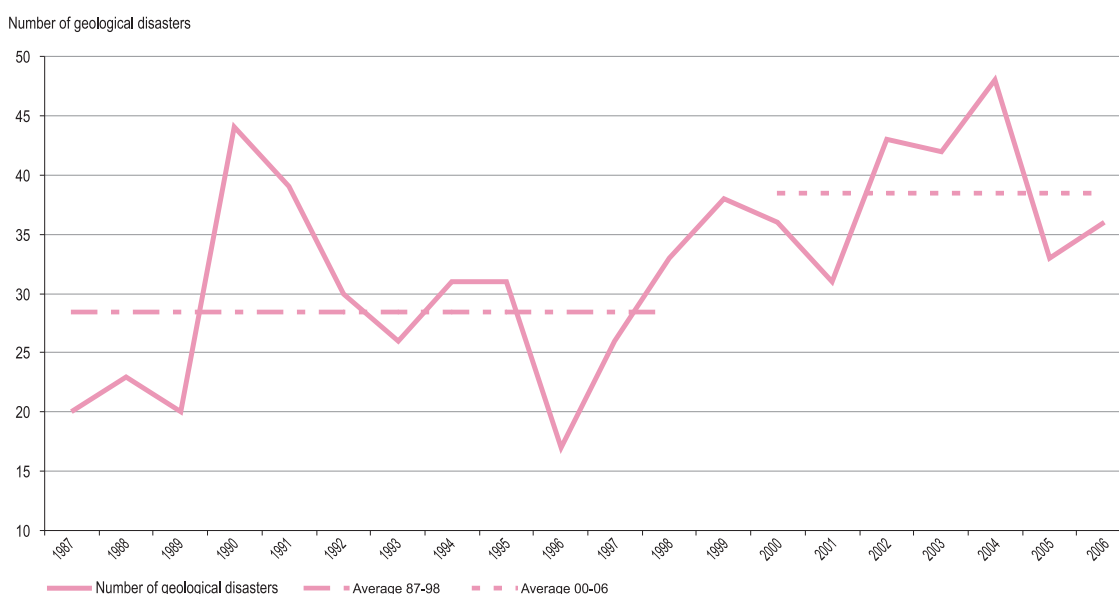


Figure 7 – Occurrence of geological disasters: 1987-2006 with averages for periods 1987-1998 and 2000-2006



- ▶ Geological disasters number far fewer than hydrometeorological disasters.
- ▶ For the entire period, there were on average almost nine (88.89%) hydrometeorological disasters reported for every one geological disaster (11.11%).
- ▶ Geological disasters were more frequent in 1990 and 1991 (19.13% & 16.53%, respectively)
- ▶ In 1996, 2000, 2001, 2005 and 2006, hydrometeorological disasters were more frequent than the average, 91.37%, 91.59%, 91.97%, 91.57% and 92.38%, respectively.
- ▶ During the period 1987-2006, geological disasters show a high variability with a clear increasing trend.
- ▶ The years 1998, 1999 and 2000 show a turning point and an escalation in the number of disasters reported. As noted, data for 1999 has been excluded from the analysis.
- ▶ In 1987-1998, the average number of geological disasters was 28; in 2000-2006, the average was 38, a 136% increase.

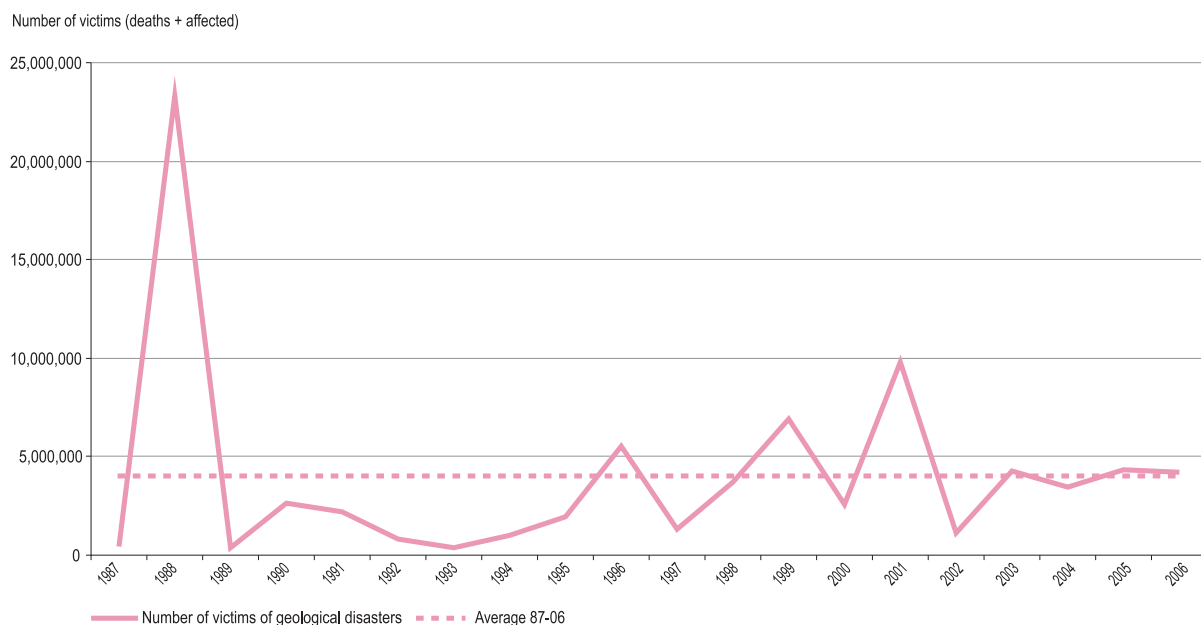


Figure 8 – Victims of geological disasters

- ▶ Victims of geological disasters are far fewer than victims of hydrometeorological disasters.
- ▶ For the period 2000-2006, victims of geological disasters represent 1.75 % of all victims of natural disasters. However, in 2005 this proportion was 2.66 % and in 2006 it was 2.97 %, an increase attributable to the lower numbers of victims of hydrometeorological disasters and not to a rise in the numbers of geological disasters victims.
- ▶ In 1988, one earthquake affected 20 million people in India (Bihar).
- ▶ In 1996, one earthquake affected more than 5 million people in China.
- ▶ In 1999, earthquakes in China, Columbia and Turkey affected, respectively, 3 million, 1 million and 1 million people.

- ▶ In 2001, one earthquake affected 6 million people in India and another affected 1 million in El Salvador.
- ▶ The extensive number of people killed by the tsunami in 2004 (226,405) was outnumbered by the total amount of people affected : more than 1 million people in Sri Lanka, more than 650,000 people in Thailand and more than 500,000 people in Indonesia.
- ▶ In 2006, the earthquake in Yogyakarta resulted in almost 3.2 million victims. In 2005, the earthquake in Pakistan resulted in 2,850,000 victims.

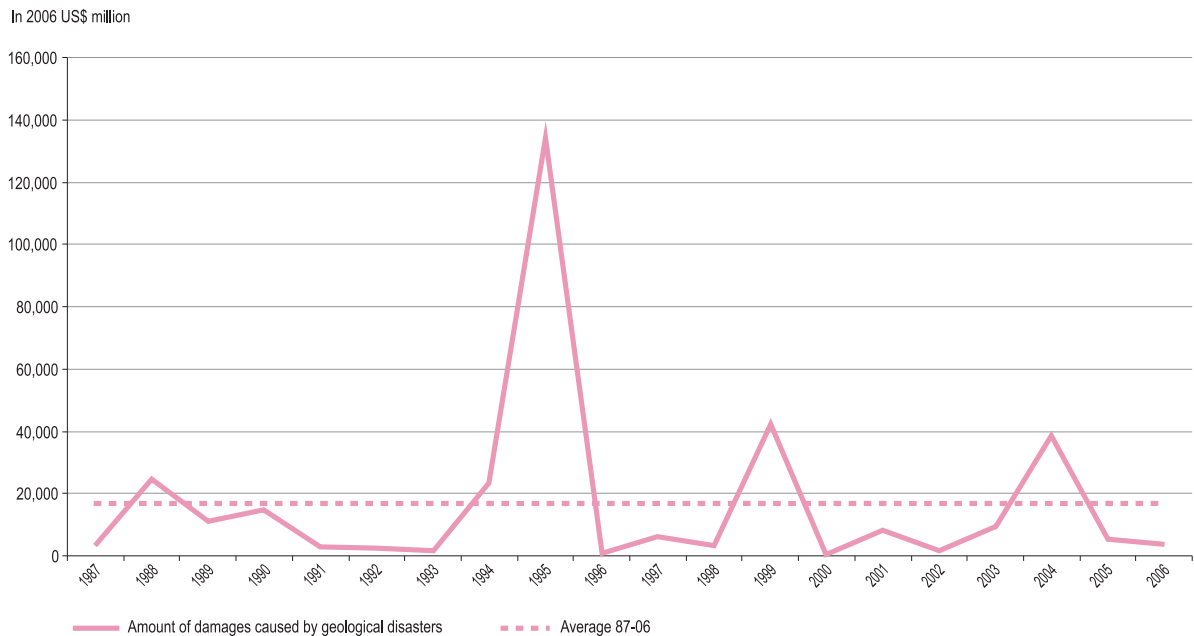


Figure 9 – Damages caused by geological disasters (in 2006 US\$ million)

- ▶ The earthquake in Kobe caused the highest damages ever reported for geological disaster - more than 2006 US\$ 130 billion.
- ▶ Other costly years were: 1988, with an earthquake in Soviet Union (US\$ 23.8 billion) ; 1999, with earthquakes in China (US\$ 17 billion) and Turkey (US\$ 10 billion); and 2004, with the Nigata earthquake in Japan (US\$ 30 billion).
- ▶ Compared to 2005, the damages reported in 2006 were among the lowest of the entire period.

2.3. Global overview by scale of disaster

The number of victims and amount of damages caused by natural disasters were used to scale and categorize the disasters. The categorization process was based on analysis of the distributions of numbers taking into account the different types of disasters with the high variability in their human and economic impacts. The first criterion we used to set thresholds was the differentiation that appeared from the observed continuities. The second criterion was to achieve a relative homogeneity in each defined category. The third criterion was legibility of the thresholds. This approach will be refined in the future.

2.3.1. Trends

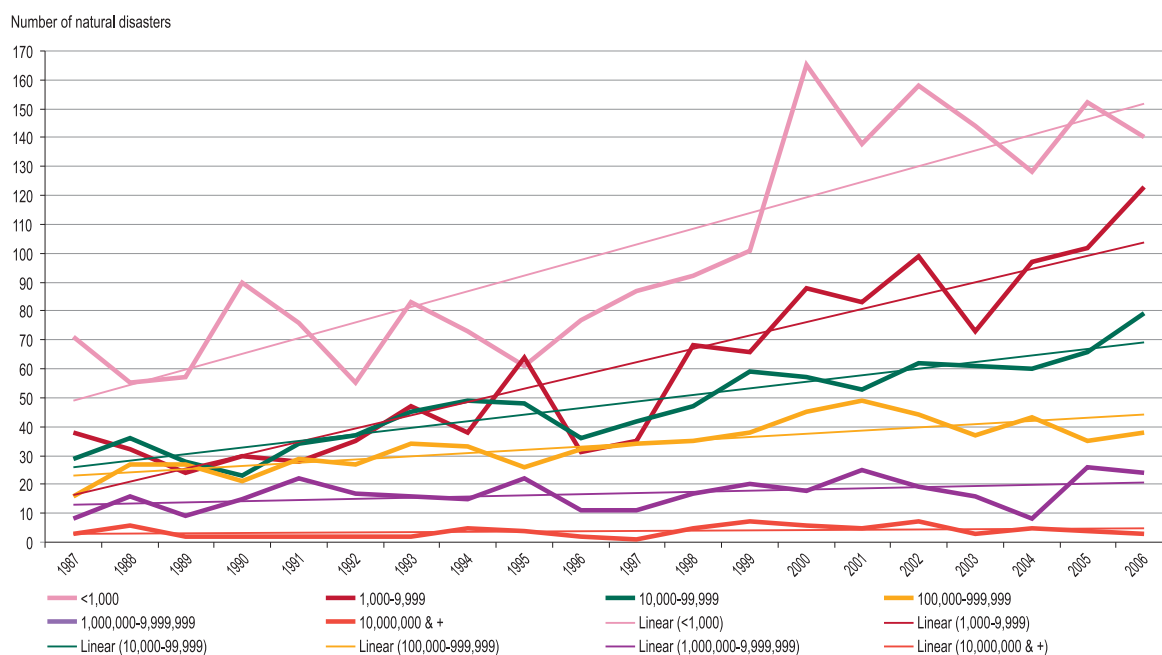


Figure 10 – Natural disasters categorized by numbers of victims (killed and affected) – number and linear trends

- ▶ Between 1987 and 2006, there was an increase in all categories of natural disaster victims.
- ▶ Disasters creating fewer than 1,000 victims remained the most numerous during the entire period. Their increase, as evidenced by their linear time-trend line, is the most pronounced. Their number increased three times between 1987 and 2006.
- ▶ Until 1990-1991, there is no distinction between the numbers in the categories of disasters causing between 1,000 and 999,999 victims.
- ▶ After 1991, disasters causing 1,000 to 9,999 and 10,000 to 99,999 victims show an increase which differentiates them from those causing 100,000 to 999,999 victims.
- ▶ In 1998-1999, the differentiation between these three categories of disasters becomes clear as well as the differentiation in the evolution of their numbers.
- ▶ Disasters causing 1,000 to 9,999 victims show the most pronounced evolution. Their number increased five times between 1987 and 2006.

- ▶ The two other severity categories show a less marked evolution. Between 1987 and 2006, the number of disasters resulting in 10,000 to 99,999 victims increased 2.5 times and the number of disasters resulting in 100,000 to 999,999 victims increased two times.
- ▶ The two most severe disasters categories appear differentiated since the beginning of the period and the distinction between them is clear for the entire period.
- ▶ The number of disasters with 1,000,000 to 9,999,999 victims evolved slowly from an annual rate of 10-12 to 20, increasing around 1.6 times between 1987 and 2006.
- ▶ Disasters creating 10 million victims or more remained rare, evolving from an annual rate of 2-3 in the beginning of the period to 4-5 at its end. At least one such disaster occurred each year. Their occurrence increased around 1.6 times between 1987 and 2006.

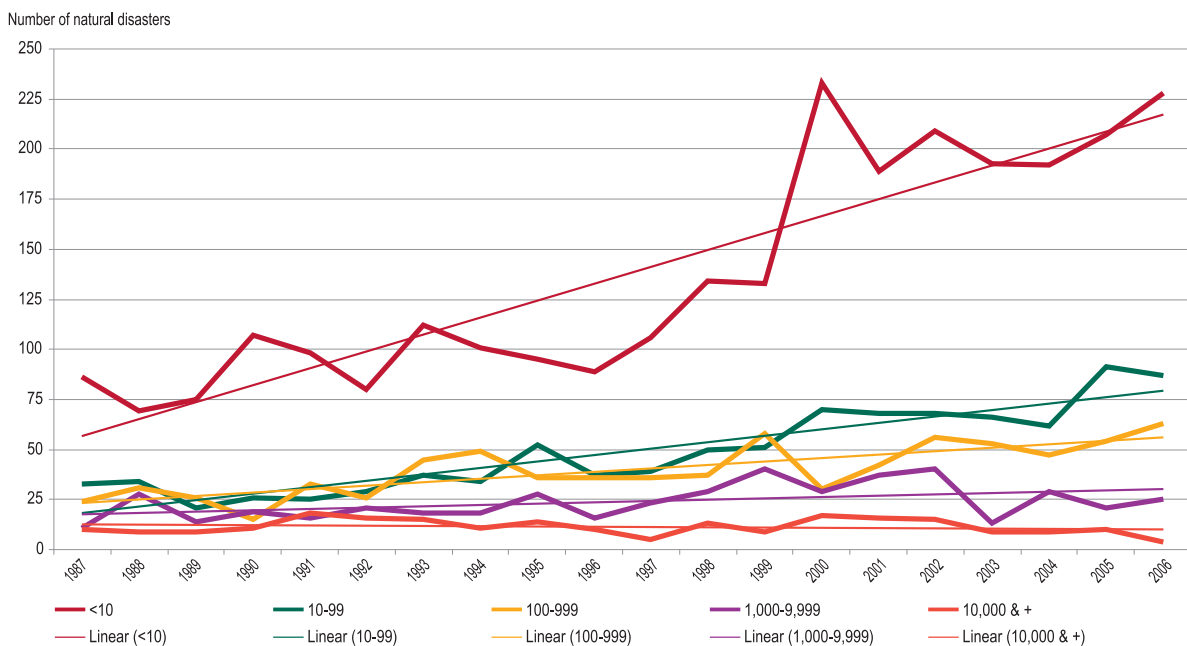


Figure 11 – Trends of natural disasters categorized by number of victims (killed and affected) per 100,000 inhabitants – numbers and linear trends

- ▶ Figures for the categorization of number of victims per 100,000 inhabitants are less discriminating.
- ▶ Disasters with less than 10 victims per 100,000 inhabitants can be clearly distinguished from all other categories. They are the most numerous and with a 400% increase over time far above the other categories.
- ▶ For other categories, differentiation begins in 1993-1994 and becomes accentuated after 2000.
- ▶ Disasters with 10 to 999 victims per 100,000 inhabitants starts to diverge from those with 1,000 and more in 1992-1993 and show a differentiated evolution since 2000.

- ▶ Disasters with 10 to 99 victims per 100,000 inhabitants increased around three times between 1987 and 2006.
- ▶ Disasters with 100 to 999 victims per 100,000 inhabitants increased around two times between 1987 and 2006.
- ▶ Disasters with 1,000 to 9,999 victims per 100,000 inhabitants.
- ▶ Disasters with 1,000 to 9,999 victims per 100,000 inhabitants showed a slow increase during the period, increasing around 1.7 times between 1987 and 2006.
- ▶ Contrary to all other categories, the numbers of disasters with 10,000 victims or more per 100,000 inhabitants, annually averaging 11.5, showed a small decrease during the period.

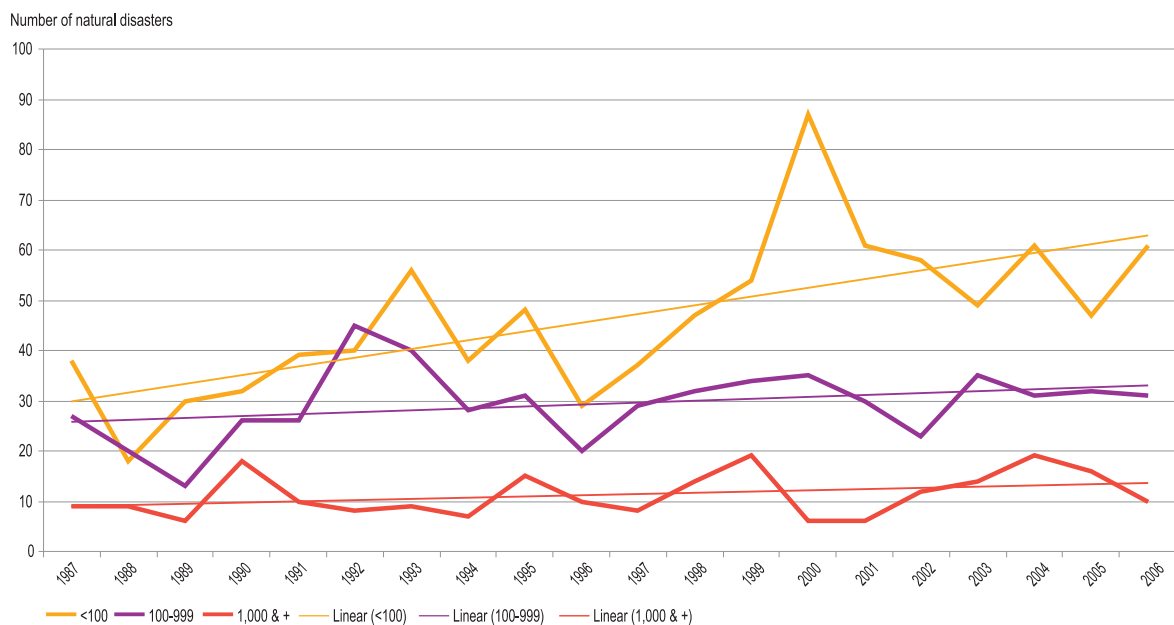


Figure 12 – Natural disasters categorized by amount of damages (in 2006 US\$ million) – numbers and linear trends

- ▶ As explained above, three categories were empirically determined: disasters causing damages of less than US\$ 100 million (in 2006 \$), disasters causing damages of US\$ 100-999 million and disasters causing damages of at least US\$ one billion.
- ▶ The evolution of the two first categories appears clearly in 1997, 1998 and 1999. Thereafter, the number of disasters causing damages of less than US\$ 100 million increase faster than those in the range of US\$ 100-999 million. The first category doubled between 1987 and 2006. The second category grew about 1.3 times.
- ▶ The number of disasters causing damages of at least US\$ one billion, which an annual average 11.25, grew around 1.4 times during the period.

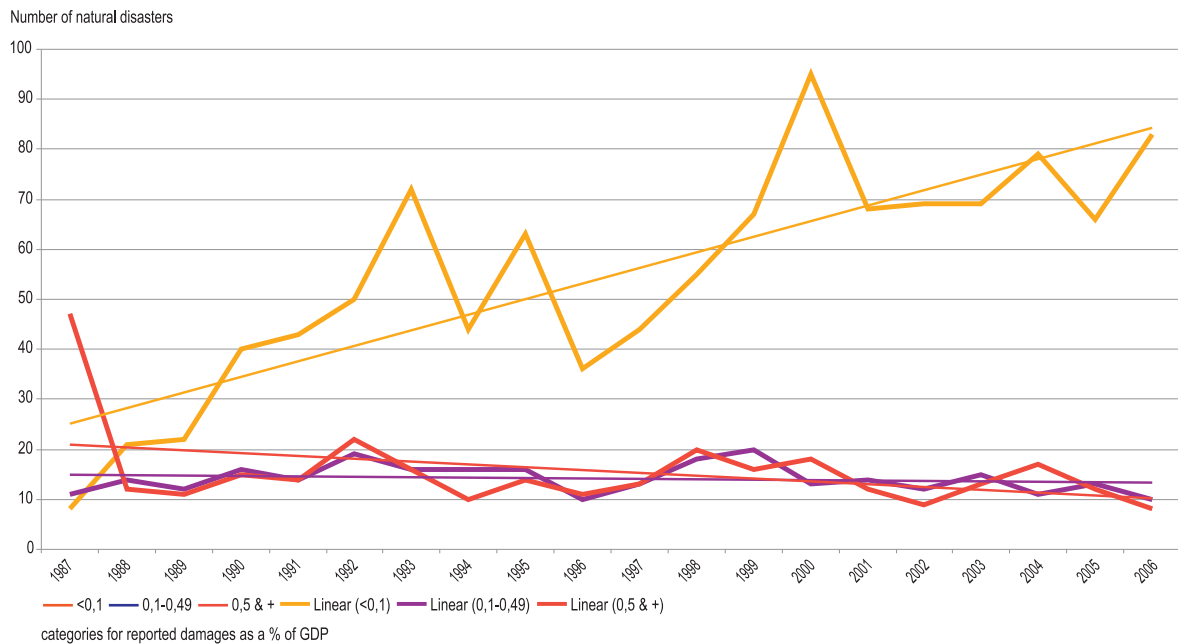


Figure 13 – Natural disasters categorized by amount of damages (in 2006 US\$ million) as a percentage of GDP – numbers and linear trends

- ▶ Damages from natural disasters categorized according to the percentage of GDP of the affected country gives a figure which differentiates disasters causing damages equalling less than 0.1% of GDP, from those disasters for which the economic impacts were more severe (i.e., between 0.1 and 0.49%, and 0.5% and greater).
- ▶ The number of the first category grew around three times between 1987 and 2006.
- ▶ The number of disasters causing damages in the range of 0.1-0.49% of GDP and those more severe with damages representing 0.5% of the GDP or more, remain in a range of 10-20 disasters annually.
- ▶ The decrease in the number of disasters causing damages in the range of 0.1-0.49% of GDP, declining around 15% between 1987 and 2006.
- ▶ The decrease in the number of disasters causing damages of at least 0.5% of the GDP is more pronounced, declining around 50% between 1987 and 2006. However this higher decrease is attributable to 1987 number. When it is excluded, the decrease is around 13%.

2.3.2. By major type of natural disasters

In its 2004 publication, “Thirty Years of Natural Disasters 1974-2003: The Numbers”, CRED defined the human impact of a natural disaster as “large” when the number of deaths was 50 or more, the number of people affected was 150,000 or more, or the amount of reported economic damages was US\$ 200 million or more adjusted to 2003 dollars. When the number of deaths is five or fewer, the number of people affected is 1,500 or fewer and reported economic damages were US\$ 8 million or less, the disaster is classified as «small». “Medium” disasters fall between large and small.

In this report, we apply these definitions (stating damage amounts in 2003 US \$) to categorize natural disasters which have occurred in the period of 1987-2006 and examined the way that various impacts were distributed among four major types of disasters. The four types are as follows :

- ▶ Droughts and related disasters including, extreme temperatures, wild fires and complex emergencies associated with droughts.
- ▶ Floods and related disasters including, slides, waves/surge.
- ▶ Windstorms including cyclones, hurricanes, typhoons, tropical storms, winter storms and tornadoes.
- ▶ Geological disasters including earthquakes, tsunamis and volcanic eruptions.

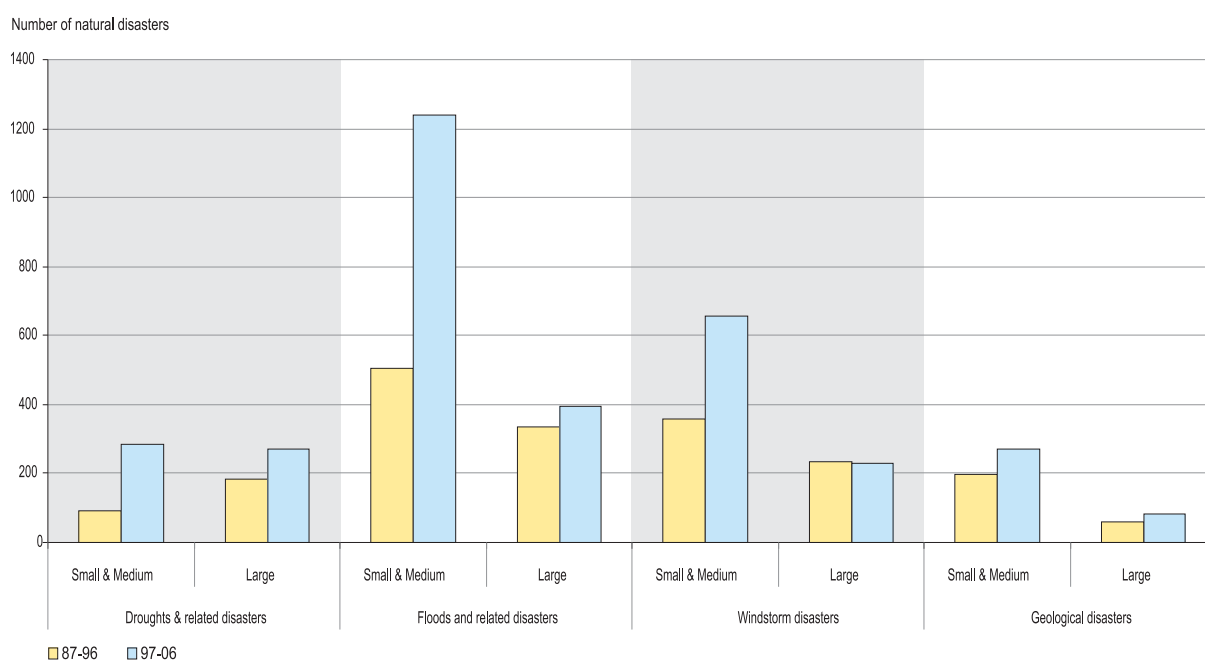


Figure 14 – Evolution by decades of the occurrence by major types of natural disasters according to their amplitude 1987 - 2006

- ▶ Small and medium disasters are primarily associated with floods and related disasters, and secondly with windstorms.
- ▶ The increase of small and medium disasters in the second decade is also associated with floods and related disasters, and with wind storm disasters. However, an increase in small and medium disasters also appears for droughts and related disasters.
- ▶ Greater numbers of large disasters are primarily associated with floods and related disasters, secondly with wind storm disasters, and thirdly with droughts and related disasters.
- ▶ The increase in large disasters during the second decade appears specifically in droughts and related disasters, and in floods and related disasters.

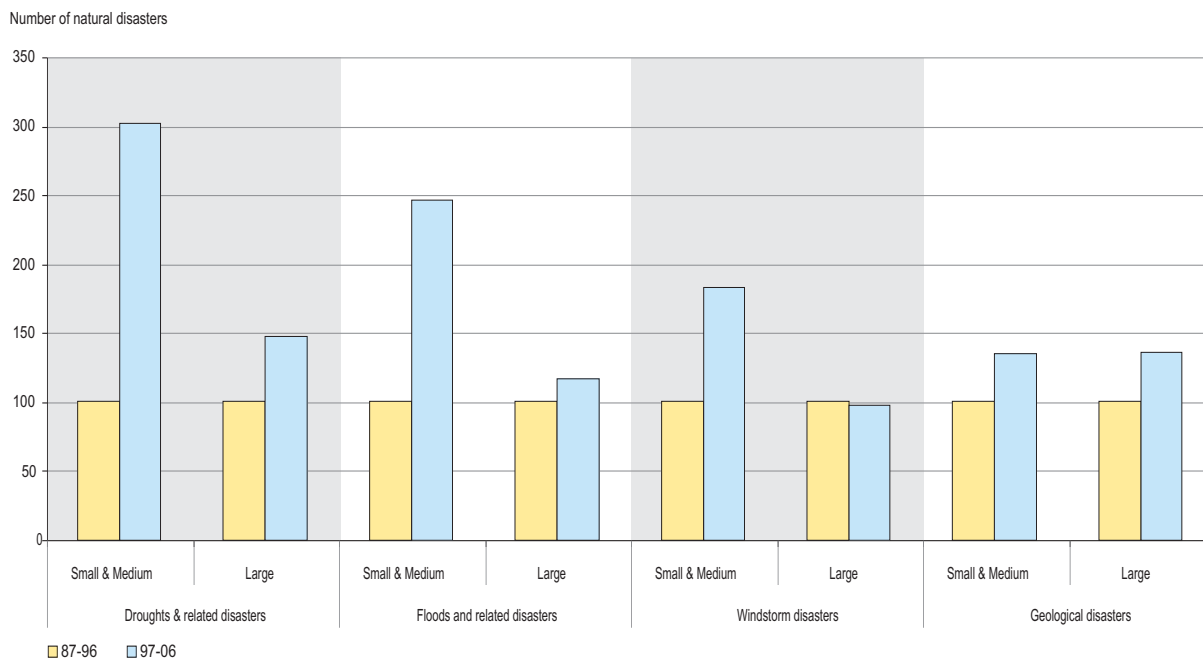


Figure 15 - Standardized evolution by decades and major types of natural disasters according to their amplitude 1987 - 2006 (1987-1996 = 100)

- ▶ The standardization of data dramatically changes the figures.
- ▶ The increase of small and medium disasters in the second decade can be found first in droughts and related disasters, secondly in floods and related disasters, thirdly in windstorm disasters and finally in geological disasters.
- ▶ For large disasters, the increase is primarily found in droughts and related disasters, secondly in geological disasters and thirdly in floods and related disasters. Numbers of large windstorm disasters were stable over the decade.
- ▶ Over the two decades, the most significant increase in numbers is in droughts and related disasters whatever their amplitude.
- ▶ For geological disasters, the increases in the numbers of small and medium disasters and of large disasters are similar.
- ▶ The increase in the numbers of floods and related disasters is mainly in small and medium disasters. This trend appears also in a less marked manner for windstorm disasters.

3. Global figures for 2006 (Top 10 Tables)

3.1. At disaster level

- ▶ In 2006, the three deadliest disasters were the earthquake in Indonesia in May (5,778 killed), Typhoon Durian in the Philippines in December (1,399 killed) and the European heat-wave in July (3,392 killed).
- ▶ With five of the ten most significant 2006 disasters, windstorms had a devastating human impact. The most significant disaster in terms of victims was Typhoon Bilis which alone affected more than 29 million persons in China. China remained the most affected country in terms of victims, six disasters out of the top ten.
- ▶ The most significant disasters in terms of economic damages were: the flood in India (US\$ 3.39 billion), Typhoon Bilis in China (US\$ 3.32 billion) and the Indonesian earthquake (US\$ 3.1 billion)

	Disaster type	Country	Number of killed
1	Earthquake (Yogyakarta)	Indonesia	5,778
2	Wind Storm (Typhoon Durian)	Philippines	1,399
3	Extreme Temperature (heat-wave)	France	1,388
4	Slides (landslide)	Philippines	1,126
5	Extreme Temperature (heat-wave)	Netherlands	1,000
6	Extreme Temperature (heat-wave)	Belgium	940
7	Wind Storm (Typhoon Bilis)	China P Rep	820
8	Wave / Surge (tsunami)	Indonesia	802
9	Extreme Temperature (cold-wave)	Ukraine	801
10	Flood	Ethiopia	498

Table 1 – Top 10 of 2006 most significant disasters by number of killed

	Disaster type	Country	Number of Victims
1	Wind Storm (Typhoon Bilis)	China P Rep	29,622,820
2	Drought	China P Rep	18,000,000
3	Wind Storm (Typhoon Prapiroon)	China P Rep	10,000,089
4	Wind Storm (Cyclone Kaemi)	China P Rep	6,531,109
5	Wind Storm (Typhoon Saomai)	China P Rep	5,921,791
6	Drought	Malawi	5,100,000
7	Flood	China P Rep	4,600,045
8	Flood	China P Rep	4,120,030
9	Flood	India	4,000,415
10	Wind Storm (Typhoon Milenyo)	Philippines	3,842,634

Table 2 – Top 10 of 2006 most significant disasters by number of victims

	Disaster type	Country	Economic damages
1	Flood	India	3,390
2	Wind Storm (Typhoon Bilis)	China P Rep	3,325
3	Earthquake (Yogyakarta)	Indonesia	3,100
4	Extreme Temperature (heat-wave)	China P Rep	2,910
5	Wind Storm (Typhoon Saomai)	China P Rep	2,510
6	Wind Storm (Typhoon Shanshan)	Japan	2,500
7	Wind Storm (tornado)	United States	1,200
8	Wind Storm (Tropical Storm Larry)	Australia	1,180
9	Flood	United States	1,000
10	Extreme Temperature (cold-wave)	Russia	1,000

Table 3 – Top 10 of 2006 most significant disasters by economic damages (in US\$ million)

3.2. At aggregated country level

	Country	No. of Natural disasters
1	China P Rep	38
2	United States	31
3	India	21
4	Philippines	20
5	Indonesia	20
6	Afghanistan	13
7	Viet Nam	11
8	Pakistan	9
9	Bangladesh	8
10	Romania	8

- ▶ China, the US and India were the countries most hit by natural disasters in 2006. The combined number of reported disasters for these countries slightly increased in comparison to 2005. In 2006, reported disasters were 38 for China, 31 for the US and 21 for India; in 2005, reported disasters were 30, 16 and 26, respectively.

Table 4 – Top 10 of countries most hit by natural disasters in 2006

	Country	No. of People Killed	Country	No. of People Killed / 100000 inhabitants
1	Indonesia	7,432	Belgium	9.057
2	Philippines	2,984	Netherlands	6.064
3	China P Rep	2,109	Philippines	3.335
4	India	1,521	Indonesia	3.206
5	France	1,393	France	2.288
6	Netherlands	1,000	Latvia	1.758
7	Ethiopia	951	Ukraine	1.722
8	Belgium	940	Ethiopia	1.272
9	Ukraine	803	Afghanistan	1.230
10	Viet Nam	579	Korea Dem P Rep	1.203

Table 5 – Top 10 of countries by people killed in 2006

- ▶ Asia remained the most affected region in terms of absolute numbers killed. The three most affected countries in the region were Indonesia, the Philippines and China; each suffering deaths of 7,432, 2,984 and 2,109, respectively.
- ▶ In number of deaths per 100,000 inhabitant, Belgium and the Netherlands reported the highest number of persons dead, mainly due to the July heat-wave.

	Country	No. of Victims		Country	in % of the total population
1	China P Rep	88,739,531		Malawi	38.8%
2	Philippines	8,615,801		Djibouti	30.8%
3	India	7,385,999		Burundi	26.8%
4	Malawi	5,160,508		Niger	24.3%
5	Kenya	4,283,526		Kenya	11.9%
6	Indonesia	3,952,616		Philippines	9.6%
7	Viet Nam	3,349,989		Mali	8.8%
8	Thailand	3,257,588		Afghanistan	7.2%
9	Niger	3,046,476		Mozambique	7.0%
10	Afghanistan	2,234,292		China P Rep	6.8%

Table 6 – Top 10 of countries by victims in 2006

- ▶ China remains the most affected country with more than 88 million reported victims. The Philippines had 8.6 million victims and India had 7.3 million.
- ▶ In proportion of the total population, the most affected country was the Malawi with 38.8% of the population affected mainly by a drought, followed by the Djibouti (30.8%) and Burundi (26.8%).

	Country	Economic damages (in 2006 US\$ million)		Country	in % of the previous year GDP
1	China P Rep	13,551		Guyana	16.96%
2	United States	5,031		Viet Nam	3.70%
3	India	3,390		Lithuania	1.46%
4	Indonesia	3,314		Indonesia	0.90%
5	Japan	2,533		Philippines	0.87%
6	Australia	1,282		Tajikistan	0.83%
7	Russia	1,187		Ecuador	0.58%
8	Viet Nam	1,099		China P Rep	0.54%
9	Philippines	988		India	0.29%
10	Spain	659.0		Bolivia	0.28%

Table 7 – Top 10 of countries with highest economic damage in 2006

- ▶ China, the US and India remained the countries reporting the highest economic damages due to natural disasters in 2006 (China - US\$ 13.5 billion; the US - US\$ 5 billion; and India - US\$ 3.3 billion).

4. Comparison of 2006 with 2005 and 2000–2004 averages

4.1. Natural disasters occurrence

Major types of natural disasters	2006	2005	2000-04 Average
Geological	36	33	40.0
Floods & related	254	206	177.6
Droughts & related	60	69	72.8
Windstorms	77	125	102.6
Total	427	433	393.0

Table 8 – Occurrence by major types of natural disasters

- ▶ Two major observations for 2006 concerning the occurrence of reported natural disasters can be drawn from the figures:
 - There was a large increase in the frequency of floods and related disasters. In 2006, 254 of such disasters were reported, which accounted for 59% of all disasters reported. This represents an increase of 43% compared to the 2000-04 average and of 23% compared to 2005.
 - There was a significant drop in the number of reported windstorms. Seventy-seven windstorms were reported, which represents a decrease of 25% compared to the average number of disasters reported.
- ▶ The reported figures for the geological and the drought and related disasters do not show major variations.

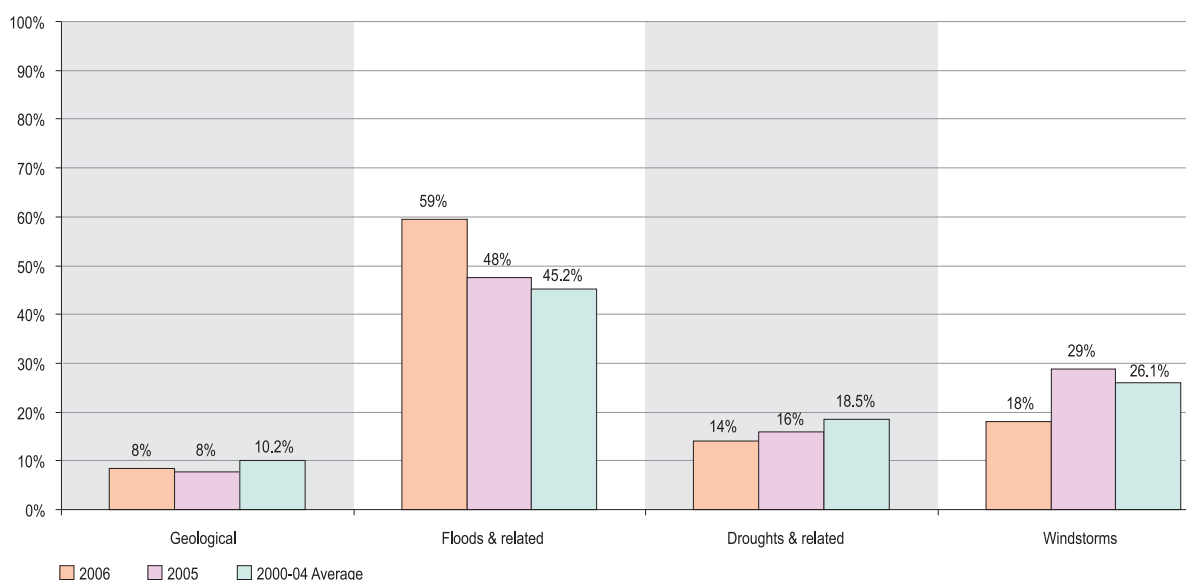


Figure 16 – Occurrence by major types of natural disasters

4.2. Victims of natural disasters

Major types of natural disasters	2006	2005	2000-04 Average
Geological	4,236,677	4,336,741	4,243,138.0
Floods & related	31,560,074	75,044,200	112,877,814.6
Droughts & related	39,742,530	29,642,502	174,819,066.6
Windstorms	67,113,202	49,119,136	36,890,271.4
Total	142,652,483	158,142,579	328,830,290.6

Table 9 – Victims by major types of natural disasters

- ▶ On a global perspective, there was a decrease in the number of victims of natural disasters for 2006 (142 million, 57% lower than the 2000-04 average).
- ▶ Windstorms and floods and related disasters had the most important human impact in terms of victims, accounting for 47% and 22%, of all reported victims, respectively.
- ▶ Two interesting facts regarding these two types of disasters are:
 - Despite the important increase in the occurrence of floods and related disasters, there was a decrease in the number of victims of these disasters (72% lower than the average number of victims and 58% lower than in 2005).
 - Despite a reduction of the occurrence, the number of victims of windstorms increased by 82% compared to the average and by 37% compared to 2005 (which was an exceptional year in terms of cyclones and hurricanes).
- ▶ The number of victims due to drought significantly decreased for the last two years compared to the period average (a diminution of +/- 80% of the reported number of victims). During 2000-04, droughts resulted in the largest amount of victims, accounting for 53% all reported victims.

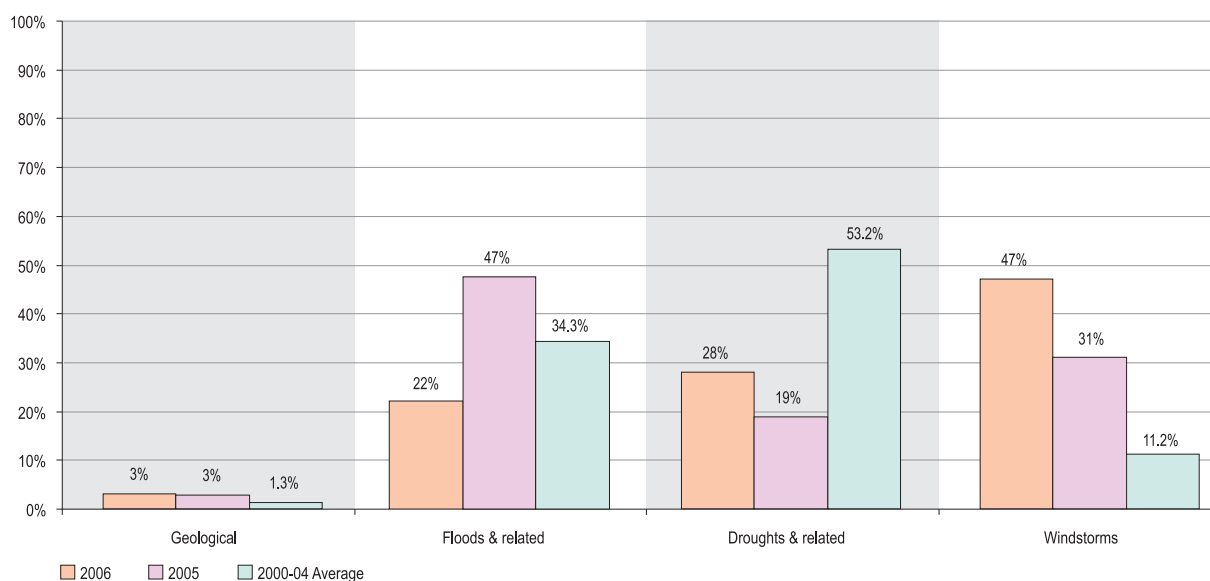


Figure 17 – Victims by major types of natural disasters

4.3. Economic damages of natural disasters

Major types of natural disasters	2006	2005	2000-04 Average
Geological	3,581	5,263	11,758.4
Floods & related	8,088	17,685	17,334.6
Droughts & related	5,842	2,217	7,212.0
Windstorms	16,963	184,364	22,468.1
Total	34,474	209,530	58,773.2

Table 10 – Economic damages by major types of natural disasters (in 2006 US\$ million)

- ▶ After the record damages caused by Hurricane Katrina in 2005, the 2006 figures show a global decrease of the amount of economic damages due to natural disasters compared to 2005 and also to the average. In 2006, natural disasters caused approximately US\$ 34.5 billion of economic damages, 41% lower than the period average.
- ▶ Windstorms remain the main cause of economic damages, accounting for more than 49% of the total amount.
- ▶ Despite the increase of flood and related disaster occurrence, there was a decrease in the reported economic damages due to such disasters.
- ▶ The economic damages due to droughts and related disasters increased slightly in 2006 (US\$ 5.8 billion), but still remained 19% below the period average of US\$ 7.2 billion.

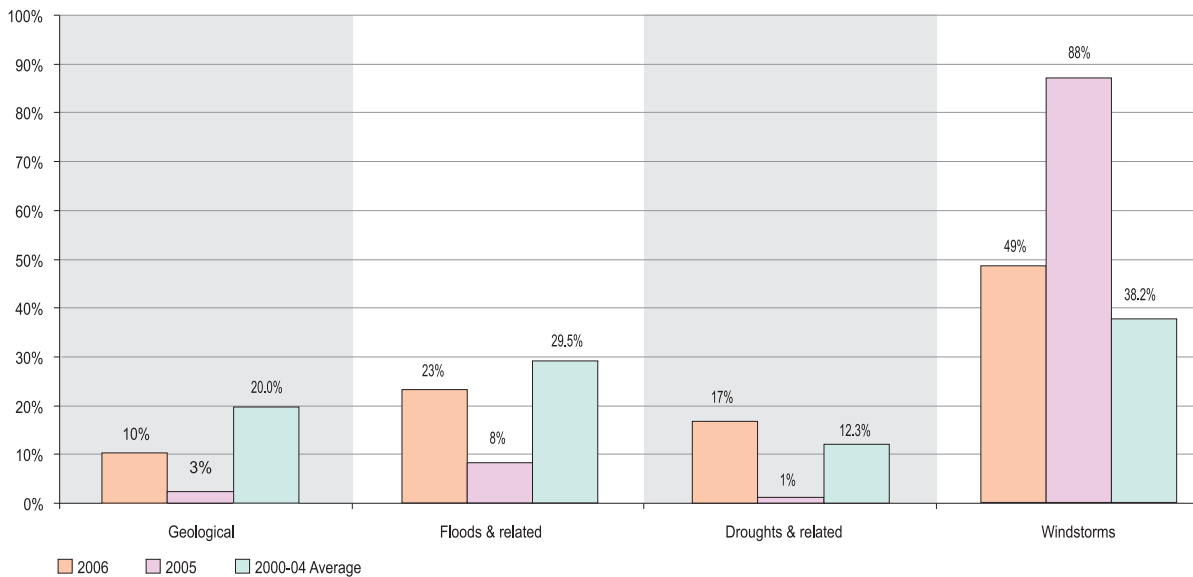


Figure 18 – Economic damages by major types of natural disasters (in 2006 US\$ million)

5. Regional section

Over years, natural disasters show high variability in reported occurrence, deaths and people affected between and within regions. This makes analysis difficult. However, trend analysis yields interesting insights.

5.1. Continent Comparison

5.1.1. Occurrence

Continent	2006	2005	2000-04 Average
Africa	79	60	65.0
Americas	75	98	97.8
Asia	187	166	147.8
Europe	68	94	65.6
Oceania	18	15	16.8
Total	427	433	393

Continent	2006	2005	2000-04 Average
Africa	18.50%	13.86%	16.54%
Americas	17.56%	22.63%	24.89%
Asia	43.79%	38.34%	37.61%
Europe	15.93%	21.71%	16.69%
Oceania	4.22%	3.46%	4.27%
Total	100%	100%	100%

Table 11 – Natural disasters occurrence by continent

- ▶ In 2006, Asia remained the region most hit by natural disasters with 187 reported natural disasters (44% of 2006 all natural disasters).
- ▶ The Americas, Europe and Africa accounted for 18%, 16% and 19%, respectively, of all reported natural disasters.
- ▶ Compared to 2005 and the 2000-04 average period the reported figures show:
 - A strong increase of the number of disasters for Asia (+26.5% compared to the 2000-04 annual average and +12.7% compared to 2005) and for Africa (+21.5% compared to the average and +31.7% compared to 2005).
 - A decrease of about 23% compared to average and 2005 for the Americas.
 - Europe and Oceania are consistent with the averages.

5.1.2. Victims

Continent	2006	2005	2000-04 Average
Africa	21,858,117	21,779,142	38,802,923
Americas	1,446,491	8,291,822	5,405,748
Asia	119,050,089	127,513,978	283,120,528
Europe	259,900	529,359	1,452,740
Oceania	37,886	28,278	48,351
Total	142,652,483	158,142,579	328,830,291

Continent	2006	2005	2000-04 Average
Africa	15.32%	13.77%	11.80%
Americas	1.01%	5.24%	1.64%
Asia	83.45%	80.63%	86.10%
Europe	0.18%	0.33%	0.44%
Oceania	0.03%	0.02%	0.01%
Total	100%	100%	100%

Table 12 – Victims of natural disasters by continent

- ▶ In 2006, the number of reported victims of natural disasters was lower than the 2005 reported numbers (-9.8%) and far below the period average (-56.6%).
- ▶ Compared to the 2000-04 averages of other continents, Europe has had the largest decrease in reported victims of natural disasters in 2006 (-82.1%).
- ▶ Asia remains the most affected region with over 119 millions reported victims (83% of all reported victims).
- ▶ There are great variations in the total numbers of reported victims over the considered period (142 millions in 2006, 158 millions in 2005 and 328 millions in the 2000-04 average). However, the distribution of victims between the different regions remains stable over the years.

5.1.3. Damages

Continent	2006	2005	2000-04 Average
Africa	229	30	1,733
Americas	5,398	178,083	18,884
Asia	25,132	24,883	27,272
Europe	2,428	6,308	9,986
Oceania	1,286	226	898
Total	34,474	209,530	58,773

Continent	2006	2005	2000-04 Average
Africa	0.66%	0.01%	2.95%
Americas	15.66%	84.99%	32.13%
Asia	72.90%	11.88%	46.40%
Europe	7.04%	3.01%	16.99%
Oceania	3.73%	0.11%	1.53%
Total	100%	100%	100%

**Table 13 – Economic damages of natural disasters by continent
(in 2006 US\$ million)**

- ▶ In 2006, reported economic damages (US\$ 34.4 billion) were 41.3% below the average reported damages for the 2000-04 period (US\$ 58.7 billions).
- ▶ Except Oceania where reported damages increased sharply (+43.3%), and Asia which remained stable (around US\$ 25 billion), the reported economic damages for the other regions were under the average of the 2000-2004 period (more than 70% lower).
- ▶ In 2006, Asia was the most affected region with more than 25 billions of damages due to natural disasters (72.9% of all reported economic damages).

5.2. Details by continent

5.2.1. Africa

5.2.1.1. Occurrence

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	3	6	3.4	1	8
Floods & related	59	33	36.4	26	43
Droughts & related	12	16	15.4	11	20
Windstorms	5	5	9.8	6	13
Total	79	60	65.0	1	43

Table 14 – Natural disaster occurrence in Africa

- ▶ In the 2000-2006 period, 96% of geological disasters (n = 26) occurred in three sub-regions: Eastern (n = 15; 58%), Northern (n = 7; 27%) and Middle Africa (n = 3; 12%).
- ▶ The higher frequency in Eastern Africa remained consistent in 2005 (63%) and 2006 (63%).
- ▶ There was no geological disaster in Northern Africa in 2005 and only one in 2006.

Floods and related disasters:

- ▶ The number of floods and related disasters in 2005 (33) was near the average for 2000-2004 (36.4), but far above it in 2006 (59).
- ▶ Floods were more frequent in all sub-regions in 2006.
- ▶ Eastern Africa stands out with 51.5% of all flood disasters in 2005 and 52.5% in 2006, well above its annual average of 40.6% for years 2000-2004.
- ▶ For other sub-regions, the occurrence of floods were distributed according to the 2000-2004 averages, with Western Africa more frequently hit (annual average 2000-2004: 8, 2005: 8, 2006: 11) and Southern Africa the less frequently hit (annual average 2000-2004: 3, 2005: none, 2006: 4).

Droughts and related disasters:

- ▶ The number of droughts and related disasters was near the annual average of 15 for 2000-2004 in 2005 (16), and below it in 2006 (12).
- ▶ Eastern Africa remained the most hit for the entire period; 2005 (10) and 2006 (8) were near the 2000-2004 average (8). All other sub-regions were less frequently affected.
- ▶ In Western Africa the number of such disasters in 2006 (4) was over the 2000-2004 average of 3.
- ▶ In 2006, no such disasters were reported for Northern, Middle and Southern Africa.

Windstorm disasters:

- ▶ In 2005 and 2006, the numbers of windstorm disasters (5 for both years) were below the 2000-2004 average (9.8).
- ▶ This appeared particularly in Eastern Africa where the numbers of such disasters were 2 and 3 versus 5 for the 2000-2004 average.
- ▶ No windstorms were reported for Western Africa in 2005 or 2006.

5.2.1.2. Victims

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	1,803	290,574	90,704.80	700	212,736
Floods & related	2,195,610	734,836	2,372,505.80	807,001	5,715,058
Droughts & related	19,571,074	20,739,088	35,730,863.60	26,369,549	42,200,908
Windstorms	89,630	14,644	608,848.60	5,959	1,119,707
Total	21,858,117	21,779,142	38,802,922.80	700	42,200,908

Table 15 – Victims of natural disasters in Africa

Geological disasters:

- ▶ Except in Eastern Africa in 2005 with 289,000 victims reported, the number of victims caused by geological disasters was largely below the average in all the three regularly affected sub-regions: Northern (average: 45,000), Middle (average: 22,000) and Eastern Africa (average: 23,000).
- ▶ The only disaster of the 2000-2006 period that occurred in Southern Africa created few victims (60).

Floods and related disasters:

- ▶ In 2005 and 2006, in all sub-regions the numbers of victims of floods and related disasters were largely below the average.
- ▶ Exceptions occurred in Northern Africa in 2005 and 2006 (162,000 and 230,000 victims, respectively, versus a 2000-2004 average of 130,000) and in Eastern Africa in 2006 (1,850,000 victims versus a 2000-2004 average of 1,775,000).

- ▶ In Middle, Southern and Western Africa the decreases in the numbers of victims vary from 52% to 91% of the 2000-2004 average.

Droughts and related disasters:

- ▶ In 2005 and 2006, the numbers of victims of droughts and related disasters were more than 40% lower than the 2000-2004 average.
- ▶ An exception was Western Africa where the numbers of victims were around 4 million in 2005 and 2006, versus the 2000-2004 average of 2.1 million.
- ▶ In Southern Africa, the number of victims of geological disasters is unavailable for 2005 but the annual regional average for 2000-2004 was of 4.1 million.
- ▶ Eastern Africa was the hardest hit with 16.7 million and 15.5 million victims in 2005 and 2006, respectively, far below the 2000-04 average of 28.4 million.

Windstorm disasters:

- ▶ The number of victims of windstorm disasters in 2005 (14,600) and in 2006 (almost 90,000) is far below the over 600,000 average for 2000-04.
- ▶ This decrease is largely explained by the decline in Eastern Africa from the 2000-04 average of 580,000 victims to a number of around 8,000 in 2005 and 2006.
- ▶ Middle Africa is an exception with 75,000 victims in 2006, far above the 5,000 victims of 2005
- ▶ Victims of windstorm disasters are rarely reported for Northern Africa.

5.2.1.3. Economic Damages

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	n.a.	21	1,189	n.a.	5,476
Floods & related	229	9	327	n.a.	642
Droughts & related	n.a.	n.a.	141	n.a.	364
Windstorms	n.a.	n.a.	76	n.a.	267
Total	229	30	1,733	n.a.	5,476

Table 16 – Economic damages of natural disasters in Africa (in 2006 US\$ million)

- ▶ Data on damages are very rare for Africa, In 2005 and 2006, data are unavailable for 23 of the 26 region/year cells where at least one natural disaster occurred.
- ▶ When annual data exist, they generally relate to only a small number of disasters, providing little insight into the economic impact of natural disasters in Africa.

5.2.2. Americas

5.2.2.1. Occurrence

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	8	6	7.0	5	8
Floods & related	39	35	39.8	31	46
Droughts & related	11	12	19.8	11	27
Windstorms	17	45	31.6	20	44
Total	75	98	97.8	5	46

Table 17 – Natural disaster occurrence in Americas

Geological disasters:

- ▶ In 2005, the number of geological disasters (6) was below the average for 2000-04 (7); in 2006 (8) it was a little above the average.
- ▶ South America had the greatest occurrence of geological disasters for the period 2000-04 (average of 2), in 2005 (3) and in 2006 (6).
- ▶ In all other sub-regions, the numbers of geological disasters were at or below the period averages.

Floods and related disasters:

- ▶ Compared to the 2000-2004 average (39.8), floods and related disasters were less frequent in 2005 (35) and about average in 2006 (39).
- ▶ Northern America is an exception with the numbers of floods and related disasters in 2005 (8) and 2006 (17) above the 2000-2004 average (6).
- ▶ In Central America in 2005, the number of floods and related disasters (12) was above the 2000-2004 average (8.4).
- ▶ In the Caribbean, the number of these disasters remained stable in 2005 (4) and 2006 (4) and at the 2000-2004 average (4).
- ▶ In South America, the number of floods and related disasters were almost half (11 in 2005, 12 in 2006) of the 2000-2004 average of 21.

Droughts and related disasters:

- ▶ The numbers of droughts and related disasters in 2005 (12) and 2006 (11) were well below the 2000-2004 average (20). This was particularly true for South American averages in 2006 versus the 2000-04 average of 4.
- ▶ In 2005, Central (2) and Northern America (4) were below their respective averages of 4 and 7. In 2006, the numbers increased to 4 and 6, respectively.

Windstorm disasters:

- ▶ In 2005, the number of windstorm disasters (45) was above the 2000-2004 average (31.6). In 2006 the number significantly decreased to 17.
- ▶ These figures are explained by the strong increases of such disasters in Central America and in the Caribbean in 2005 (16 and 15 respectively), followed by significant decreases in 2006 (2 and 3) below the respective 2000-2004 averages of 8 and 5.
- ▶ In Northern America, the numbers of windstorm disasters in 2005 (9) and 2006 (12) were below the 2000-2004 average (16).
- ▶ In South America, the numbers of windstorm disasters were 5 in 2005 and only 1 in 2006, versus a 2000-2004 average of 3.

5.2.2.2. Victims

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	332,997	33,120	482,604.4	9,081	1,969,287
Floods & related	818,570	1,034,416	821,877.4	586,222	1,004,852
Droughts & related	3,339	113,903	1,439,428.0	188,358	2,577,566
Windstorms	291,585	7,110,383	2,661,838.6	124,998	6,243,896
Total	1,446,491	8,291,822	5,405,748.4	9,081	6,243,896

Table 18 – Victims of natural disasters in America

Geological disasters:

- ▶ The numbers of victims of geological disasters in 2005 (33,000) and in 2006 (333,000) were far below the 2000-04 average (482,000).
- ▶ This appears in all sub-regions except in South America in 2006 where the number of victims was more than 320,000 versus a 2000-04 average of 112,000.
- ▶ In 2005 and 2006, South America accounted for 91% and 96% of all victims, far above the 2000-2004 average of 23%.



Floods and related disasters:

- ▶ The number of victims of floods and related disasters in 2005 (1,034,000) was above the 2000-2004 average (822,000); in 2006, it was near to the average (819,000).
- ▶ In the Caribbean and Central America, the numbers of victims in 2005 (15,600 and 29,800, respectively) and 2006 (31,200 and 8,000, respectively) were far below the 2000-04 averages (83,500 and 75,700, respectively).
- ▶ In Northern America, the victims of these disasters were fewer in 2005 (23,000) than the 2000-04 average (39,000), but greater in 2006 (82,000).
- ▶ In South America, the numbers of these victims in 2005 (965,000) and 2006 (698,000) were above the 2000-2004 average (625,000).

Droughts and related disasters:

- ▶ The numbers of victims of the droughts and related disasters in 2005 (114,000) and 2006 (3,300) were drastically fewer than the 2000-2004 average (1,440,000).
- ▶ For the only wild fire in the Caribbean in 2005 and the only drought in South America in 2006, the number of victims are unavailable.

Windstorm disasters:

- ▶ The number of victims of wind storm disasters in 2005 (7.11 million) was significantly above the 2000-2004 average (2.66 million); the number decreased very significantly in 2006 (0.29 million).
- ▶ Caribbean and Central America accounted for 88% of the victims of windstorms in 2005 with 2.64 and 3.63 million victims, versus the 2000-2004 averages of 1.45 and 0.07 million, respectively.
- ▶ In 2006, with more than 270,000 victims, Central America accounted for 93% of the victims of these disasters.
- ▶ In Northern America, the number of victims of windstorm disasters was below the 2000-2004 average (1 million) in 2005 (800,000); the number decreased dramatically in 2006 to less than 6,000.

5.2.2.3. Economic damages

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	300	n.a.	1,005.7	n.a.	4,624
Floods & related	1,938	1,424	1,362.5	745	2,805
Droughts & related	116	851	2,440.0	459	4,562
Windstorms	3,044	175,808	14,076.1	1,053	47,076
Total	5,398	178,083	18,884.3	745	47,076

Figures for damages should always to be regarded with caution: data are frequently unavailable.

Table 19 – Economic damages of natural disasters in Americas (in 2006 US\$ million)

Geological disasters:

- ▶ In 2005 and 2006, US\$ 150 million in economic damages due to geological disasters was reported for Northern America.

Floods and related disasters:

- ▶ In 2005 and 2006, the reported amounts of flood and related disaster damages showed an increase of 4.5% and 42% respectively compared to the average for 2000-04.
- ▶ This increase is attributable to Northern America where the amount of flood and related damages increased 179% in 2005 and 356% in 2006 above the 2000-04 average.

Droughts and related disasters:

- ▶ Data are too sparse to be considered in the analysis.
- ▶ For the entire period 2000-2006, the amount of damages reported for Northern America was US\$ 10.7 billion.

Windstorm disasters:

- ▶ Hurricane Katrina damages (US\$ 125 billion) dominate the figure for windstorm disasters, but even with Katrina damage removed, the remaining amount for 2005 (US\$ 50.8 billion) is still well above the 2000-04 average (US\$ 14 billion).
- ▶ In contrast, damages reported for 2006 (US\$ 3 billion) were far below the 2000-04 average.



5.2.3. Asia

5.2.3.1. Occurrence

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	20	15	22.6	15	28
Floods & related	116	90	67.8	58	75
Droughts & related	9	16	17.8	6	26
Windstorms	42	45	39.6	29	49
Total	187	166	147.8	6	75

Table 20 – Natural disaster occurrence in Asia

Geological disasters:

- ▶ The numbers of geological disasters in 2005 (15) and 2006 (20) were below the annual 2000-04 average (22.6).
- ▶ In 2005, this is attributable to a lower number of such disasters in Eastern and South-Eastern Asia.
- ▶ In 2006, there were fewer geological disasters reported in Southern and Western Asia.

Floods and related disasters:

- ▶ The numbers of floods and related disasters in 2005 (90) and 2006 (116) substantially exceeded the 2000-04 average (67.5). In 2005, this was attributable almost entirely to 44 such disasters in Southern Asia compared to the 2000-04 average of 21.
- ▶ In 2006, the number of floods in Eastern Asia (28), South Eastern Asia (39) and Southern Asia (41) exceeded the 2000-04 averages of 15, 24 and 21, respectively.

Droughts and related disasters:

- ▶ The numbers of droughts and related disasters in 2005 (16) and in 2006 (9) were below the 2000-04 average 17.8.
- ▶ This is true for all regions except South Eastern Asia where 6 such disasters occurred in 2005, more than triple the 2000-2004 average.

Windstorm disasters:

- ▶ The numbers of windstorm disasters in 2005 (45) and 2006 (42) exceeded the 2000-2004 average of 39.6.
- ▶ In 2005, the number of such disaster in East Asia (23) was above the 2000-04 average of 18;. In Southern Asia the number of these disasters (14) was also above the average 9.
- ▶ In 2006, only South Eastern Asia, with 18 windstorm disasters, was above the 2000-04 average of 11.

5.2.3.2. Victims

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	3,886,011	3,989,800	3,534,443.4	582,483	7,834,878
Floods & related	28,341,412	73,150,041	109,183,091.2	30,157,621	167,226,188
Droughts & related	20,101,705	8,788,136	137,381,501.2	2,805	385,873,245
Windstorms	66,720,961	41,586,001	33,021,492.0	6,597,021	109,129,113
Total	119,050,089	127,513,978	283,120,527.8	2,805	385,873,245

Table 21 – Victims of natural disasters in Asia

Geological disasters:

- ▶ The numbers of victims of geological disasters in 2005 (3.99 million) and 2006 (3.89 million) slightly exceeded the 2000-2004 average (3.5 million).
- ▶ In 2005, most of the victims (3.2 million) were in Southern Asia, substantially above the 2000-2004 average for this region (1.95 million).
- ▶ In 2006, there were 3.27 million victims in South-Eastern Asia, well above the 0.29 million 2000-2004 average.

Floods and related disasters:

- ▶ The numbers of victims of floods and related disasters in 2005 (73.2 million) and 2006 (28.4 million) were far below the 2000-2004 average (109.1 million). This was not true for all Asian sub-regions. In 2006, the number of victims of such disasters in Western Asia (126,000) was over the 2000-2004 average of 25,000.
- ▶ For 2005 and 2006, the lowest decrease in the numbers of victims of floods and related disasters was 7% in South Eastern Asia in 2006. The highest decrease was 84% in 2006 in Central Asia.

Droughts and related disasters:

- ▶ With 8.8 million in 2005 and 20.1 million in 2006, the numbers of victims of drought and related disasters are far below the 2000-04 average of 137.4 million. This decrease exceeded 80% for all sub-regions except in South Eastern Asia in 2005 (-30%) and Eastern Asia in 2006 (-50%).

Windstorm disasters:

- ▶ With 41.6 million in 2005 and 66.7 million in 2006, the numbers of victims of windstorm disasters were far above the 2000-2004 average of 33 million.
- ▶ Most of this increase is attributable to disasters in Eastern Asia, which accounted for almost 97% of the victims in 2005 and 83% in 2006.
- ▶ In 2006, windstorm disasters created more than 11 million victims in South Eastern Asia, far above the 2000-2004 average of 1.76 million.

5.2.3.3. Economic damages

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	3,226	5,243	9,200.6	371	38,285
Floods & related	5,438	11,177	8,743.6	1,679	13,411
Droughts & related	3,741	477	1,610.2	n.a.	3,036
Windstorms	12,727	7,986	7,717.8	537	16,328
Total	25,132	24,883	27,272.2	371	38,285

Table 22 – Economic damages of natural disasters in Asia (in 2006 US\$ million)

Geological disasters:

- ▶ Data are often unavailable.
- ▶ In 2005, damages reported for Southern Asia (US\$ 5.2 billion) were below the 2000-2004 average (US\$ 9.2 billion).
- ▶ In 2006, damages of US\$ 3.2 billion were reported for South Eastern Asia, far above the US\$ 1.05 billion 2000-04 average.
- ▶ In contrast, the 2000-04 average of US\$ 6.6 billion in Eastern Asia was far above the damages reported for this region in 2005 and 2006.

Floods and related disasters:

- ▶ Damages associated with floods and related disasters amounted to US\$ 11.2 billion in 2005 and US\$ 5.5 billion in 2006, 29% above and 38% below the US\$ 8.7 billion 2000-2004 average respectively.

- ▶ In Southern Asia, damages exceeded the 2000-04 average (US\$ 2.6 billion) in 2005 (US\$ 5.96 billion) and in 2006 (US\$ 3.41 billion).

Droughts and related disasters:

- ▶ Economic data on droughts and related disasters are poor in Asia. However, in 2006, damages were US\$ 3.7 billion in Eastern Asia, the greatest amount reported for these disasters in the world during the entire 2000-2006 period.

Windstorm disasters:

- ▶ For these disasters economic data are sparse.
- ▶ However, US\$ 6.4 billion and US\$ 10.2 billion were reported for Eastern Asia in 2005 and 2006, compared to the 2000-2004 average of US\$ 7.4 billion.
- ▶ For South Eastern Asia, the amount of damage was US\$ 2 billion in 2005 and US\$ 2.5 billion in 2006, far above the average of US\$ 0.25 billion for 2000-2004.

5.2.4. Europe

5.2.4.1. Occurrence

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	12,567	3,046	127,629.4	911	293,200
Floods & related	179,238	119,010	494,568.8	36,439	1,027,711
Droughts & related	66,267	1,139	264,893.8	2,321	1,286,814
Windstorms	1,828	406,164	565,648.4	129	2,668,857
Total	259,900	529,359	1,452,740.4	129	2,668,857

Table 23 – Natural disaster occurrence in Europe

Geological disasters:

- ▶ Geological disasters are infrequent in Europe, accounting for only 7% of all geological disasters in the world for the period 2000-2006.
- ▶ Three geological disaster occurred in Europe in 2005 and only 2 occurred in 2006.

Floods and related disasters:

- ▶ The numbers of floods and related disasters in 2005 (44) and 2006 (33) far exceeded the 2000-04 average (28.6).
- ▶ This increase was due almost entirely to Eastern Europe, which accounted for 63% of all floods in 2005 and 61% in 2006, far above the 36% 2000-04 average for the region.



Droughts and related disasters:

- ▶ Droughts and related disasters showed increases in 2005 (24) and 2006 (24) far above the 2000-04 average (18.2). The major part of this increase occurred in Northern and Western Europe. In Northern Europe there were the disasters both in 2005 and 2006, far above the 2000-04 average of 1.2. In Western Europe the number of droughts and related disasters was 9 in 2005 and six in 2006, far above the 1.4 regional average.

Windstorm disasters:

- ▶ The number of windstorm disasters in 2005 was 23, almost double the 2000-04 average of 13.2.
- ▶ In 2005, windstorm disasters doubled in Eastern Europe and tripled in Northern and Southern Europe.
- ▶ In 2006, these disasters were infrequent in Europe. However, in Western Europe the number of windstorm disasters increased 150% compared to the 2000-04 average.

5.2.4.2. Victims

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	2	3	5.6	4	7
Floods & related	33	44	28.6	17	41
Droughts & related	24	24	18.2	7	35
Windstorms	9	23	13.2	6	23
Total	68	94	66.0	4	41

Table 24 – Victims of natural disasters in Europe

Geological disasters:

- ▶ The occurrence of geological disasters in Europe is relatively low. Only 12,567 victims of these disasters were reported in 2006 and 3,046 in 2005.

Floods and related disasters:

- ▶ In 2005, 119,000 victims of floods and related disasters were reported in Europe. In 2006, there were 179,000. This represents, only 24% and 36% of the 2000-04 average (495,000), respectively.
- ▶ All sub-regions reported a decrease in the number of victims within the range of 63% to 90% when compared to the 2000-04 sub-regional averages.

Droughts and related disasters:

- ▶ Numbers of victims for 2005 (1,139) and 2006 (66,267) are far below the 2000-04 average (265,000).

- ▶ A decrease was found in all sub-regions as 62,800 victims were reported in 2006 in Eastern Europe (2000-04 average: 206,979) and 3,340 in Western Europe (2000-04 average: 7,007).
- ▶ In Southern Europe, numbers of victims were far below the 2000-04 average of 51,000.

Windstorm disasters:

- ▶ The numbers of victims in 2005 (406,000) and 2006 (1,828) were below the 2000-04 average (566,000).
- ▶ Differences in the numbers were particularly significant for:
 - Eastern Europe: 12 and 305 victims in 2005 and 2006 respectively against an average of 536,000 for 2000-2004.
 - Southern Europe: 400,031 and 604 victims in 2005 and 2006 respectively against an average of 25,000 for 2000-2004.

5.2.4.3. Economic damages

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	55	0	363.1	4	999
Floods & related	479	4,942	6,743.0	182	20,120
Droughts & related	1,885	851	2,436.3	717	10,504
Windstorms	10	516	443.7	14	917
Total	2,428	6,308	9,986.2	4	20,120

Table 25 – Economic damages of natural disasters for Europe (in 2006 US\$ million)

- ▶ Economic damages were poorly reported in Europe. In 2005-2006, data were not available for 12 of the 23 region/year cells with disasters reported.

Geological disasters:

- ▶ US\$ 55 million in economic damages were reported in Eastern Europe in 2006.

Floods and related disasters:

- ▶ Amounts for 2005 (US\$ 4.9 billion) and 2006 (US\$ 0.48 billion) were below the 2000-04 average (US\$ 6.74 billion).
- ▶ In 2005, damages of US\$ 1.8 billion and US\$ 3.1 billion were reported for Eastern and Western Europe, respectively.
- ▶ Data are not available for Northern and Southern Europe in 2005 and Western Europe in 2006.
- ▶ In 2006, US\$ 156 million in economic damages was reported for Eastern Europe.

Droughts and related disasters:

- ▶ In 2005-2006, data were unavailable for 3 of the 8 region/year cells where at least one drought or related disaster was reported.
- ▶ Damages of US\$ 1 billion were reported in Eastern Europe in 2006.

Windstorm disasters:

- ▶ Data are not available for 6 of the 7 region/year cells where at least one windstorm disaster occurred.
- ▶ Damages of US\$ 516 million were reported in 2005.

5.2.5. Oceania

5.2.5.1. Occurrence

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	3	3	1.8	1	5
Floods & related	7	4	5.0	3	7
Droughts & related	4	1	1.6	1	3
Windstorms	4	7	8.4	4	11
Total	18	15	16.8	1	11

Table 26 – Natural disaster occurrence in Oceania

Geological disasters:

- ▶ Three disasters were reported in Melanesia in 2005 and 2006, increasing from the 2000-2004 average of 1.8.

Floods and related disasters:

- ▶ Flood disasters occurred in Australia, New Zealand and Melanesia.
- ▶ The only significant variation from the 2000-2004 average (1) was found in Melanesia in 2006 (5).

Droughts and related disasters:

- ▶ Droughts and related disasters were only reported for Australia.
- ▶ In 2006, this number (4) exceeded the 2000-2004 average (2).

Windstorm disasters:

- ▶ The numbers in 2005 (7) and in 2006 (4) were below the 2000-2004 average (8.4).
- ▶ No windstorm disasters occurred in Melanesia in 2005, in Polynesia in 2006 or in Micronesia in 2005 and 2006.
- ▶ In Polynesia, in 2005, the number of windstorm disasters (4) was above the 2000-2004 average (1).

5.2.5.2. Victims

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	3,299	20,201	7,756.0	4,701	19,478
Floods & related	25,244	5,897	5,771.4	604	19,577
Droughts & related	145	236	2,380.0	200	4,646
Windstorms	9,198	1,944	32,443.8	1,351	89,951
Total	37,886	28,278	48,351.2	200	89,951

Table 27 – Victims of natural disasters in Oceania

Geological disasters:

- ▶ The number of victims geological disasters in 2005 (3,299) was significantly below the 2000-04 average (7,756); in 2006, the number (20,201) was far above it.

Floods and related disasters:

- ▶ The number of victims was significantly above the 2000-04 average (2,890) only in Melanesia in 2006 (22,944).

Droughts and related disasters:

- ▶ Droughts and related disasters were only reported for Australia and the numbers of victims reported in 2005 (236) and 2006 (145) were far below the 2000-04 average (2,380).

Windstorm disasters:

- ▶ The numbers of victims of windstorm disasters in 2005 (1,944) and 2006 (9,198) were far below the 2000-04 average (32,444). However, the Australia-New Zealand sub-region shows a different figure with 1,301 and 9,030 victims in 2005 and 2006, respectively, against the 2000-04 average of 882.

5.2.5.3. Economic damages

Major types of natural disasters	2006	2005	2000-2004		
			Average	Min	Max
Geological	n.a.	n.a.	n.a.	n.a.	n.a.
Floods & related	4	134	158.6	1	318
Droughts & related	100	38	584.4	n.a.	2,365
Windstorms	1,182	54	154.6	66	271
Total	1,286	226	897.5	1	2,365

Table 28 – Economic damages of natural disasters in Oceania (in 2006 US\$ million)

Geological disasters:

- ▶ No data are available for geological disasters for 2005-2006.

Floods and related disasters:

- ▶ In 2006, the amount of damage reported (US\$ 4 million) was far below the 2000-2004 average (US\$ 159 million).

Droughts and related disasters:

- ▶ Damages reported in the Australia-New Zealand sub-region in 2005 (US\$ 38 million) and 2006 (US\$ 100 million) were dramatically lower than the 2000-2004 average (US\$ 584 million).

Windstorm disasters:

- ▶ Data are not always available.
- ▶ In 2006, windstorm disasters caused almost US\$ 1.2 billion damages in the Australia-New Zealand sub-region.

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