

# Disaster Stories

**Bahar Yetiş Kara**

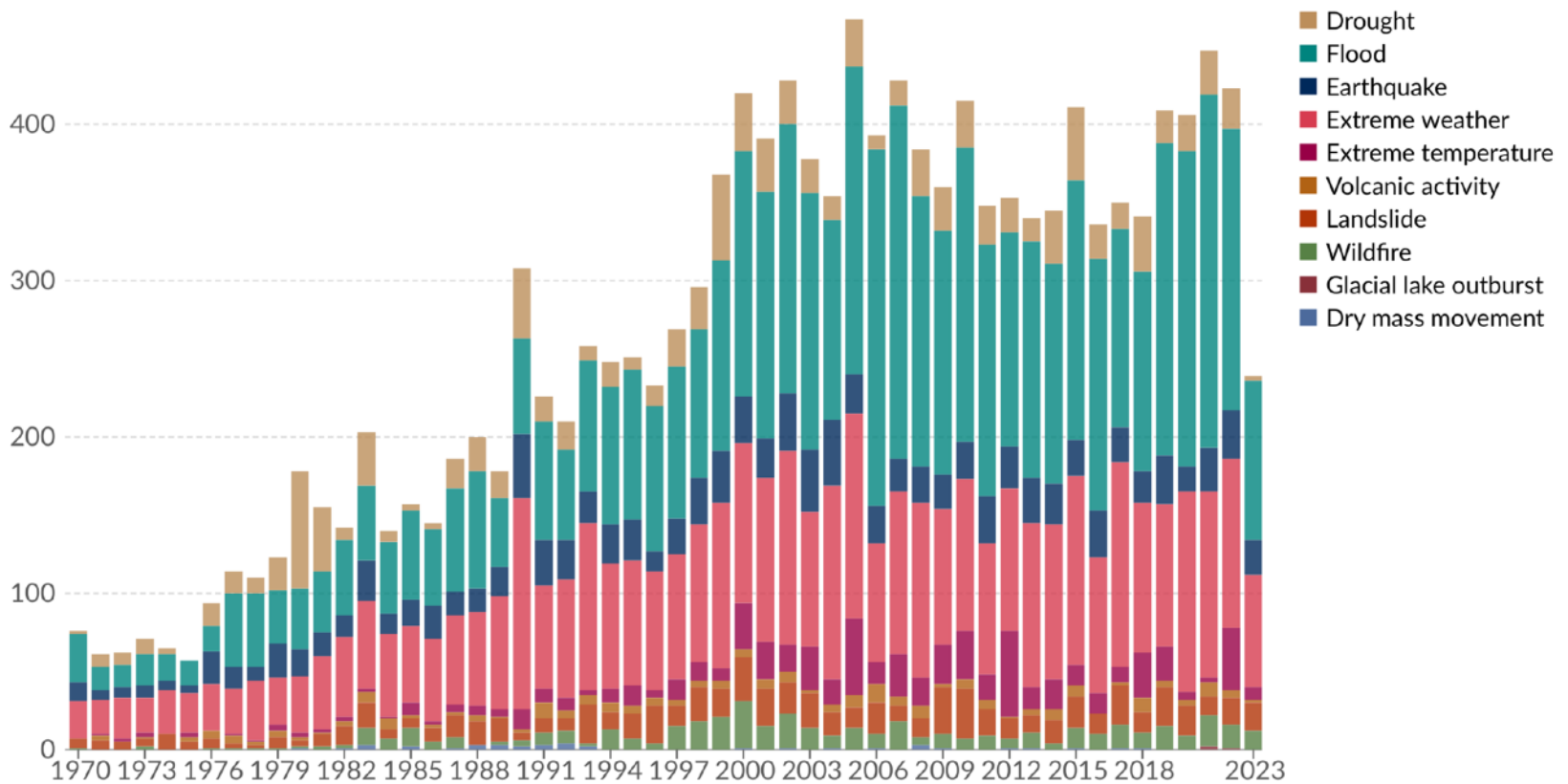






## Global reported natural disasters by type, 1970 to 2023

The annual reported number of natural disasters, categorised by type. The number of global reported natural disaster events in any given year. Note that this largely reflects increases in data reporting, and should not be used to assess the total number of events.



Data source: EM-DAT, CRED / UCLouvain (2023)

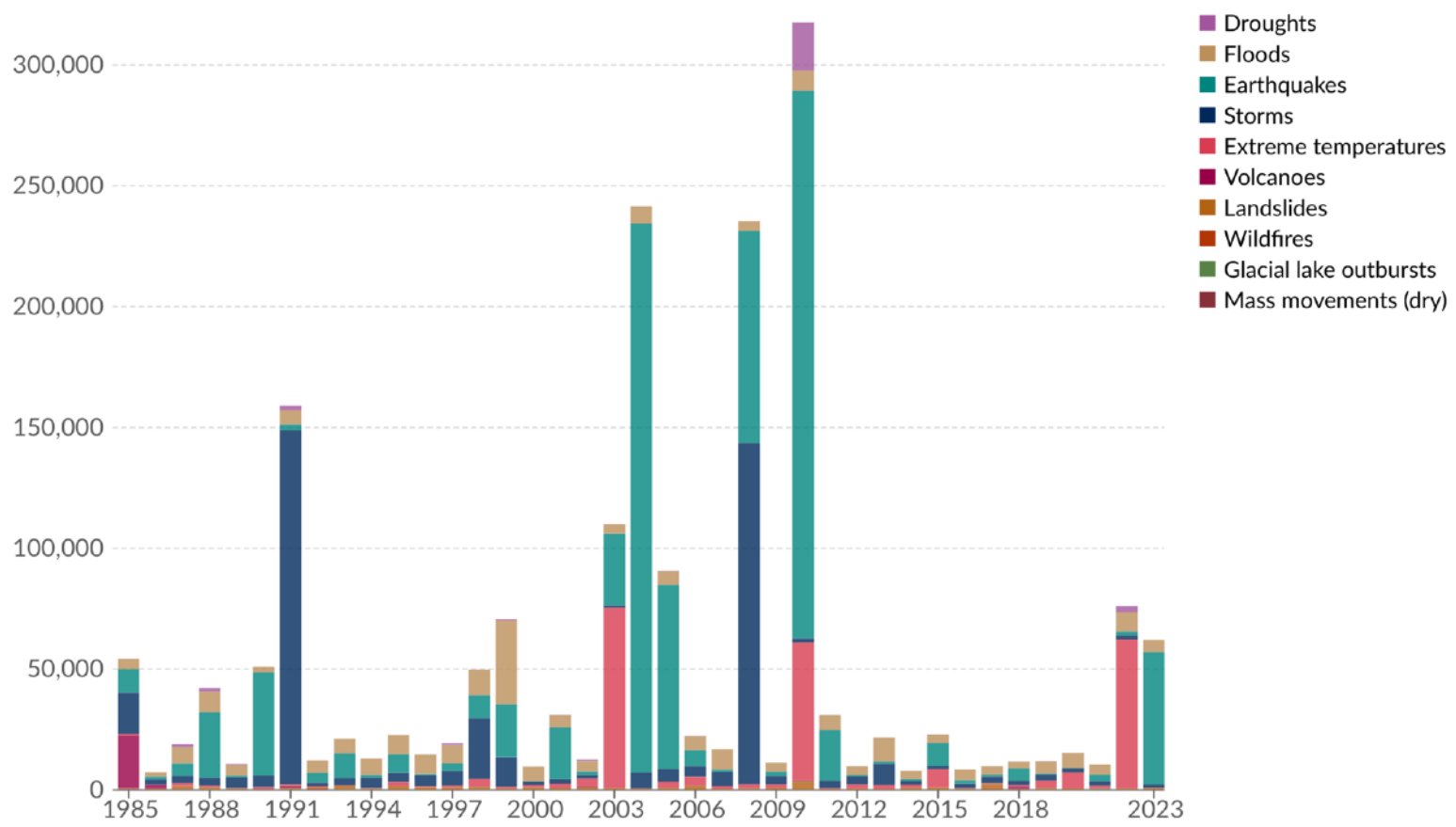
Note: Data includes disasters recorded up to September 2023.

[OurWorldInData.org/natural-disasters](https://OurWorldInData.org/natural-disasters) | CC BY



# Number of deaths from natural disasters, World, 1985 to 2023

Our World  
in Data



Data source: EM-DAT, CRED / UCLouvain (2023)

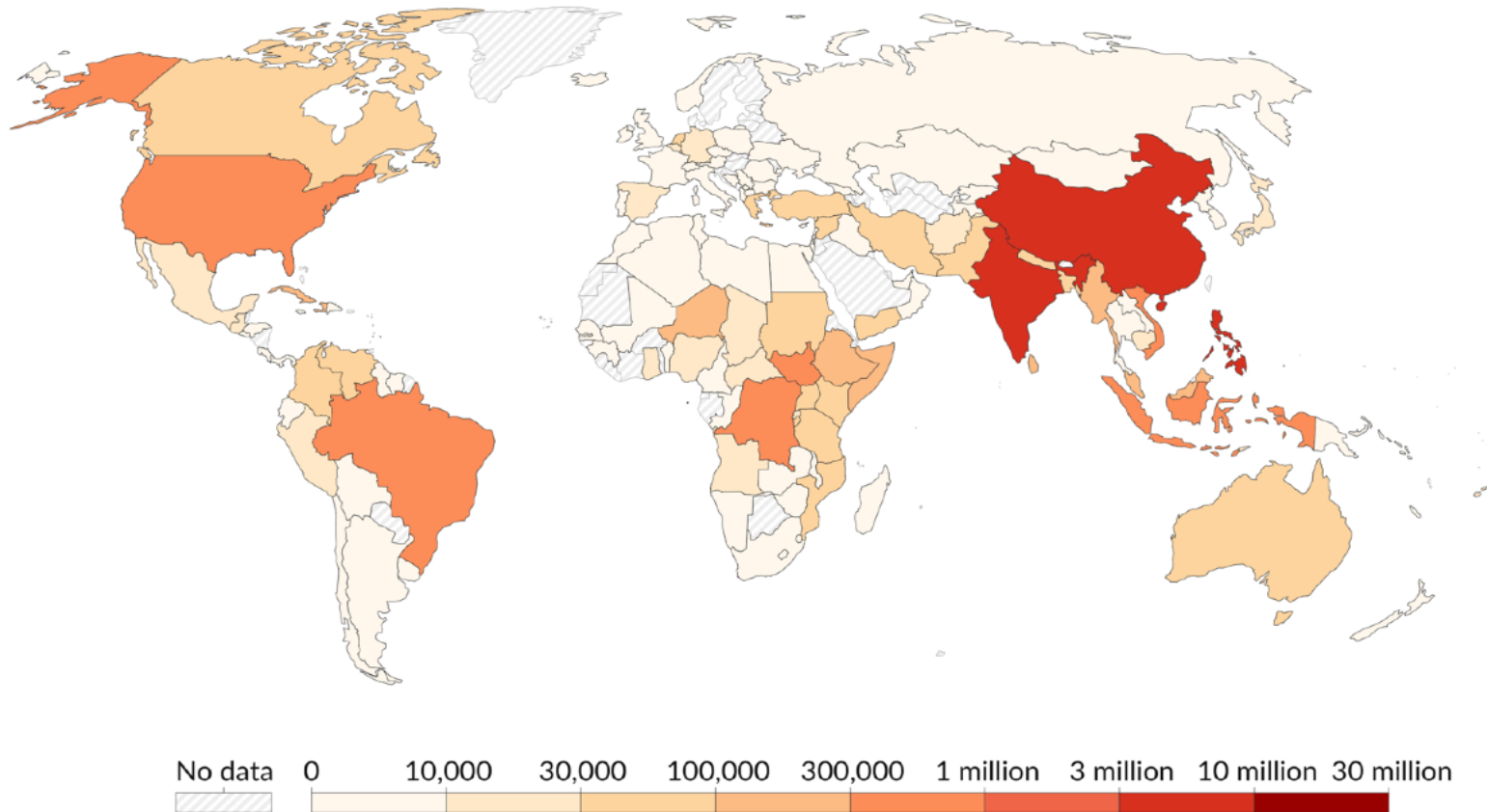
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[OurWorldInData.org/natural-disasters](https://OurWorldInData.org/natural-disasters) | CC BY



# People displaced internally by natural disasters, 2021

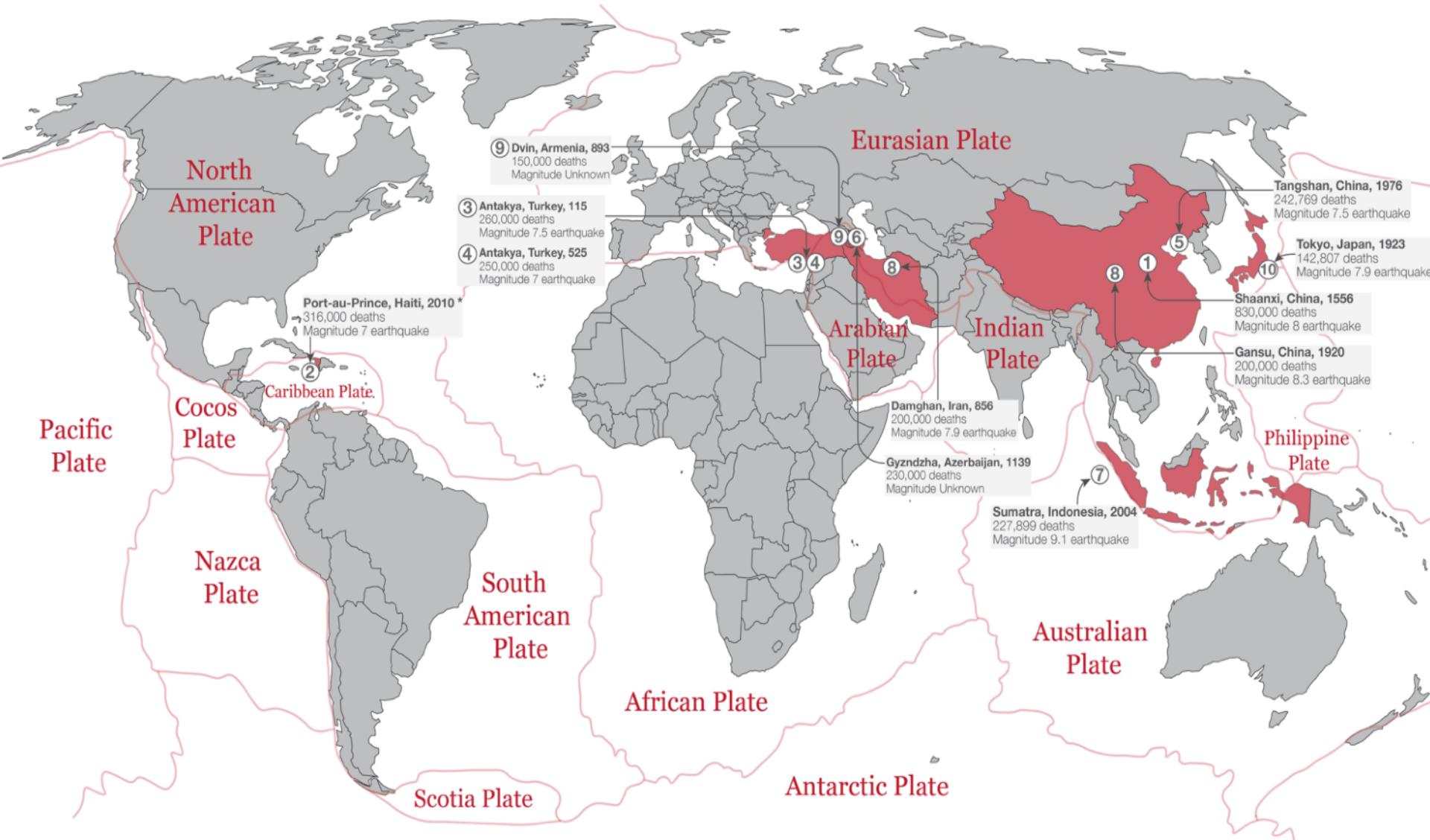
Internally-displaced persons are defined as people or groups of people who have been forced or obliged to flee or to leave their homes or places of habitual residence, as a result of natural or human-made disasters and who have not crossed an international border.



# The deadliest earthquakes in human history

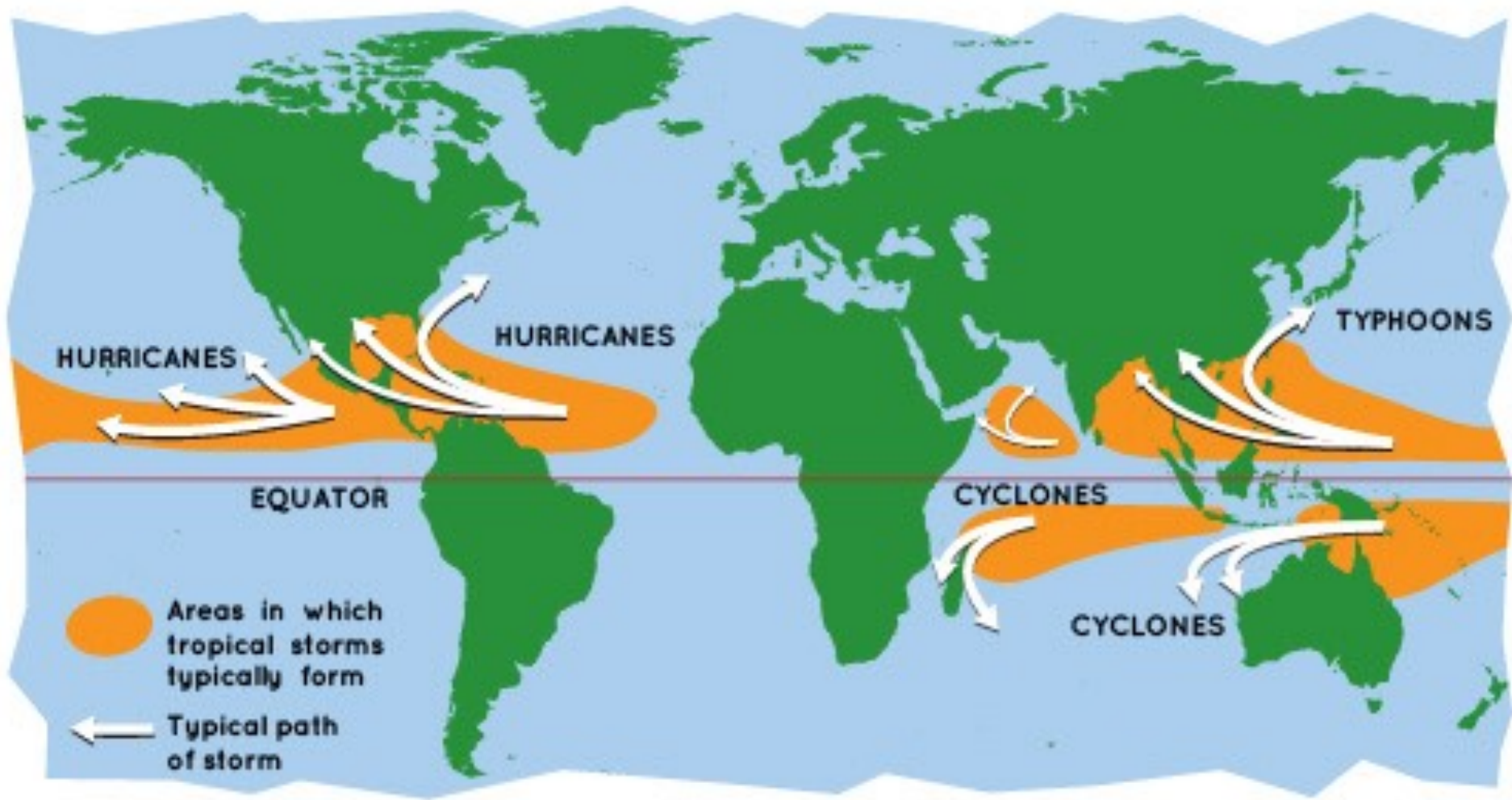
Mapped are the top 10 rankings of known earthquakes by death toll.

Since two events are ranked equally in 8th place, a total of 11 are included. Tectonic plate boundaries are also shown in red.



\*The death toll figure for the 2010 Haitian earthquake in Port-au-Prince is still disputed. Here we present the adopted figure by the NGDC of the NOAA (for consistency with other earthquakes); this is the figure reported by the Haitian government. Some sources suggest a lower figure of 220,000. In the latter case, this event would fall to 7th place in the above rankings.

# Hurricane

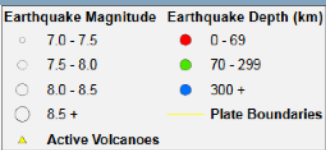


# Tsunami

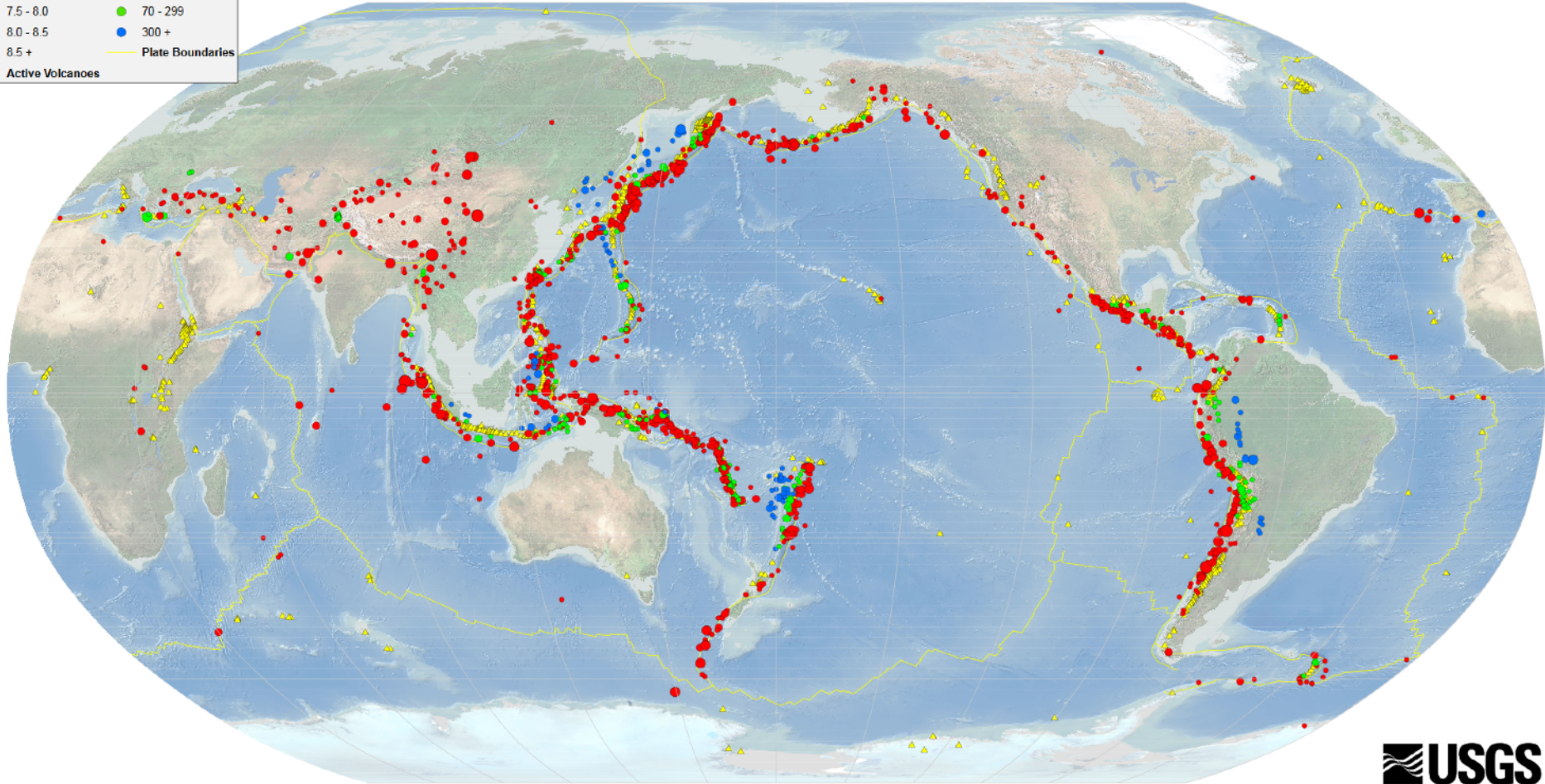




# Tsunami – the Ring of Fire



Global Earthquakes 1900 - 2013



# Volcano



## The World Map of Volcanic Activity



Countries/territories/U.S. states/Russian territories  
which experienced volcanic eruptions in 2023



<sup>1</sup> U.S. territory   <sup>2</sup> French Overseas Department   <sup>3</sup> India  
<sup>4</sup> Australia   <sup>5</sup> British Overseas Territory

As of Nov. 15, 2023

Source: Smithsonian Institution Global Volcanism Program

# The Sendai Framework for Disaster Risk Reduction 2015-2030

## Sendai Framework for Disaster Risk Reduction Priorities for Action

### 1. Understanding disaster risk

*Encouraging Parties to identify potentially hazardous activities to be able to target preventive measures, preparedness and response.*

### 2. Strengthening disaster risk governance to manage disaster risk

*Providing a governance mechanism for regional cooperation to address transboundary disaster risk reduction.*

### 3. Investing in disaster risk reduction for resilience

*Promoting investments in preventive measures, which cost less than remedying the consequences of disasters.*

### 4. Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction

*Ensuring preparation, review and periodical update of disaster preparedness and contingency policies, plans and programmes.*

# The Sendai Framework for Disaster Risk Reduction 2015-2030

**SENDAI FRAMEWORK**  
FOR DISASTER RISK REDUCTION 2015-2030

**SUSTAINABLE DEVELOPMENT GOALS**

## Reduce

- Target A Mortality
- Target B Affected People
- Target C Economic loss
- Target D Damage to critical infrastructure

## Increase

- Target E Countries with national & local DRR strategies 2020
- Target F International cooperation to developing Countries
- Target G Availability and access to multi-hazard early warning systems & disaster risk information and assessments



**Goal 1. End poverty in all its forms everywhere**

**Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable**

**Goal 13 Make urgent action to combat climate change and its impacts**

# Disaster Stories



- Hurricane Katrina (2005)
- 2010 Haiti Earthquake
- 2004 Indian Ocean Earthquake and Tsunami
- 1970 Bhola cyclone
- September 11 Attacks
- Japan Earthquake (later)




# Hurricane Katrina (2005)

- Between 23-30 August 2005.
- Hit southeast US, specifically greater New Orleans
- 1836 confirmed fatalities
- \$81.2Billion recorded damage



# Hurricane Katrina (2005)

- Preparedness
  - On the morning of Friday, August 26, Katrina had strengthened to a Category 3 storm (later transformed to Category 5).

Categories of hurricane					
	Category 1	Category 2	Category 3	Category 4	Category 5
Wind	74-95mph	96-110mph	111-130mph	131-155mph	Over 155mph
Storm surge	4-5ft	6-8ft	9-12ft	13-16ft	Over 18ft
					
	<b>Minimal:</b> No real structural damage; some flooding	<b>Moderate:</b> Material damage to buildings; small craft break moorings	<b>Extensive:</b> Structural damage to small houses; inland flooding	<b>Extreme:</b> Major structural damage & heavy flooding; evacuation necessary	<b>Catastrophic:</b> Massive damage to buildings; small structures blown over or away
Source: Saffir Simpson scale					



# Hurricane Katrina (2005)

- Preparedness
  - Federal Government
    - The United States Coast Guard began prepositioning resources in a ring around the expected impact zone
    - On August 27, it moved its personnel out of the New Orleans region prior to the mandatory evacuation.
    - On August 28, Louisiana coast and West Florida are marked as “inhabitable”





# Hurricane Katrina (2005)

- Preparedness
  - State and Local Level
    - On August 26, local governments began evacuating
    - 41 counties and 61 cities were evacuated
    - Plan was sufficient but not enough resources and infrastructure
    - Shifts in the predicted landfall location
    - Unexpected scale and intensity

# Hurricane Katrina (2005)

- Impact
  - Total death toll is 1836, with 1577 from LA and 238 from MS.
  - Coastal area of LA, MS and some of West FL is was flooded because of the heavy rain
  - Buildings became damaged and unused. People left homeless





# Hurricane Katrina (2005)

- Aftermath
  - Military
    - 10000 guard troops were deployed
    - Coast Guards flew around for search and rescue
    - Navy sent ships for search and rescue
    - Air force sent relief supplies, search and rescue teams, aeromedical evacuation and medical care



# Hurricane Katrina (2005)

- Aftermath
  - Government (Non-Military)
    - FEMA deployed all their S&R teams and Medical Assistance teams
    - Kids were transferred to other schools
    - 10000 temporary jobs became eligible to help recovery
    - 11500 lives saved
    - 25000 citizens evacuated
    - FEMA distributed 6.7M Liters water and 1.9M meals
    - Around 30000 government staff were employed

# Hurricane Katrina (2005)



- Aftermath
  - State and Local
    - Sent aid, S&R teams and ambulances
    - Provided shelter and bungalow areas
    - Provided schooling for children





# Hurricane Katrina (2005)

- Aftermath
  - Red Cross
    - 74000 volunteers, provided shelter to 160000 evacuees and more than 7.5 million hot meals
    - More than 250 Emergency Response Vehicles to provide food and water
    - Criticised because they mostly interested in disaster aid, not recovery



# Hurricane Katrina (2005)

- Aftermath
  - Amateur radio operators
    - Gave disaster and weather reports to staff
  - Camp Hope
    - Established by a non-profit organization
    - Volunteer camp originated in Violet, LA
    - Provided housing for evacuees



# Hurricane Katrina (2005)

- During the response to Hurricane Katrina, a lack of interoperability between the computer systems used by the Federal Emergency Management Agency (FEMA) and the State of Louisiana led to a situation in which the individuals requesting critical supplies could not check the status of their orders. Conversely, the FEMA staff processing the orders could not contact the requester to check the validity of the request (Holguin-Veras et al., 2007).
- The bullwhip effect is more controlled in commercial supply chains thanks to the transparency and supply chain coordination between partners and facilitated by shared information on enterprise resource planning systems – a stage that the humanitarian world is far from reaching (Holguin-Veras et al., 2012).



# 2010 Haiti Earthquake

- On Tuesday, 12 January 2010 at 16.53 local time (21.53 UTC)
- A catastrophic magnitude of 7.0Mw
- Nenter near town Leogane, 25 km west of the capital
- By 24 January at least 52 aftershock measuring 4.5 or more



A black and white photograph of a family smiling together. A young boy is on the left, smiling broadly. Next to him is a man, also smiling. To his right is a young girl looking towards the camera. Further right is a woman smiling, and on the far right is another man looking down. The image is partially obscured by a blue gradient bar at the bottom.

# 2010 Haiti Earthquake

- 230000 people died
- 300000 people injured
- 1000000 people made homeless
- 1.9 million people displaced by the earthquake
- No damaging tsunami reported

A black and white photograph of a family smiling together. A young boy is on the left, a man is in the center, a young girl is on the right, and a woman is partially visible on the far right. They are all looking towards the camera with happy expressions.

# 2010 Haiti Earthquake

- Damage to infrastructure
  - All hospitals in the capital; air, sea, and land transport facilities; and communication systems were destroyed
  - 3 “Doctors Without Borders” facilities were destroyed

# 2010 Haiti Earthquake

- Early Response
  - Many countries sent S&R teams
  - Dominican Republic sent water, food, machinery, made their airport and hospitals available and provided telecommunications



A black and white photograph of a family smiling together. A young boy is on the left, smiling broadly. Next to him is a man, also smiling. To the right is a young girl looking towards the camera. Further right is a woman smiling, and on the far right, a young boy is partially visible, looking down.

# 2010 Haiti Earthquake

- Relief and rescue
  - Rescue operations were intensified after the arrival of staff from other countries (two days after the disaster)
  - As of 18 January, over 3000 people were cured
  - Medical ship

## RELIEF AND RESCUE EFFORTS

- Problematic delivery of aid
- Individual and corporate donations
- In 23 January Haitian Government ended rescue efforts.





# RELIEF AND RESCUE EFFORTS

- WFP handed out food only to women with vouchers.

Organizers say they are giving food voucher tickets almost exclusively to women because previous food handouts were sometimes disrupted by young men pushing their way to the front of the line or taking the heavy bags of rice and other dry goods away from women.

They also say women are more likely to ensure that children get enough to eat.

Source: <https://www.npr.org>



# RELIEF AND RESCUE EFFORTS

- “Major aid organizations such as the Red Cross, WFP, the UN Children's Fund and the Food and Agriculture Organization stepped in to provide disaster assistance. Unfortunately, these organizations failed to effectively coordinate and communicate with the Haitian government and other relief organizations, resulting in haphazard distribution of food aid and no commitment to long term food security (Cullen & Ivers, 2010, p. 63).”



# SECURITY



- “According to the Haitian National Police (HNP), 5,136 prisoners escaped, including around 700 violent gang members. Some of these escapees have accessed hidden caches of weapons.”

Source: <https://www.usip.org>

# HEALTH



- Cholera
- On October 21, 2010, the Haitian Ministry of Public Health and Population (MSPP) reported a cholera epidemic
- Wrong waste management or disaster-related causes?



# RELIEF AND RESCUE EFFORTS

- Violence during distribution of food
- US Military to prevent chaos
- WFP handed out food only to women with vouchers.
- Cash for Work of UNDP!
- Refugee camps
- Military Engineering team from Japan and S. Korea
- 300+ protestors for lack of aid and food
- Lawyers without borders for justice system
- G7 canceled all debts of Haiti

# LATER?



- In July 2010, CNN returned to Port-au-Prince and reported, “It looks like the quake just happened yesterday”.
- More than 1 million people in shelters
- 15% house built
- Cholera epidemic broke out
- Sexual, domestic, and gang violence
- Black marketing for vouchers

A black and white photograph of a family smiling together. A young boy is on the left, looking towards the camera. Next to him is a man, then a young girl, and a woman is partially visible on the right. They are all smiling and appear to be in a close embrace.

# 2004 Indian Ocean Earthquake

- December 26, 2004. Near the west coast of Sumatra, Indonesia.
- Magnitude was between 9.1 and 9.3
- Tsunamis occurred afterwards
- Killed over 130000 people in different countries.

# 2004 Indian Ocean Earthquake





# 2004 Indian Ocean Earthquake

- Humanitarian aid is needed because of the damage in infrastructure, shortage in food, water and medical supplies.
- Epidemics was a concern
- Response was quick, so there was no hunger and therefore less deaths.
- Over 1.3 million people were effected from the tsunami. Food provided by WFP.
- Over \$7B donated by other countries.

# 2004 Indian Ocean Earthquake

- Countries provided infrastructure, medical support, staff and relief supports.
- NGOs started fund-raising activities
- Moreover, several companies donated financial support.





## “No, thanks”

- Sri Lanka’s Colombo airport reported that within two weeks of the tsunami, 288 freighter flights had arrived without airway bills to drop off humanitarian cargo. They piled up at the airport, clogged warehouses, and remained unclaimed for months. Worse yet, these prepaid flights refueled and then returned empty, when they could have carried commercial cargo. As a result, the airport ran out of fuel for the scheduled flights. After that, many companies’ offers of help were met with “no thanks.” (Harvard Business Review, 2006)

# 1970 Bhola Cyclone

- Hit West India and East Pakistan (Bangladesh)
- 12 November 1970
- Category 3 Hurricane
- Political crisis
- 167000 was killed by the storm



A black and white photograph of a family smiling together. A young boy is on the left, looking towards the camera. Next to him is a man, likely the father, looking down at a young girl. The girl is looking to the right. Behind her is a woman, likely the mother, looking down at the girl. On the far right, another person is partially visible, looking down. The background is bright and slightly out of focus.

# 1970 Bhola Cyclone

- Aftermath
  - Government sent hospital ships and staff to the area
  - Army arrived to the area after two days
  - Relief is blocked because of the political crisis
  - East Pakistani political leaders criticised central government because of the slow response
  - Lead to Bangladesh Liberation War



# 1970 Bhola Cyclone

- Aftermath
  - Since the government was ineffective, Pakistan Red Crescent started to take over response activities.
  - NGOs and foreign governments sent financial aid and relief support.
  - After this disaster, Red Crescent began to form a complete disaster plan and awareness campaign for the cyclone season.

# September 11 Attacks





# September 11 Attacks

- Series of coordinated suicide attack organized by al-Qaeda in 2001.
- 4 aircraft
  - Two crashed into WTC
  - One crashed into Pentagon
  - One crashed into field in PA
- Total death toll was 2995.

A black and white photograph of a family smiling together. A young boy is on the left, a man is in the center, a young girl is on the right, and a woman is partially visible on the far right. They are all looking towards the camera with happy expressions.

# September 11 Attacks

- Many police officers took leaves of absence to travel to NYC to assist recovering bodies.
- People donated blood for the wounded.
- Many relief funds were immediately set up to assist victims of the attacks, with the task of providing financial assistance to the survivors and to the families of victims



# September 11 Attacks

- Within the United States, Congress passed and President Bush signed the Homeland Security Act of 2002, creating the Department of Homeland Security, representing the largest restructuring of the U.S. government in contemporary history.

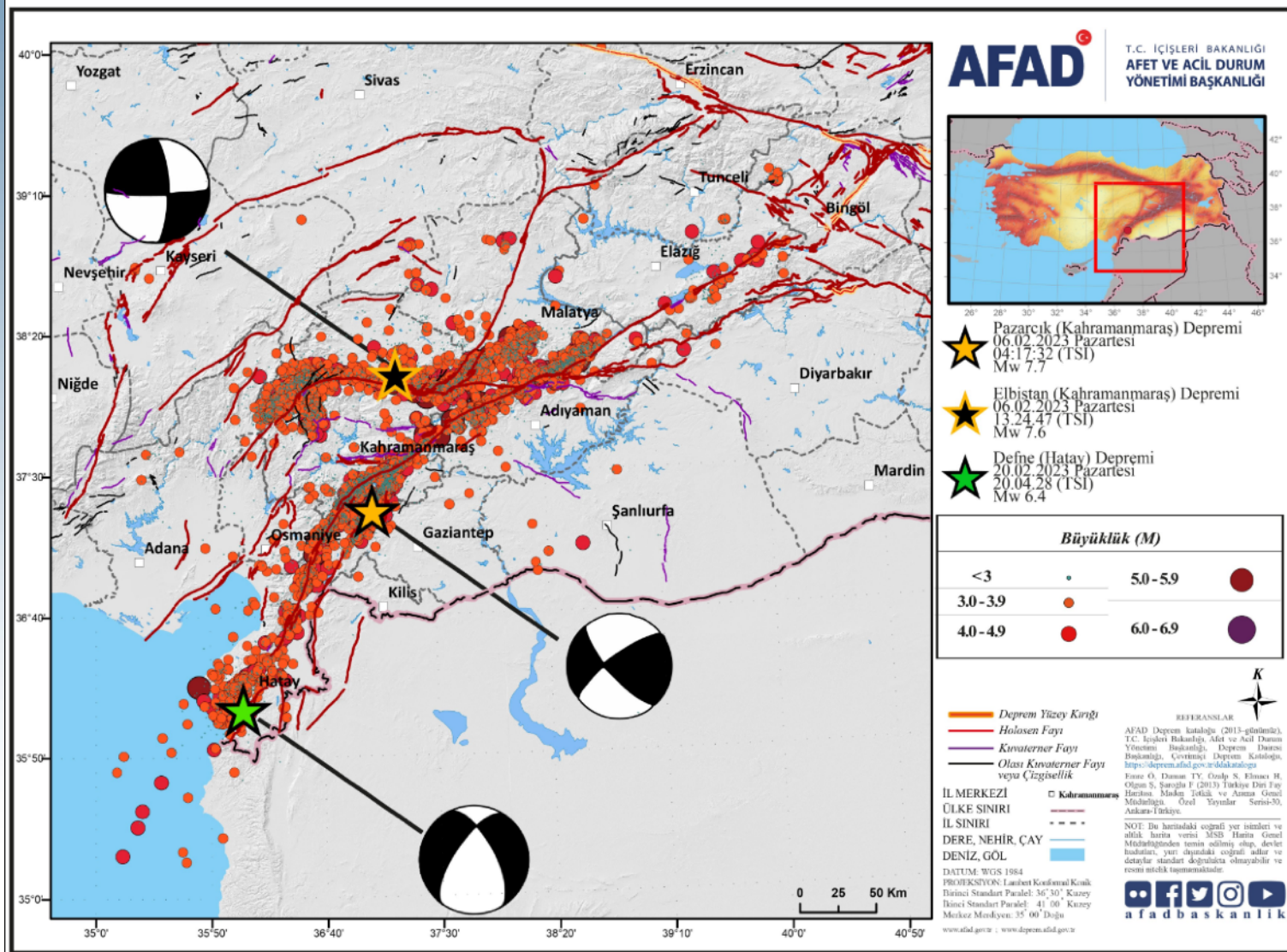




# Impact of Disasters on people

- Disasters are not “rare” events:
- 6637 natural disasters between 1974-2003 worldwide
  - More than 2 million deaths
  - 5.1 billion cumulatively affected people
  - 182 million homeless people
- Only in 2005, over 180000 deaths and over US\$ 200 billion economic loss

# Kahramanmaraş Earthquakes, 2023



# Kahramanmaraş Earthquakes, 2023

- 6 February 2023
- 7.7 and 7.6 magnitude
- South-east of Türkiye and parts of Syria
- 11 cities were affected
- A large scale disaster
- Total Number of Urgent + Severely Damaged + Collapsed Houses > 500000



# Kahramanmaraş Earthquakes, 2023

LEVEL	IMPACT	TYPE OF EVENT AND SUPPORT STATUS ACCORDING TO SCALE
L1	Local facilities are sufficient.	Provincial Disaster and Emergency Management Centre (IAADYM)
L2	Reinforcement of supportive provinces is required.	Provincial Disaster and Emergency Management Centre (IAADYM) + Search Rescue Unit (AKB) and 1st Group of Supportive Provinces
L3	National support is required	1 <sup>st</sup> and 2 <sup>nd</sup> Groups of Supportive Provinces + National Capacity
L4	International support is required.	1 <sup>st</sup> and 2 <sup>nd</sup> Groups of Supportive Provinces + National Capacity + International Support

**Table 1.** Level and Degree of Impact According to the Turkish Disaster Response Plan.



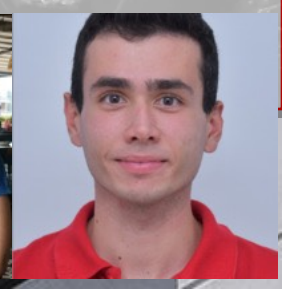
- Support groups were also affected
- Local resources are damaged
- Aftershocks and secondary disasters
  - floods, fires, etc.
- Complications regarding the implementation of TAMP
- Problems regarding
  - Facility utilization
  - Personnel experience
  - Collaboration among central and local public institutions and non-public actors
- Long-term needs?

# Disaster Resilient Cities: An OR Approach to Disaster Management

Bahar Y. Kara,

Ö. Karsu, Z. Dönmez, Ç. Dursunoğlu,

G. İkizler, E. Şentürk, Defne Tan, Egehan Uğraş





# Panels and Workshops on Resilient Cities

İstanbul  
Adana  
Mersin  
Diyarbakır  
Gemlik

**Disaster Logistics**

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İPA İstanbul Port Authority

İPA İstanbul 15d

Prof. Dr. Bahar Yetiş, lojistik boyutu çalışma grubu değerlendirme notlarını paylaşıyor.

Lojistik Boyutu

- Kıyı yapıları & Ulaştırma yapıları
  - İkinci denizcilik ve kıyı güveni sağlamak için kıyı yapılarının hasar değerlendirilmesi gerektiği belirtilmiştir.
  - Bu yapıların güçlendirilmesi.
  - Bayi işletmelerin dağılımı ve misafirhanelerde uygun yerlere konumlandırılması.
  - Çevre yapılarının hasar değerlendirilmesi gerektiği belirtilmiştir.
- Yardımlar & misafirhaneler lojistiği
  - Misafirhanelerin ve diğer konaklama tesislerinin değerlendirilmesi.
  - Deniz, vapur ve misafirhaneler için konaklama alanlarının hasar tespiti yapılması.
  - Kıyıya yakın yerlerde bulunan misafirhanelerin değerlendirilmesi.
  - Misafirhaneler için uygun alanların tespit edilmesi.
  - Yardımların etkin ve hızlı şekilde gerçekleştirilmesi için misafirhanelerin, lojistik alanlarının değerlendirilmesi.
- Envanterler çalışmaları
  - İnventar çalışmaları, hasar tespitleri, acil durum çalışmalarına ilişkin çalışmaların yapılması.
  - İnventar çalışmaları için gerekli alanların tespit edilmesi.
  - İnventar çalışmaları için gerekli alanların tespit edilmesi.

İSTANBUL BÜYÜKŞEHİR BELEDİYESİ

İSTANBUL DEPREM ÇALIŞMA GRUBU TOPLANTISI

25 ŞUBAT 2023

BOYUN BAŞKAN ADANA

BOYUN BAŞKAN ADANA

İPA İstanbul Port Authority

ADANA DEPREM EYLEM PLANI ÇALIŞMA TOPLANTISI

16 MART 2023





06.02.2023  
04:17

**First quake**



06.02.2023  
09:00

**National teams deployed**

**Istanbul'dan deprem bölgesine arama kurtarma ekipleri ile yardım malzemeleri yola çıktı**



06.02.2023  
13:24

**Second quake**



06.02.2023  
18:00

**Disaster declaration and call for international**

**Dördüncü seviye deprem ilanının ardından Türkiye'den uluslararası yardım çağırısı**



06.02.2023  
22:00

**Port fire**

**Son dakika! İskenderun Limanı'nda yangın çıktı**



18.02.2023

**Last live rescue**

**Kahramanmaraş depremi: 296'ncı saatte enkazdan kurtuluş**



16.02.2023

**International teams demobilized**  
**Yabancı Arama Kurtarma Ekipleri Geri Dönüyor**



08.02.2023

**Declaration of needs**

**AFAD deprem bölgesi için öncelikli ihtiyaç listesi yayımladı**



07.02.2023

**Critical services started**

**Kızılay, gıda ve yardım dağıtım noktalarını açıkladı**



07.02.2023

**International teams deployed**

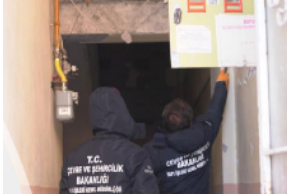
**Dünyanın farklı ülkelerinden ekipler Türkiye için seferber oldu**



19.02.2023

**Damage/risk assessment**

**DEPREM BÖLGELERİNDE, 830 BİN 783 BİNADAKİ 3 MİLYON 273 BİN 605 BAĞIMSIZ BİRİMDE HASAR TESPİT ÇALIŞMASI YAPILDI**



19.02.2023

**Debris removal**

**Hatay'da enkaz kaldırma çalışmaları başladı**



20.02.2023

**Shelter-sites established**

**Çadırkent kuruldu yeni yaşam başladı**



21.02.2023

**Mobile services for regular needs**

**ANKARA BÜYÜKŞEHİR KAHRAMANMARAŞ'A DÜŞ ALANLARI İLE MOBİL ÇAMAŞIRHANE VE BERBER GÖNDERİYOR**

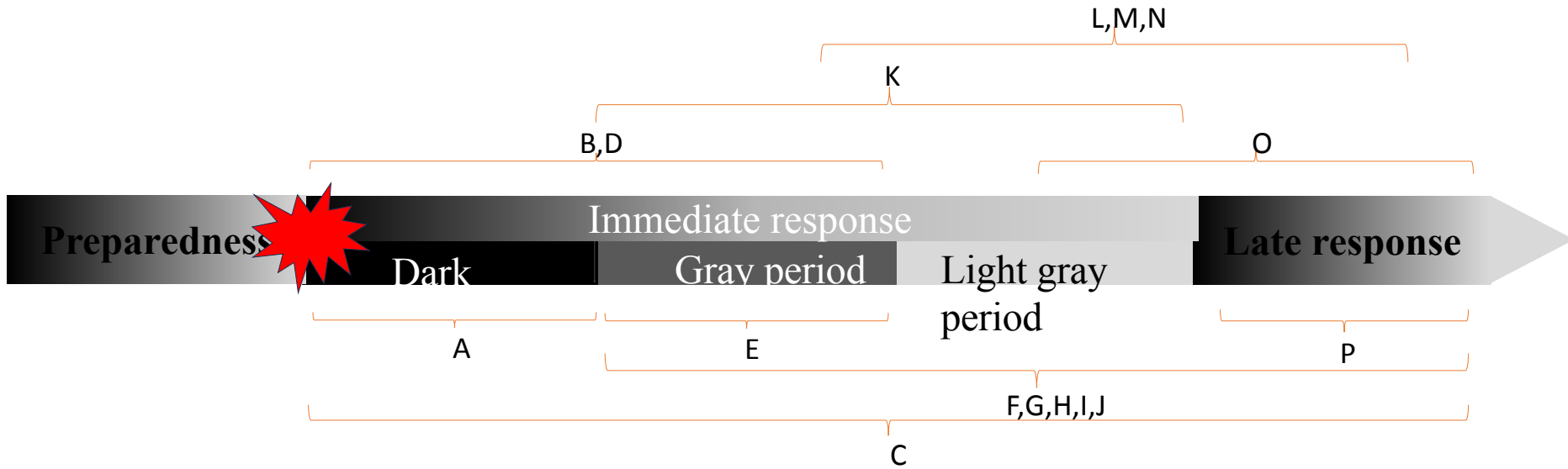


26.02.2023

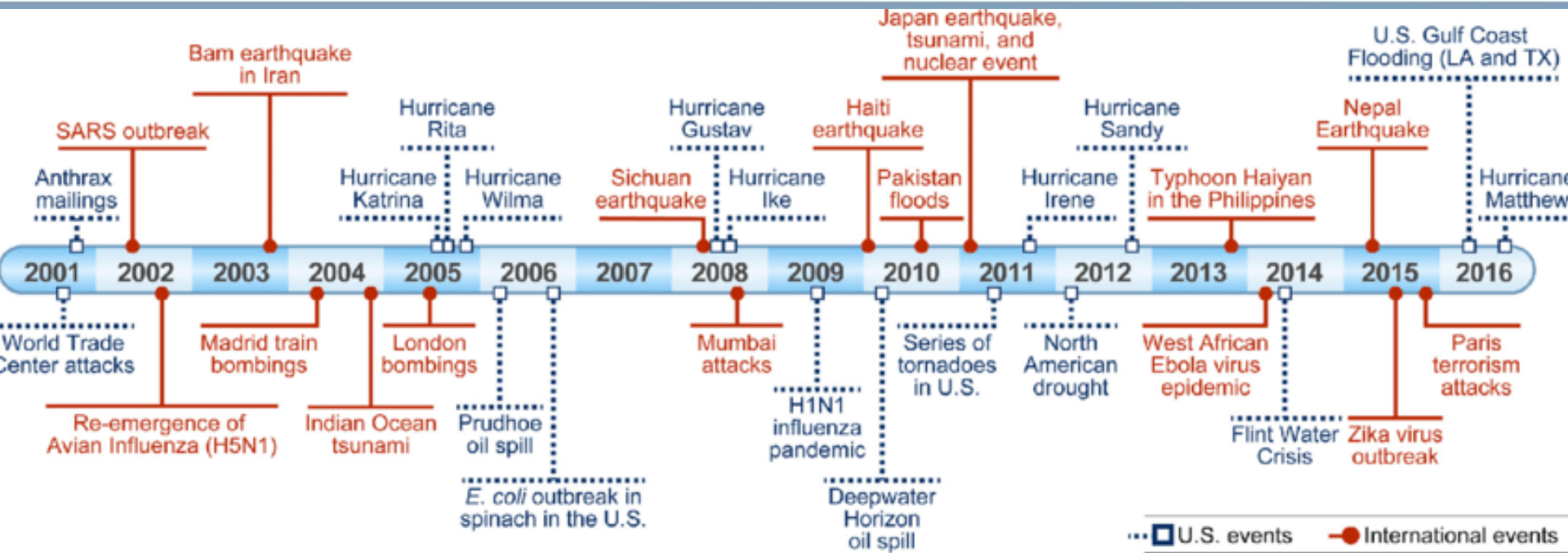
**High capacity field hospitals established for regular healthcare services**

**ABD, Antakya'da sahra hastanesi kuruyor**





- |  |                                      |
|--|--------------------------------------|
| A. Status assessment                       | I. Mobile service management         |
| B. Emergency response operations           | J. Temporary healthcare facilities   |
| C. Information management and coordination | K. Gathering areas                   |
| D. Emergency access routes                 | L. Donation management               |
| E. Casualty management                     | M. Debris and waste management       |
| F. Deceased management                     | N. Structural risk/damage assessment |
| G. Communication and infrastructure        | O. Shelter site management           |
| H. Medical service management              | P. Long-term supply chain management |



Source: Pakenham et al., 2017



*The most deadly killer in any humanitarian emergency is not dehydration, measles, malnutrition or the weather.*

***It is bad management.***

John Telford (Hulm 1994)