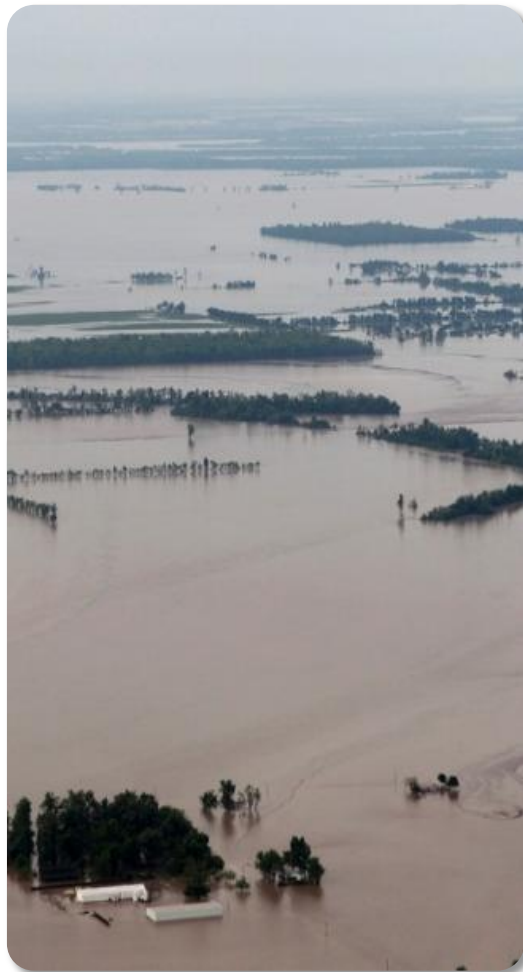




The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

A changing climate leads to changes in extreme weather and climate events



Impacts from weather and climate events depend on:



nature and severity of event

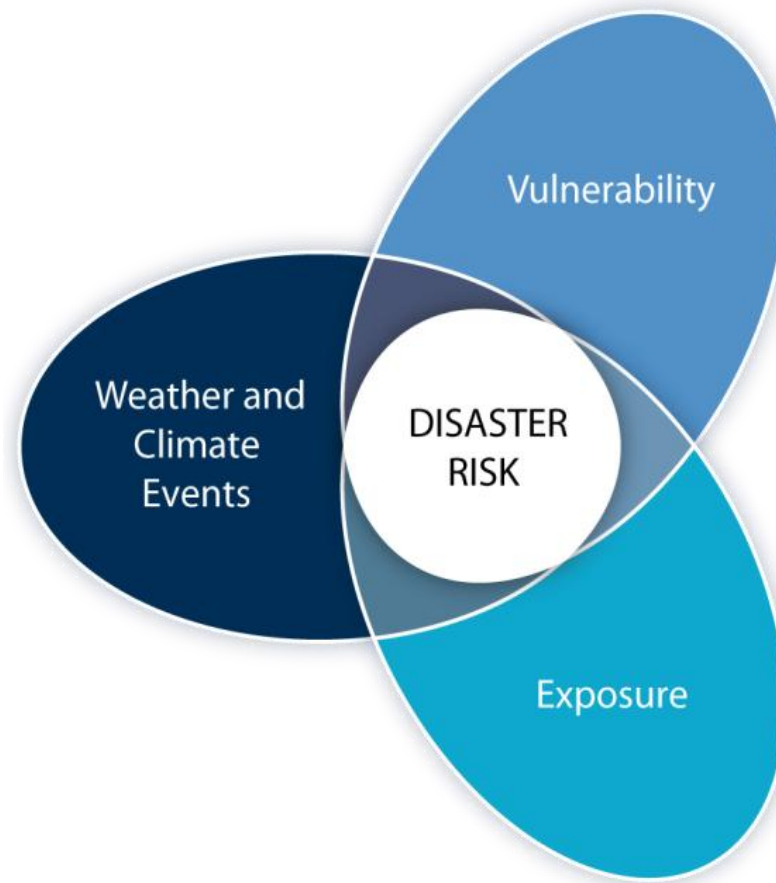


vulnerability



exposure

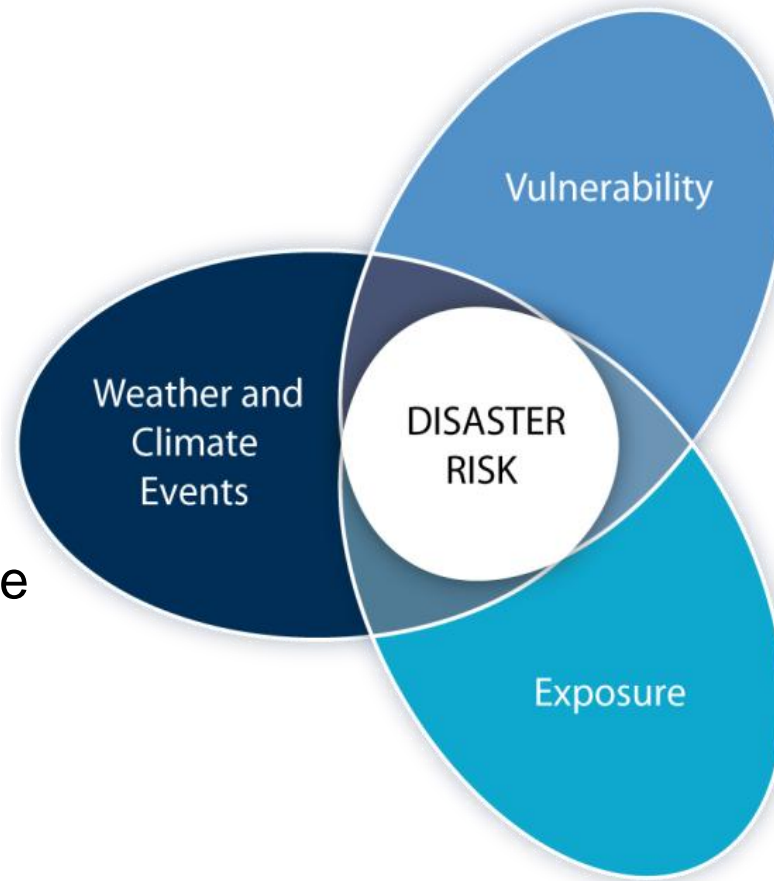
Socioeconomic development interacts with natural climate variations and human-caused climate change to influence disaster risk



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Disaster Risk:

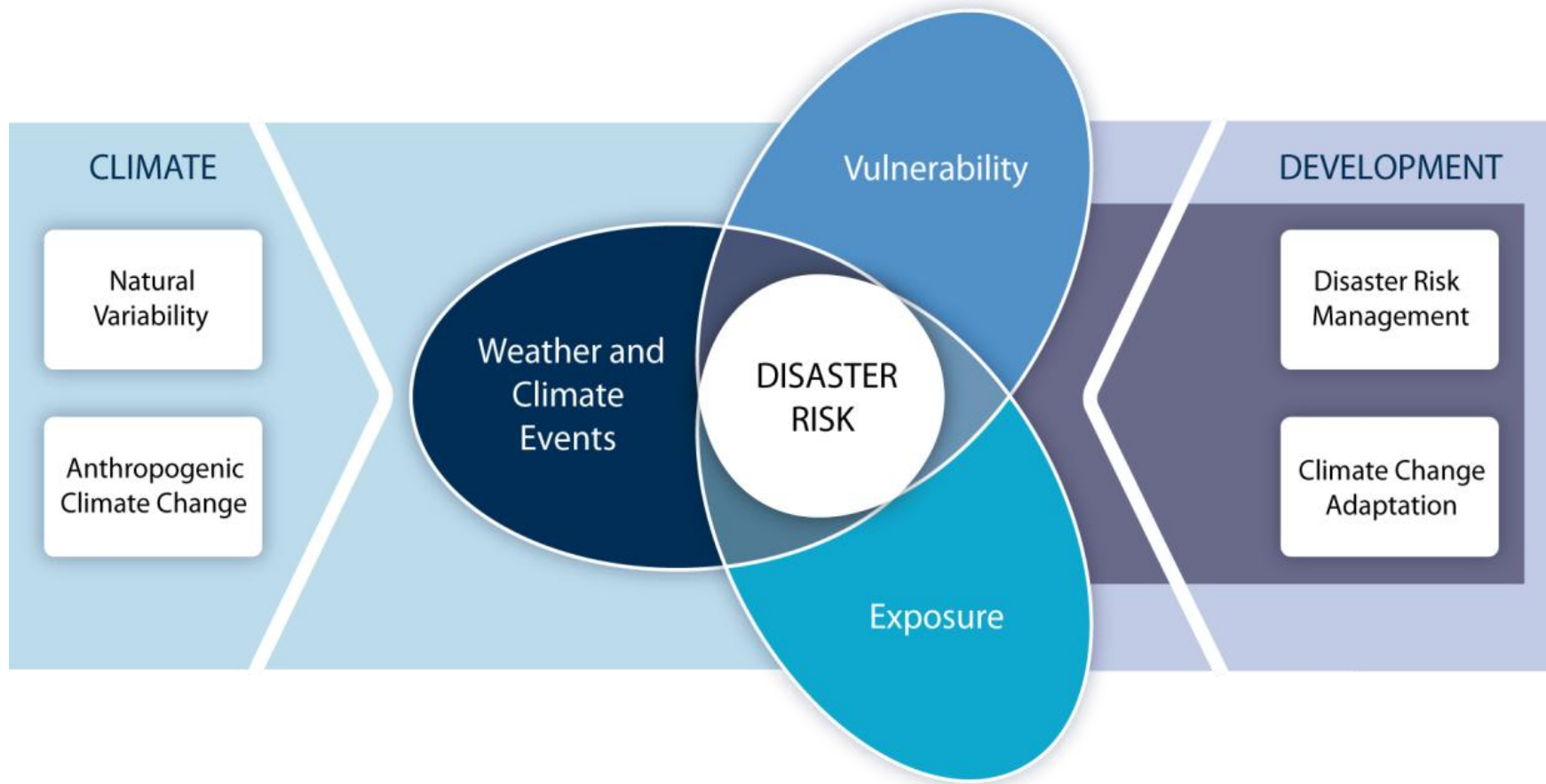
the likelihood of severe alterations in the normal functioning of a community or society due to weather or climate events interacting with vulnerable social conditions



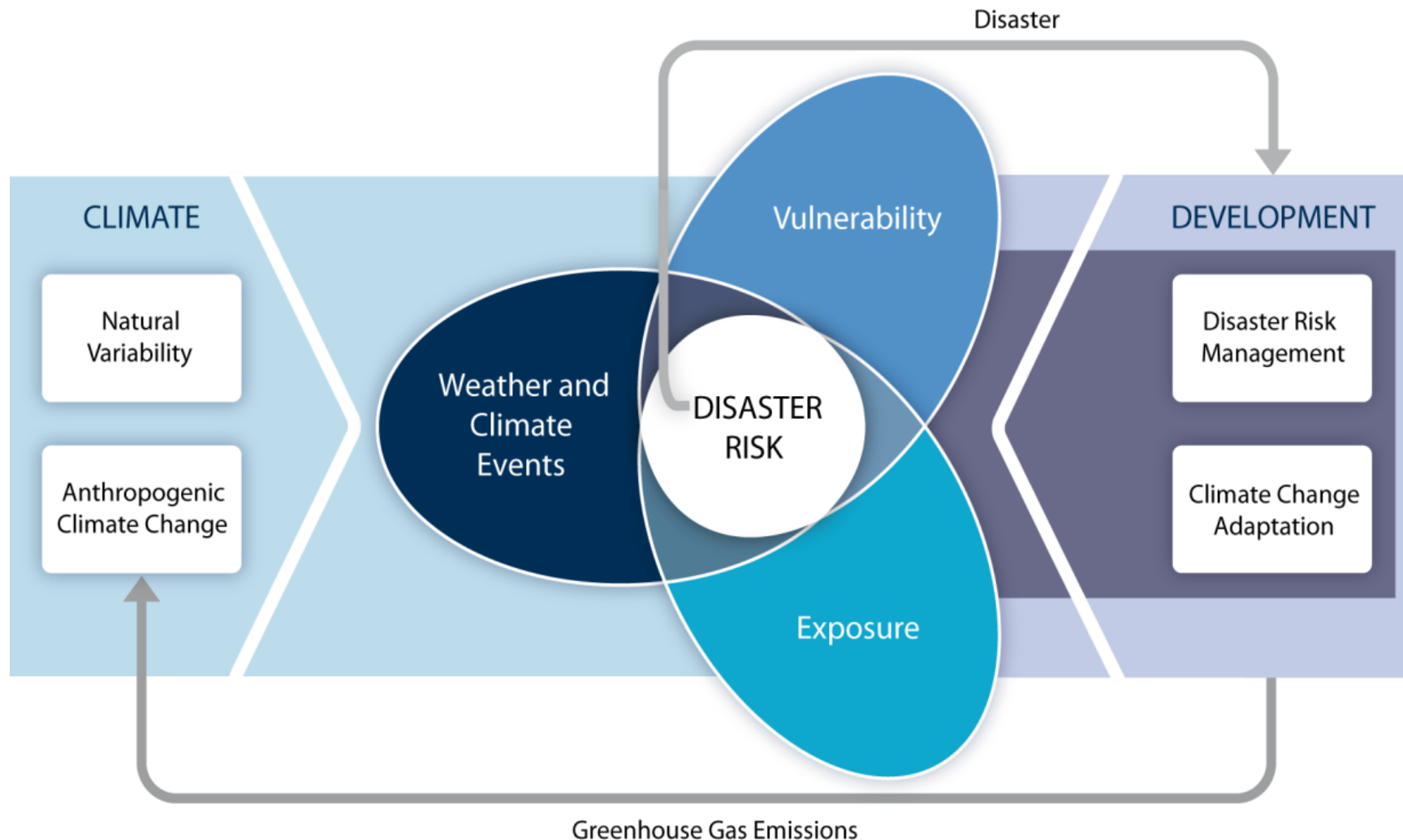
Vulnerability:

the predisposition of a person or group to be adversely affected

Increasing vulnerability, exposure, or severity and frequency of climate events increases **disaster risk**



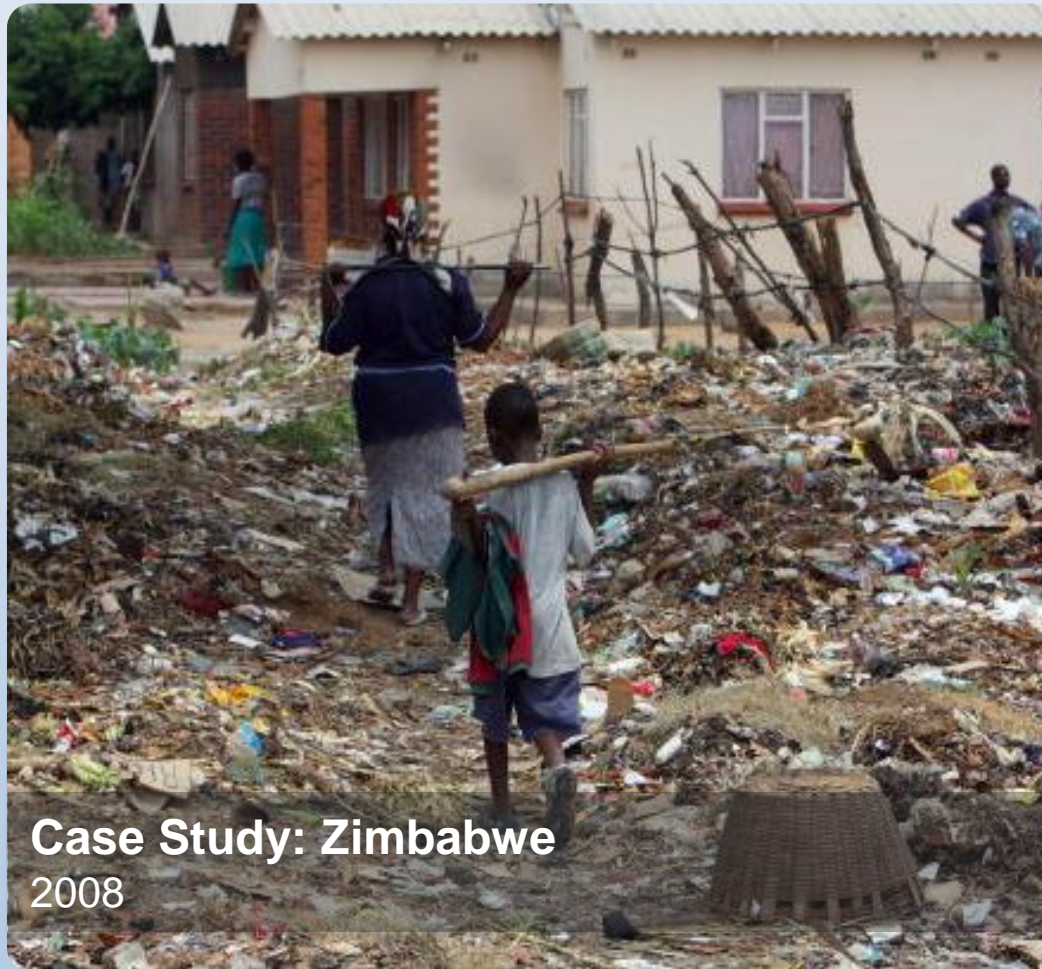
Increasing vulnerability, exposure, or severity and frequency of climate events increases **disaster risk**



*Disaster risk management and climate change adaptation can influence the degree to which **extreme events translate into impacts and disasters***

For exposed and vulnerable communities, even non-extreme weather and climate events can have **extreme impacts**

- Africa's largest recorded cholera outbreak
- over 90,000 affected
- over 4,000 killed
- began following onset of seasonal rains
- vulnerability and exposure increased risk



Impacts of climate extremes can be felt locally or regionally

AGRICULTURE

“Russia, Crippled by Drought, Bans Grain Exports”

*August 5, 2010, **The New York Times***

ENERGY

“Heatwave hits French power production”

*August 12, 2003, **The Guardian***

WATER

“Lake Mead is at Record Low Levels. Is the Southwest drying up?”

*August 08, 2010, **The Independent***

PUBLIC HEALTH

“Pakistan floods: Aid trickles in for victims as cholera spreads in Pakistan’s worst-ever floods”

*August 14, 2010, **The Guardian/Observer***

TOURISM

“Alpine resorts feel heat during record warm spell”

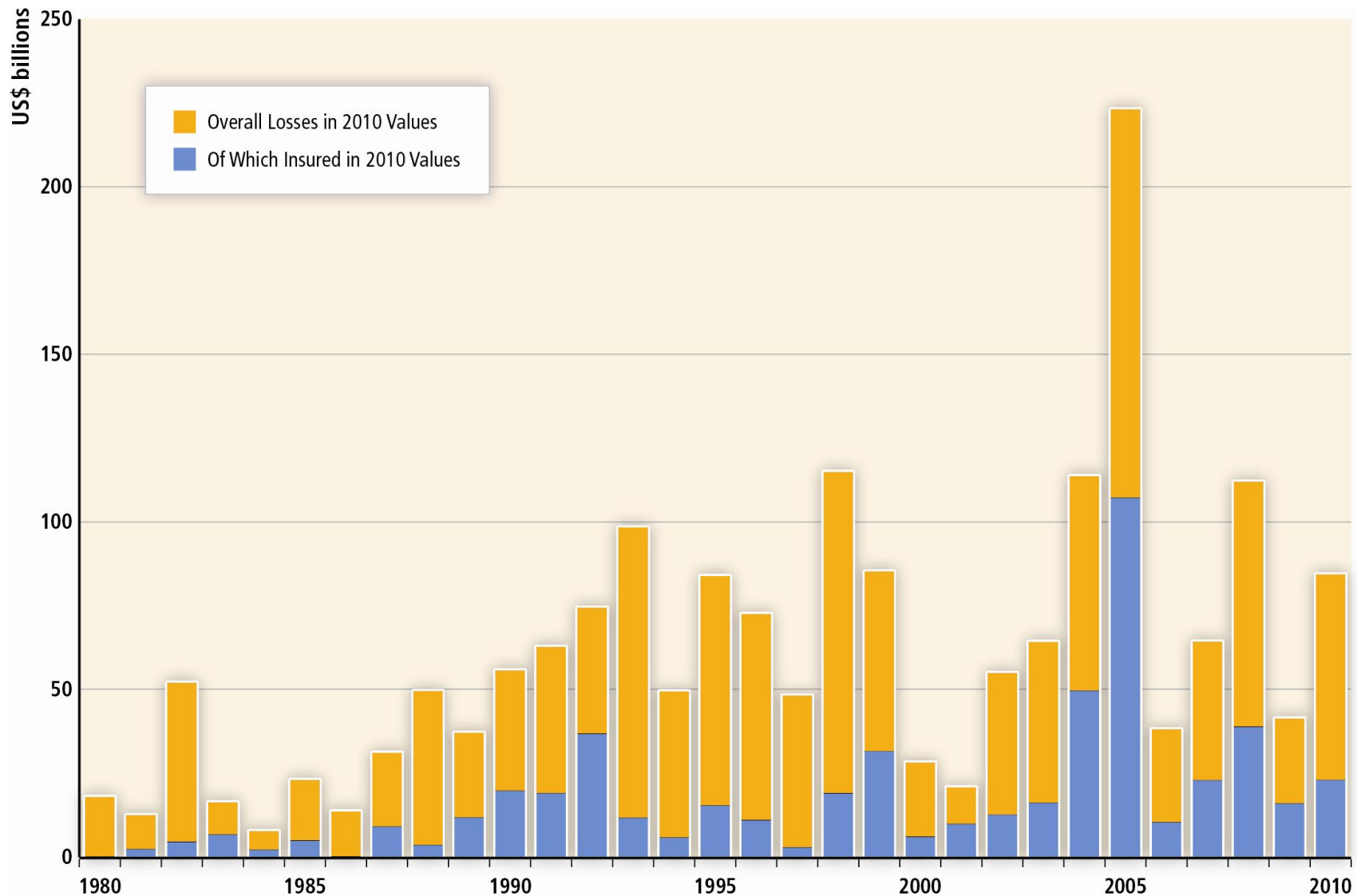
*December 08, 2006, **CNN***

TRANSPORTATION

“Flash flooding causes train to derail”

*July 30, 2001, **Chicago Sun Times***

Economic losses from climate-related disasters have increased, with large spatial and interannual variations



Increasing exposure of people and assets has been the major cause of changes in disaster losses

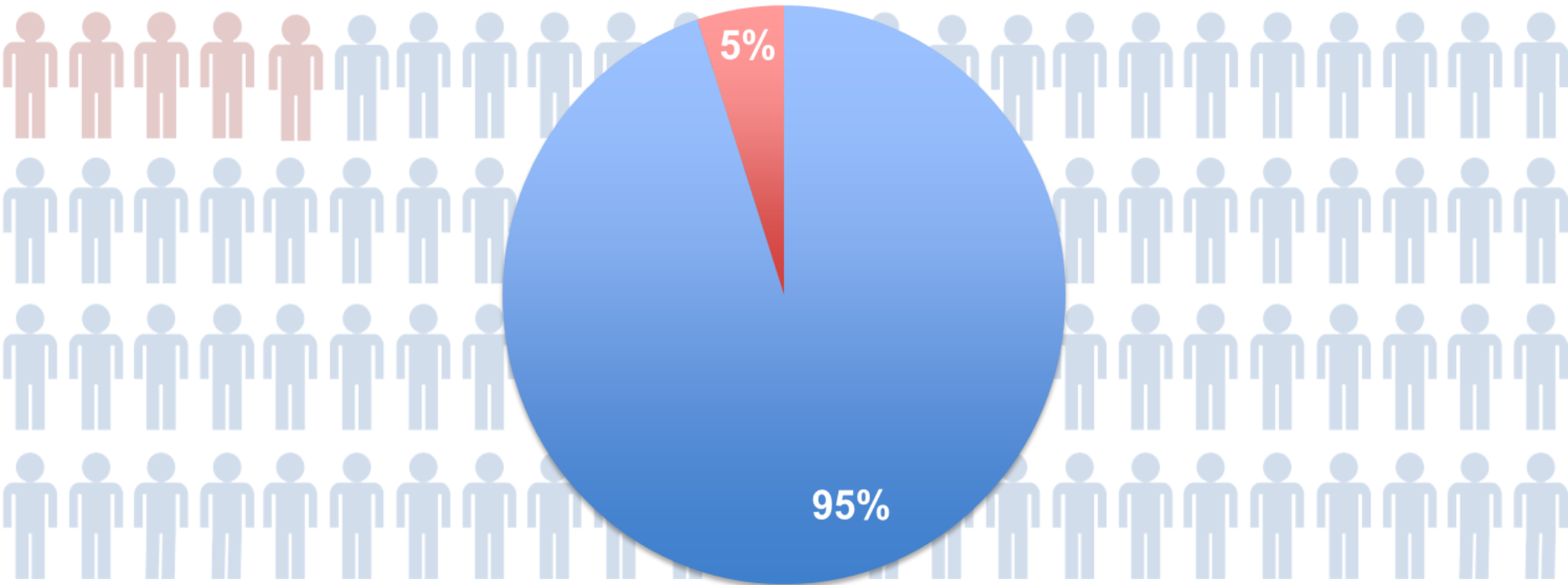


**Pakistan floods, 2010
6 million left homeless**

Economic disaster losses are higher in developed countries



Fatalities are higher in developing countries



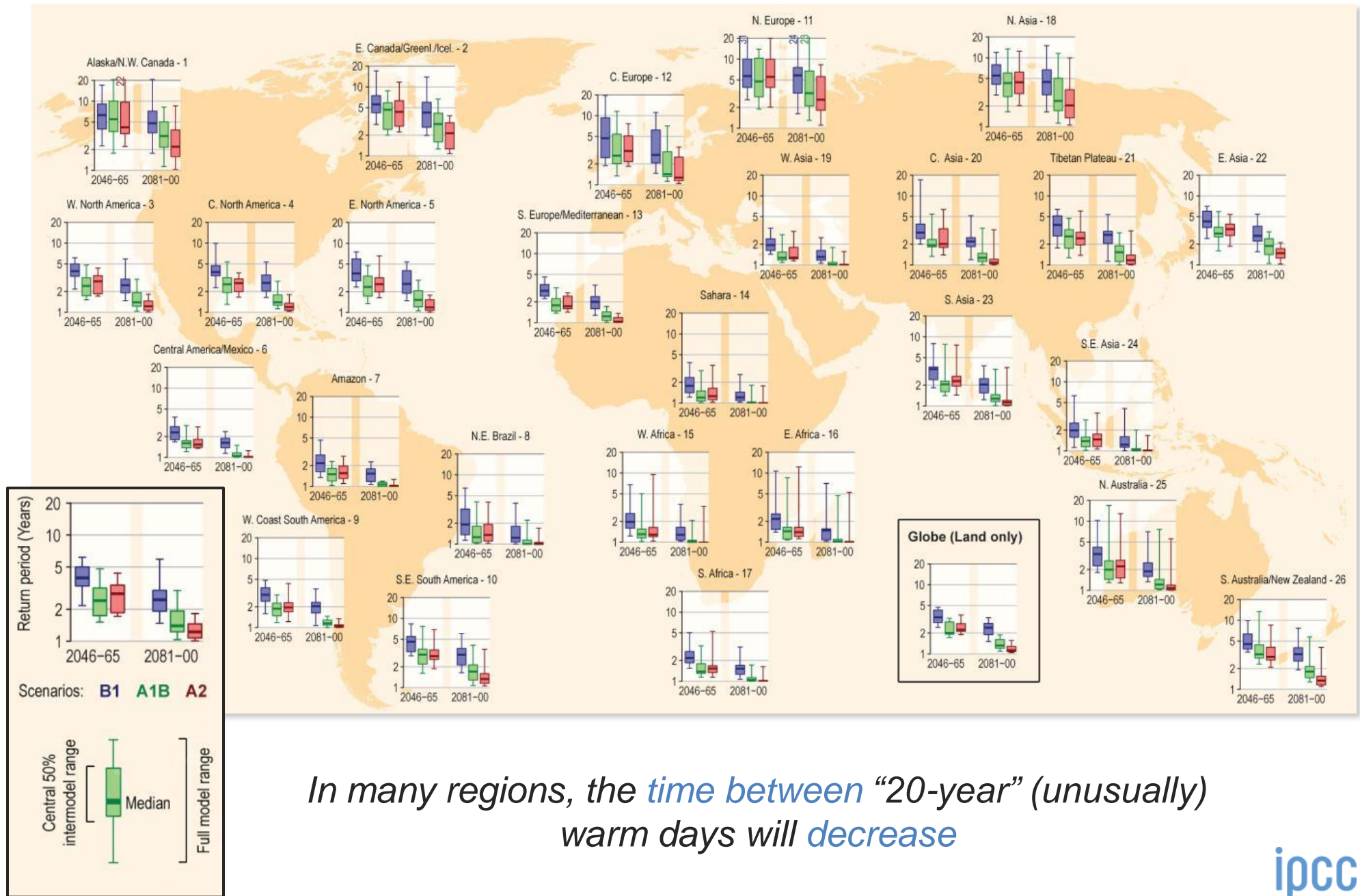
From 1970-2008, over **95%** of natural-disaster-related deaths occurred in developing countries

Since 1950, **extreme hot days** and **heavy precipitation** have become more common



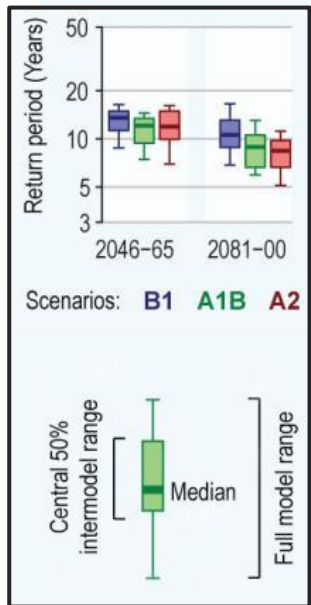
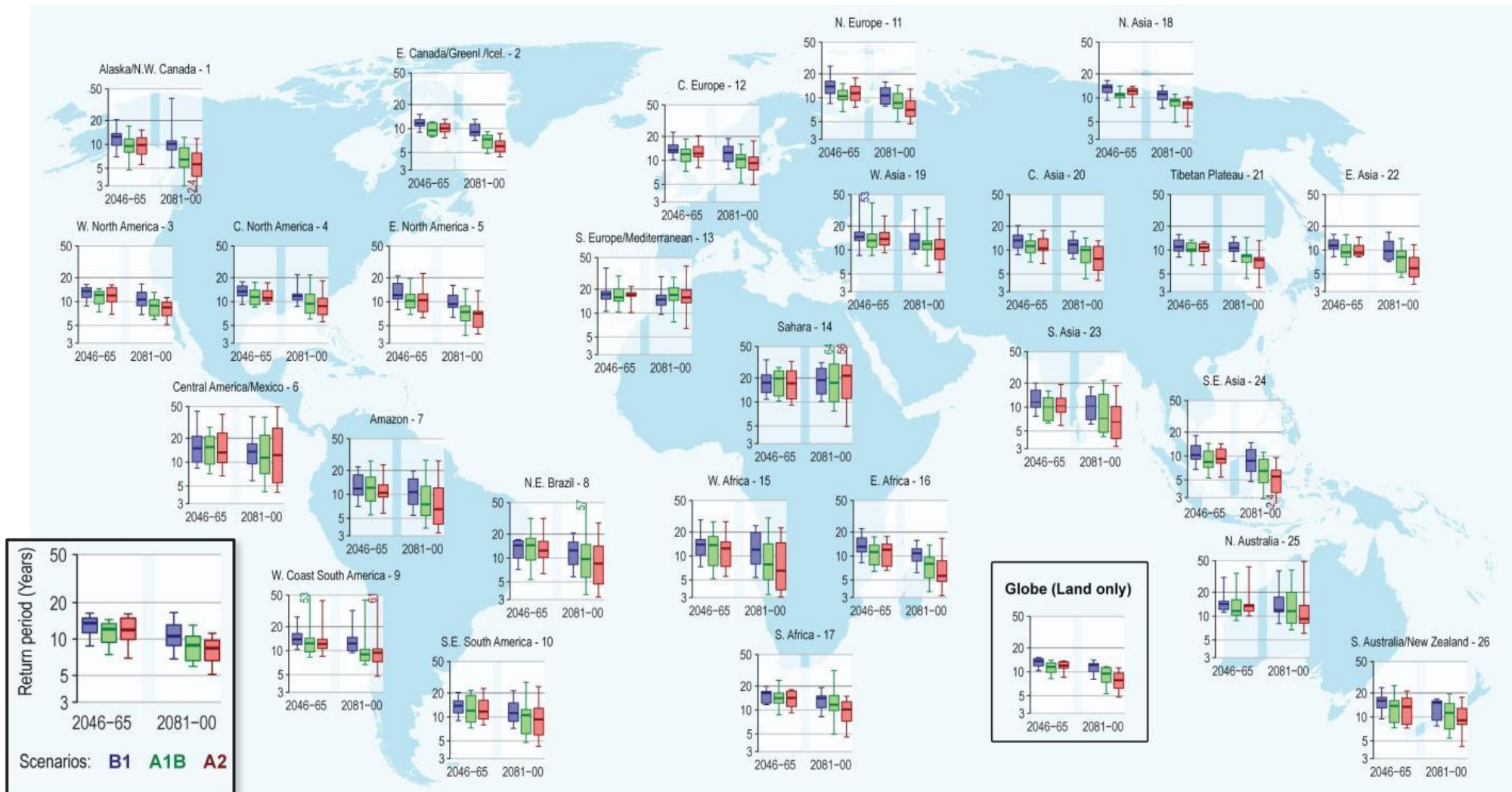
There is evidence that anthropogenic influences, including increasing atmospheric **greenhouse gas concentrations**, have changed these extremes

Climate models project more frequent hot days throughout the 21st century



*In many regions, the **time between “20-year” (unusually) warm days will decrease***

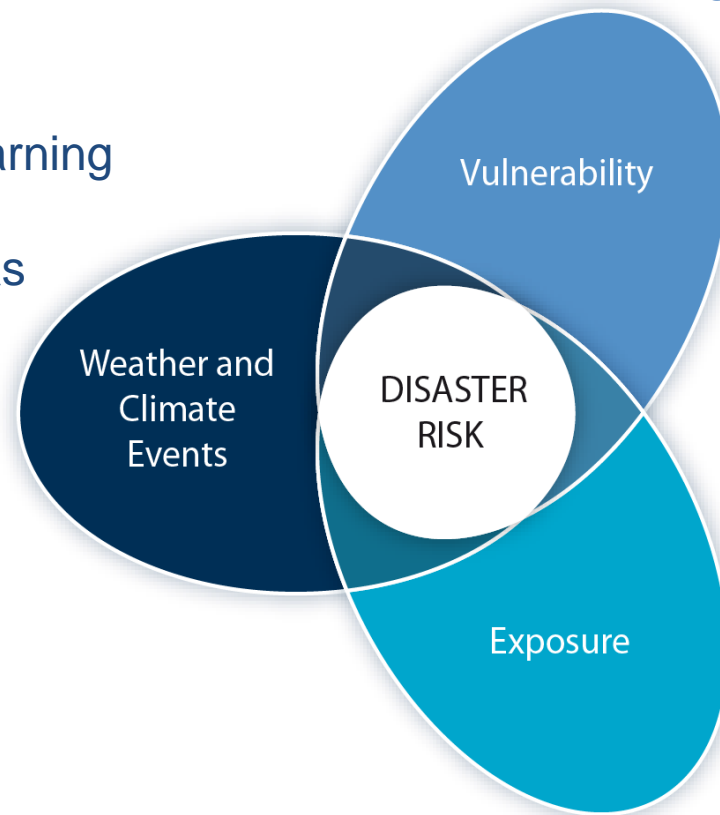
Climate models project there will be more heavy rain events throughout the 21st century



In many regions, the time between “20-year” (unusually intense) rainstorms will decrease

Information on vulnerability, exposure, and changing climate extremes can together inform adaptation and disaster risk management

- improved forecasting for warning systems
- reduction of greenhouse gas emissions



- poverty reduction
- better education and awareness
- sustainable development

- asset relocation
- weather-proofing assets
- early warning systems

Short-term actions don't always provide **long term risk reduction**



Case Study: Northern Canada

Permafrost thaw

- permafrost requires sub zero temperatures
- melt affects roads, building foundations, airport infrastructure
- infrastructure maintenance needed
- short-term risk reduction won't eliminate long-term melt risk

Effective risk management and adaptation are tailored to **local** and **regional** needs and circumstances

- changes in climate extremes vary across regions
- each region has unique vulnerabilities and exposure to hazards
- effective risk management and adaptation address the factors contributing to exposure and vulnerability



Managing the risks: **heat waves** in Europe

Risk Factors

- lack of access to cooling
- age
- pre-existing health problems
- poverty and isolation
- infrastructure



Risk Management/Adaptation

- cooling in public facilities
- warning systems
- social care networks
- urban green space
- changes in urban infrastructure

Projected: *likely* increase heat wave frequency and *very likely* increase in warm days and nights across Europe

Managing the risks: hurricanes in the USA and Caribbean

Risk Factors

- population growth
- increasing property value
- higher storm surge with sea level rise



Risk Management/Adaptation

- better forecasting
- warning systems
- stricter building codes
- regional risk pooling

Projected globally: *likely* increase in average maximum wind speed and associated heavy rainfall (although not in all regions)

Managing the risks: flash floods in Nairobi, Kenya

Risk Factors

- rapid growth of informal settlements
- weak building construction
- settlements built near rivers and blocked drainage areas



Risk Management/Adaptation

- reduce poverty
- strengthen buildings
- improve drainage and sewage
- early warning systems

Projected: *likely* increase in heavy precipitation in East Africa

Managing the risks: sea level rise in tropical Small Island Developing States

Risk Factors

- shore erosion
- saltwater intrusion
- coastal populations
- tourism economies



Risk Management/Adaptation

- early warning systems
- maintenance of drainage
- regional risk pooling
- relocation

Projected globally: *very likely* contribution of sea level rise to extreme coastal high water levels (such as storm surges)

Managing the risks: **drought** in the context of **food security** in West Africa

Risk Factors

- more variable rain
- population growth
- ecosystem degradation
- poor health and education systems



Risk Management/Adaptation

- improved water management
- sustainable farming practice
- drought-resistant crops
- drought forecasting

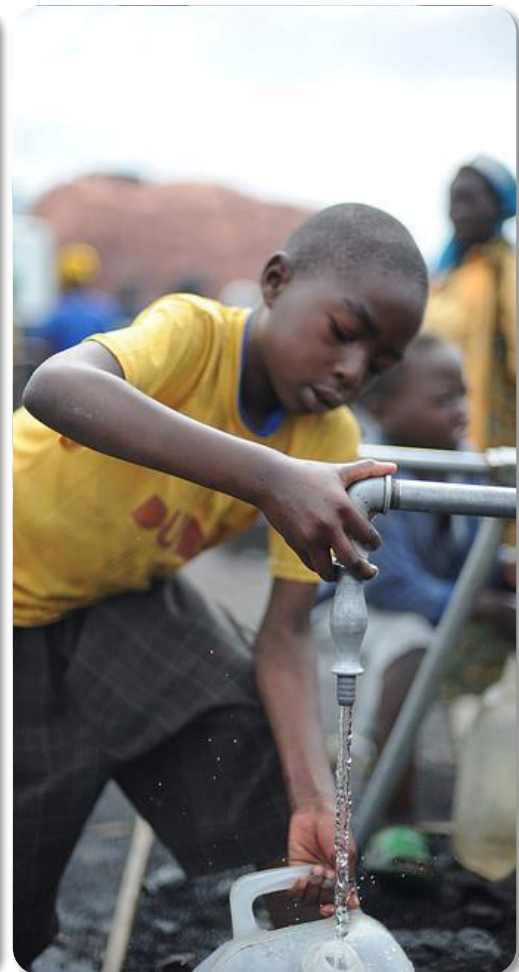
Projected: *low confidence* in drought projections for West Africa

Managing risks of disasters in a changing climate benefits from an iterative process



*Learning-by-doing and low-regrets actions can help **reduce risks now** and also promote future adaptation*

There are strategies that can help **manage disaster risk now** and also help improve people's livelihoods and well-being



The most effective strategies offer **development benefits** in the relatively near term and **reduce vulnerability** over the longer term

IPCC Assessment Reports: The Process

