Climate-related risks, sectors and systems that are most relevant to the Latin America contexts for extremes weather events and slow onset based on the IPCC AR4 and the SREX results

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LA and RE IPCC SREX
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Latin America.
IPCC Fourth Assessment Report :
2007 (AR4)

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Current regional sensitivity/ vulnerability.

Weather and climate stresses

Natural resources.

Agriculture.

Water resources

Coasts.

Human health.

Non climatic stress

Effect of demography pressure.

Over explotation of natural resources.

Pollution.

- ***Climatic variability and extreme events*** have been severely affecting the Latin America region over recent years *(high confidence).*

-During the last few decades, important ***changes in precipitation and increases in temperature*** have been observed (*high confidence).*

-***Land-use changes*** have intensified the use of natural resources and exacerbated many of the processes of land degradation *(high confidence).*

-The ***projected mean warming*** for Latin America to the end of the 21st century, according to different climate models, ranges from 1 to 4°C for SRES emissions scenario B2 and from 2 to 6°C for scenario A2 (*medium confidence).*

-Under future climate change, there is a risk of significant ***species extinctions*** in many areas of tropical Latin America *(high confidence)*.

-By the 2020s, the net increase in the number of people experiencing ***water stress*** due to climate change is likely to be between 7 and 77 million (*medium confidence).*

-Generalised ***reductions in rice yields*** by the 2020s, as well as increases in soybean yields in temperate zones, are likely when CO2 effects are considered *(medium confidence)*.

-The expected ***increases in sea-level rise***, weather and climatic variability and extremes are very likely to affect coastal areas (*high confidence).*

- Future sustainable development plans should include ***adaptation strategies*** to enhance the integration of climate change into development policies *(high confidence).*

Slow onset events (e.g. ↑T, Δ P, ↑SLR, ↑ocean acidification).

Extreme events (e.g. tropical storms, floods, heat waves/ warm spells, storm surge, heavy precipitations)

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

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SREX.

- Joint product of WGII and WGI.
- IPCC report with a focus on risk management.
- First SPM to focus on multi/chapter key findings.

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



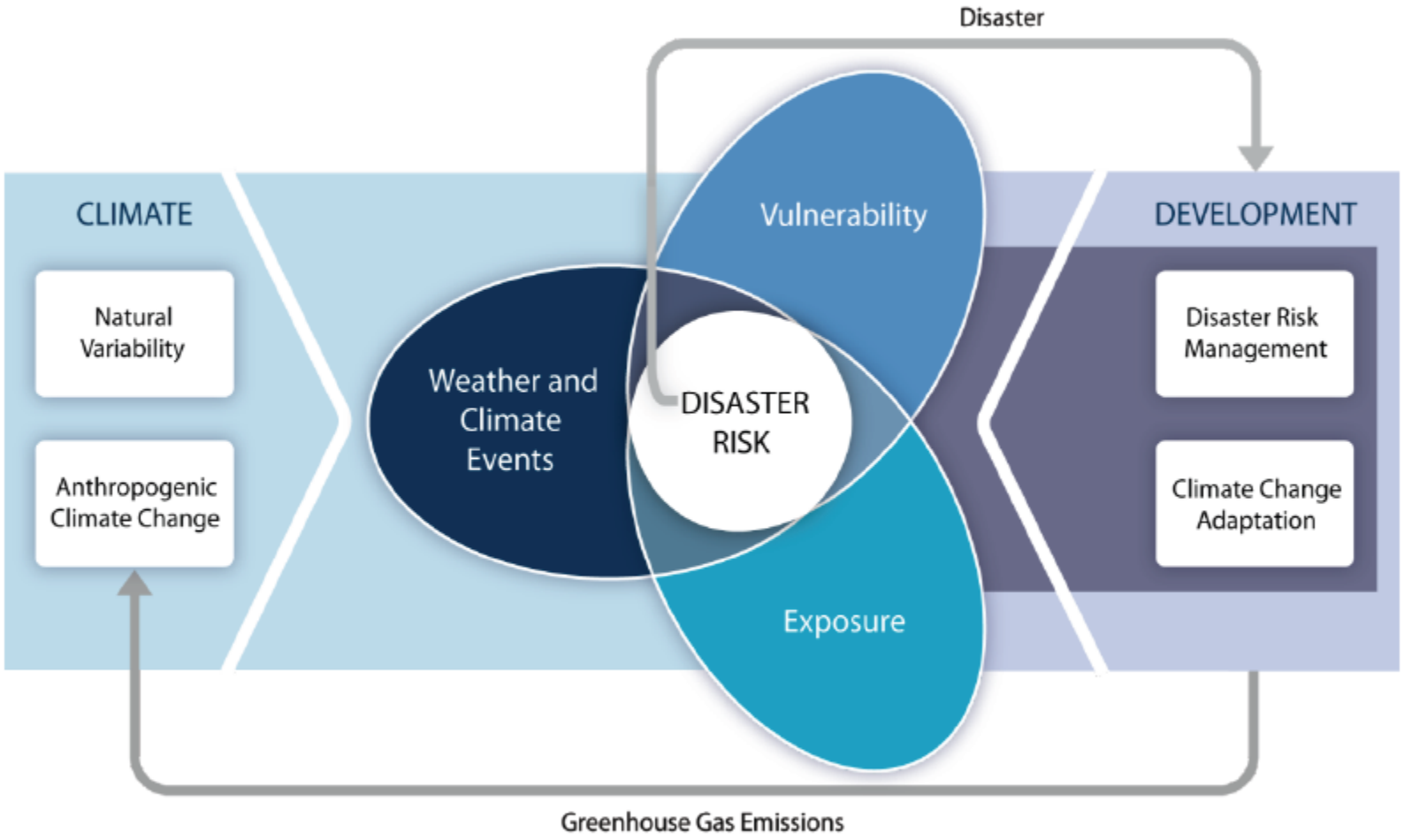

Impacts from weather and climate events depend on:

nature and severity of event

vulnerability

exposure

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***

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

A changing climate leads to changes in frequency, intensity, spatial extent, duration and timing of extremes weather and climate events, and can result in unprecedented extremes weather and climate events.

Some climate events (e.g. droughts) may be the result of an acumulation of weather or climate events that are not extreme when consider independently.

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

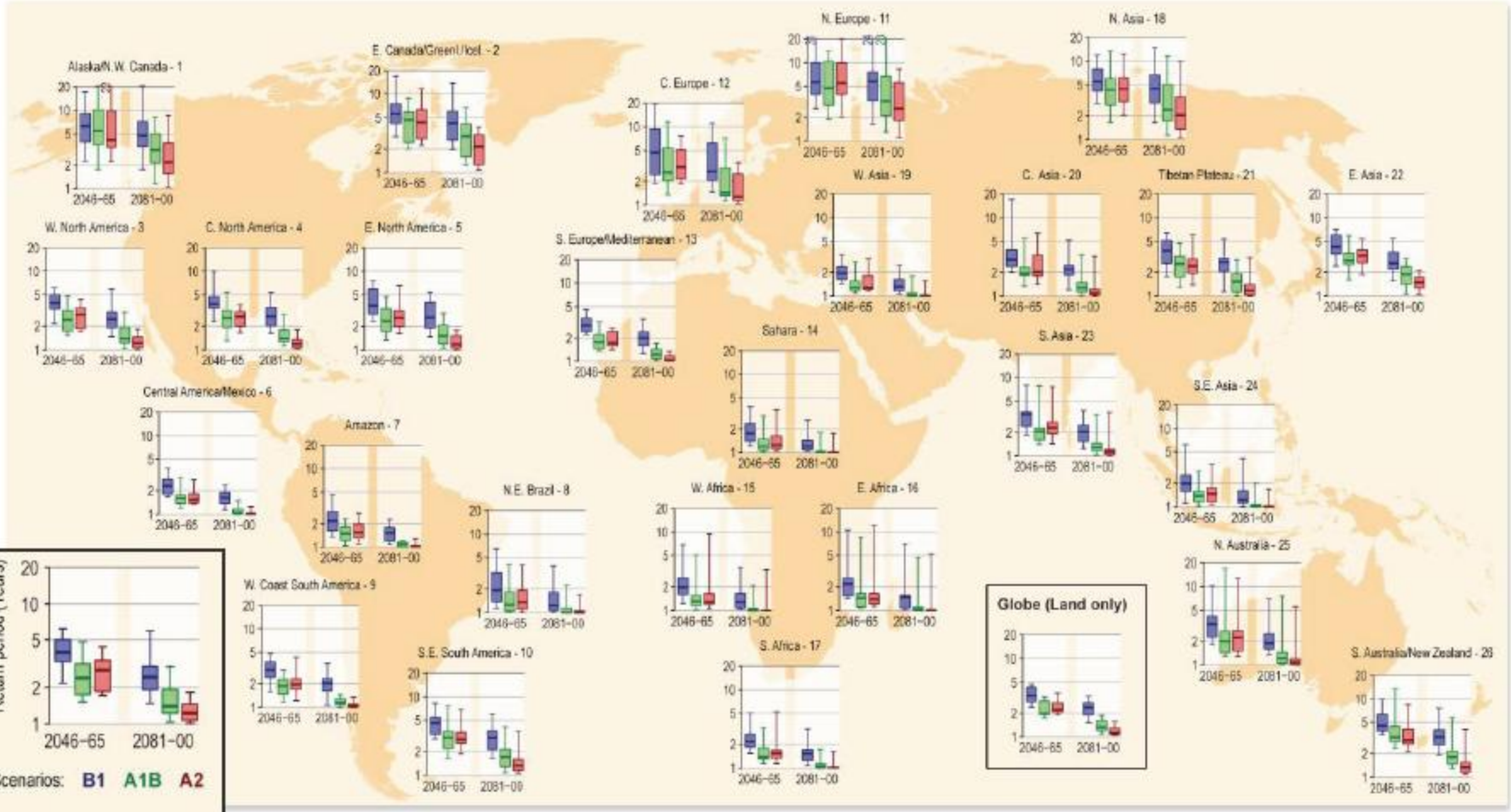
- Africa's largest recorded cholera outbreak
- over 90,000 affected
- over 4,000 killed
- began following onset of seasonal rains
- vulnerability and exposure increased risk

Case Study: Zimbabwe
2008

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

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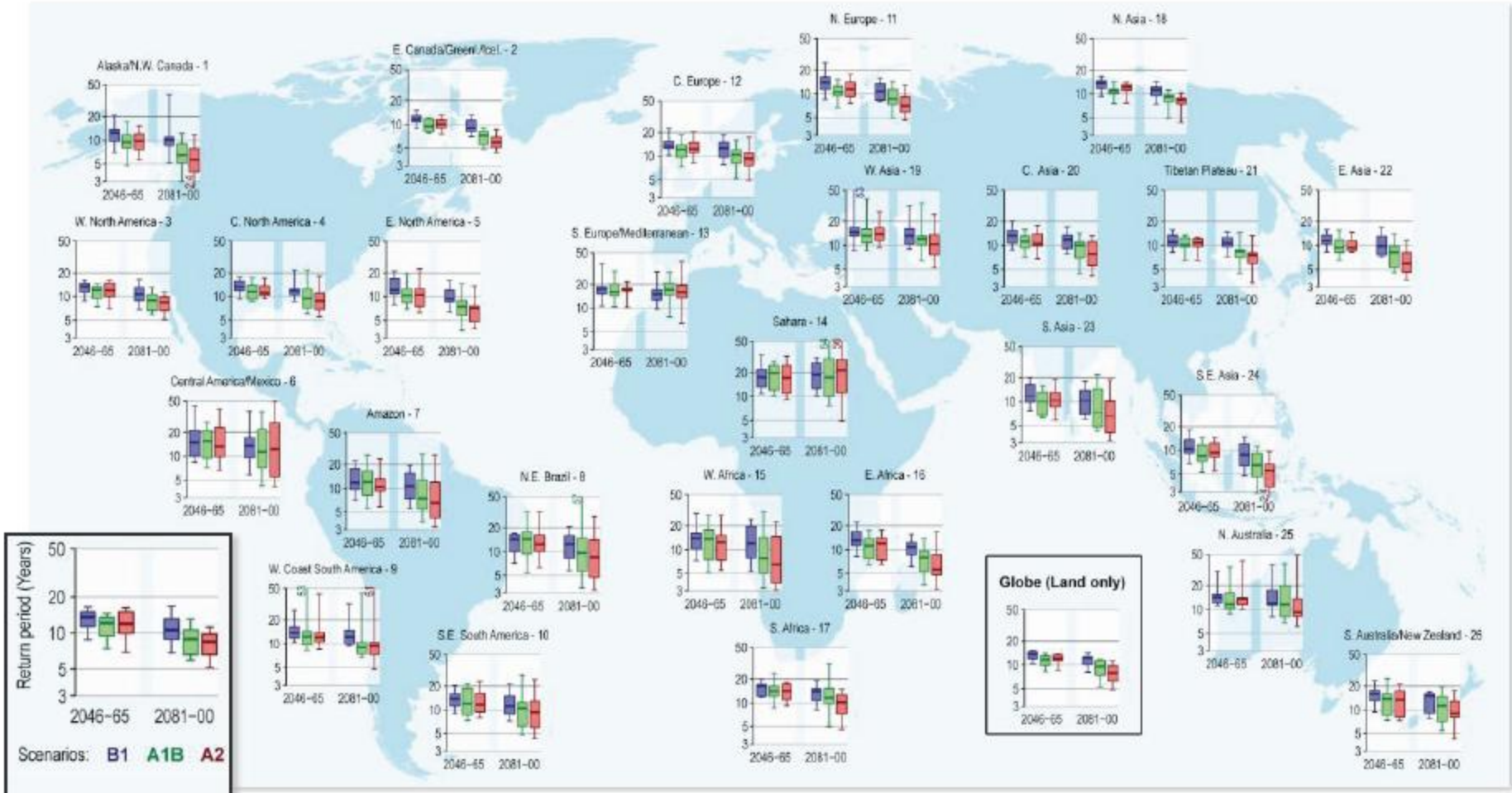
Climate models project there will be more heavy rain events throughout the 21st century



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

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There is evidence from observations gathered since 1950 of change in some extremes:

Very likely *increase in warm days and nights* & decrease in cold days and nights on global scale

Likely *that more regions have experienced increases* than decreases in *heavy precipitation events*

Likely that there has been an increase in *extreme coastal high water* related to increases in mean sea level

Medium confidence that some regions of the world have experienced more intense and longer ***droughts***, but in some regions droughts have become less frequent, less intense, or shorter

Regionally Based Aspects of Vulnerability, Exposure, and Impacts

Central and South America

-Extreme Rainfalls in South America

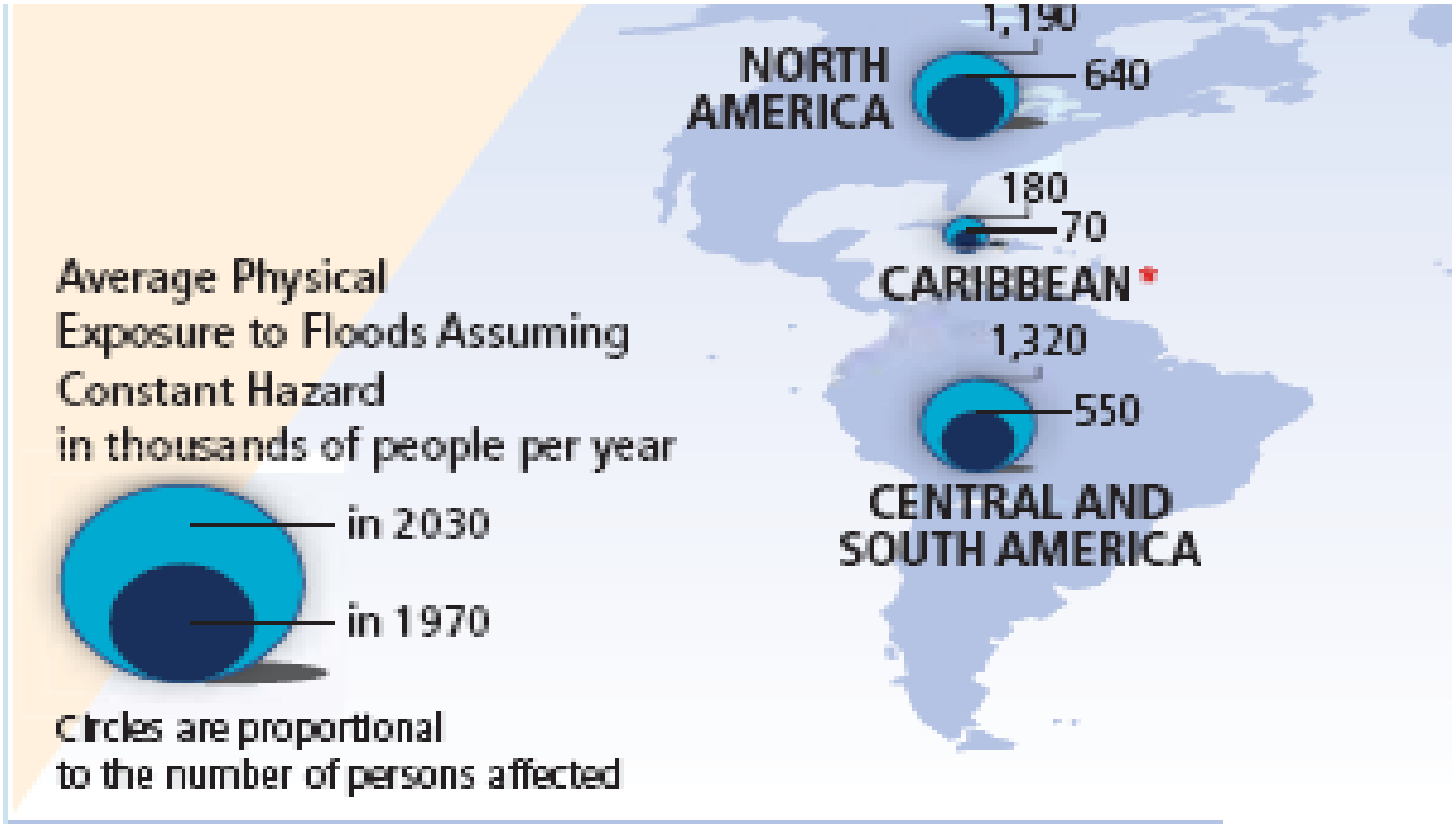
-Wildfires.

-Regional Costs

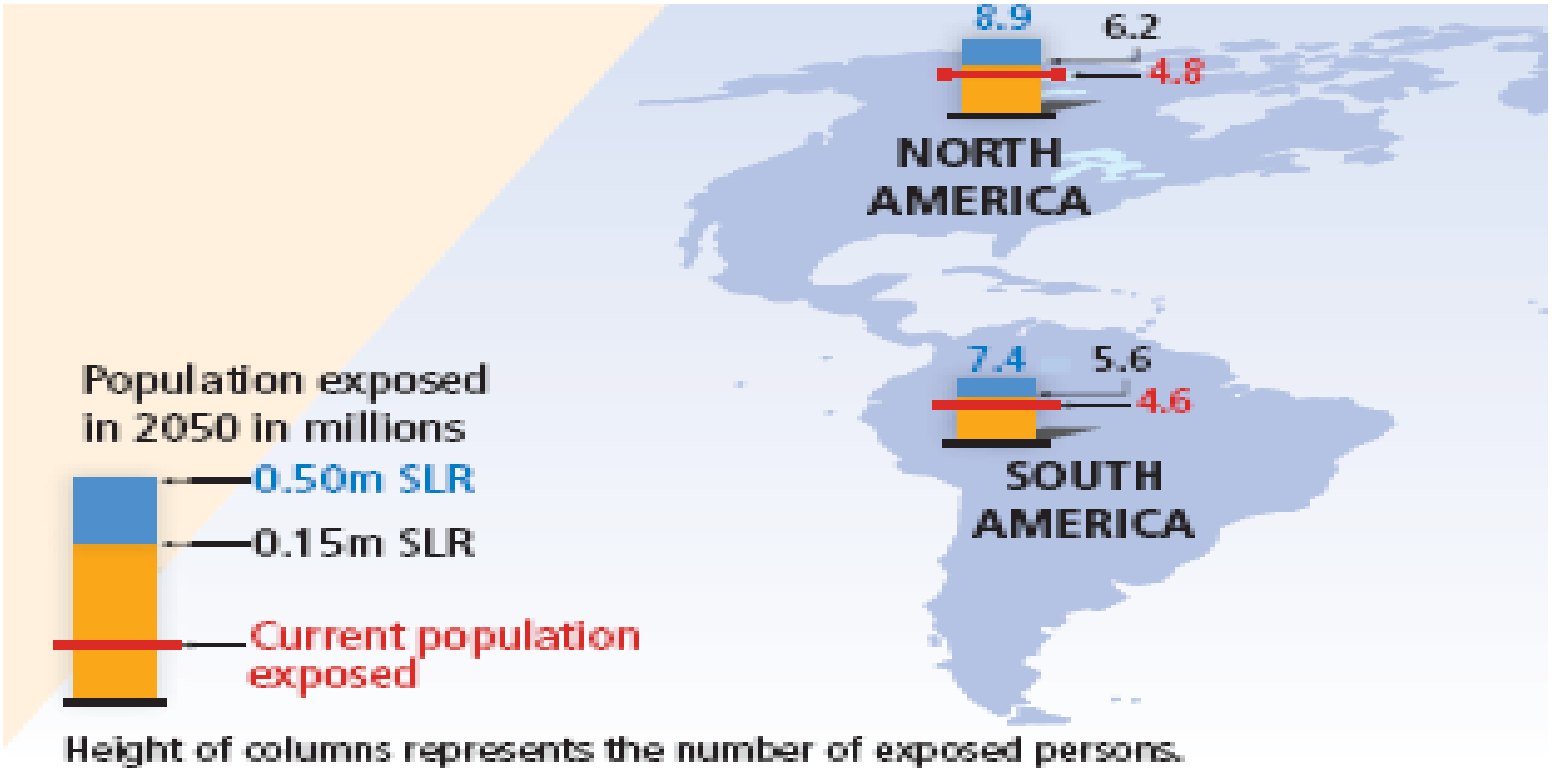
Climatic disasters account for the majority of natural disasters in Central America

Average physical exposure to **floods** assuming constant hazard (in thousands of people per year). Only catchments bigger than 1,000 km2 were included in this analysis. Therefore,

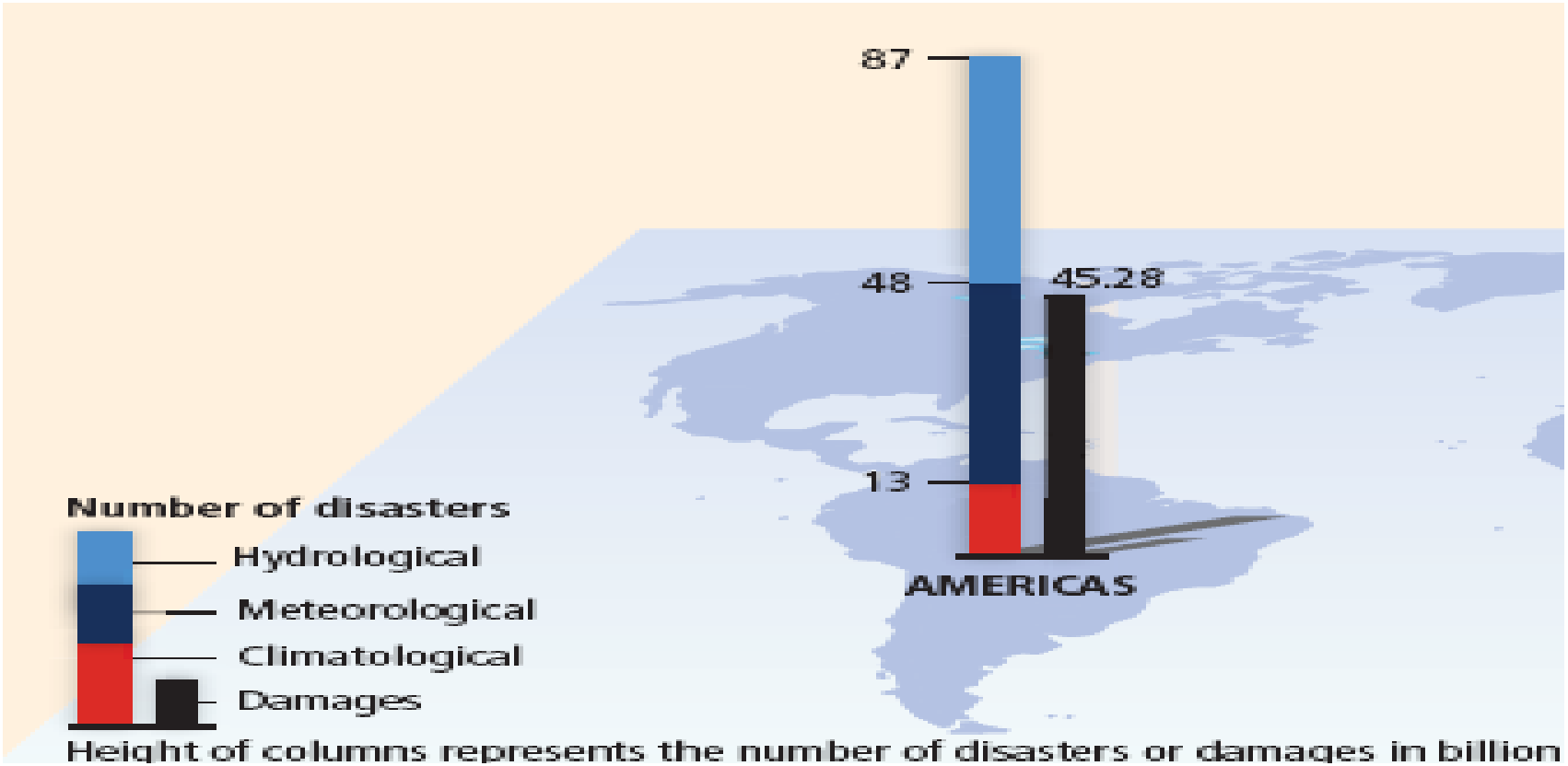
Data from Peduzzi et al., 2011.



For low-elevation **coastal areas**, current and future (2050) population exposure to inundation in the case of the 1-in-100-year extreme storm for sea level rise of 0.15 m and for sea level rise of 0.50 m due to the partial melting of the Greenland and West Antarctic Ice Sheets. Data from Lenton et al., 2009.

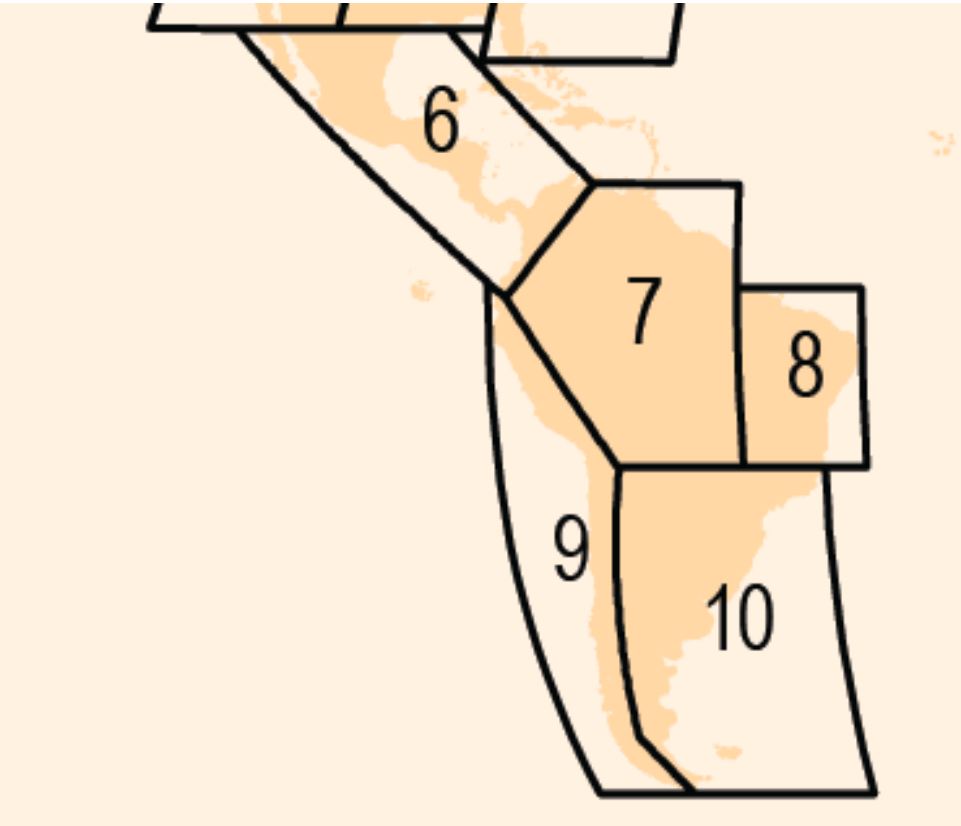


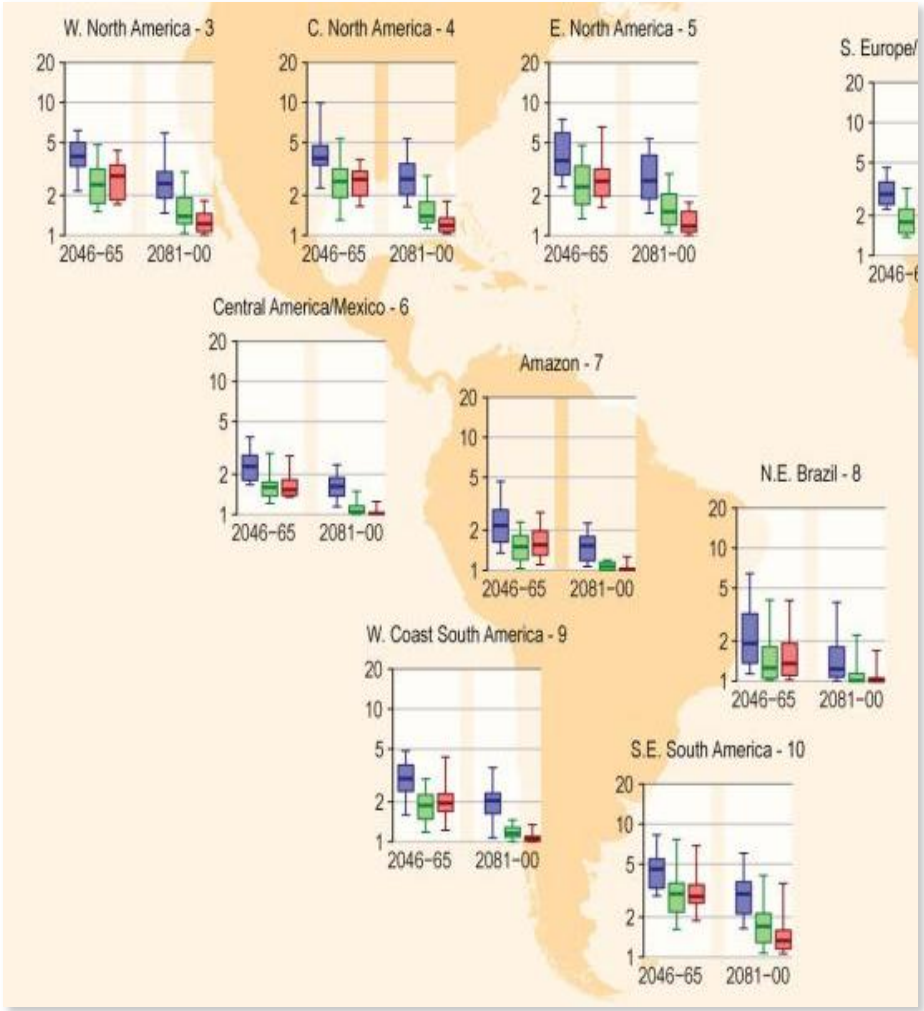
Weather- and climate-related disaster occurrence and regional average impacts from 2000 to 2008. The number of climatological (e.g., extreme temperature, drought, wildfire), meteorological (e.g., storm), and hydrological (e.g., flood, landslides) disaster along with damages (2009 US$ billion). Data from Vos et al., 2010.



For Mexico, Central and South America region

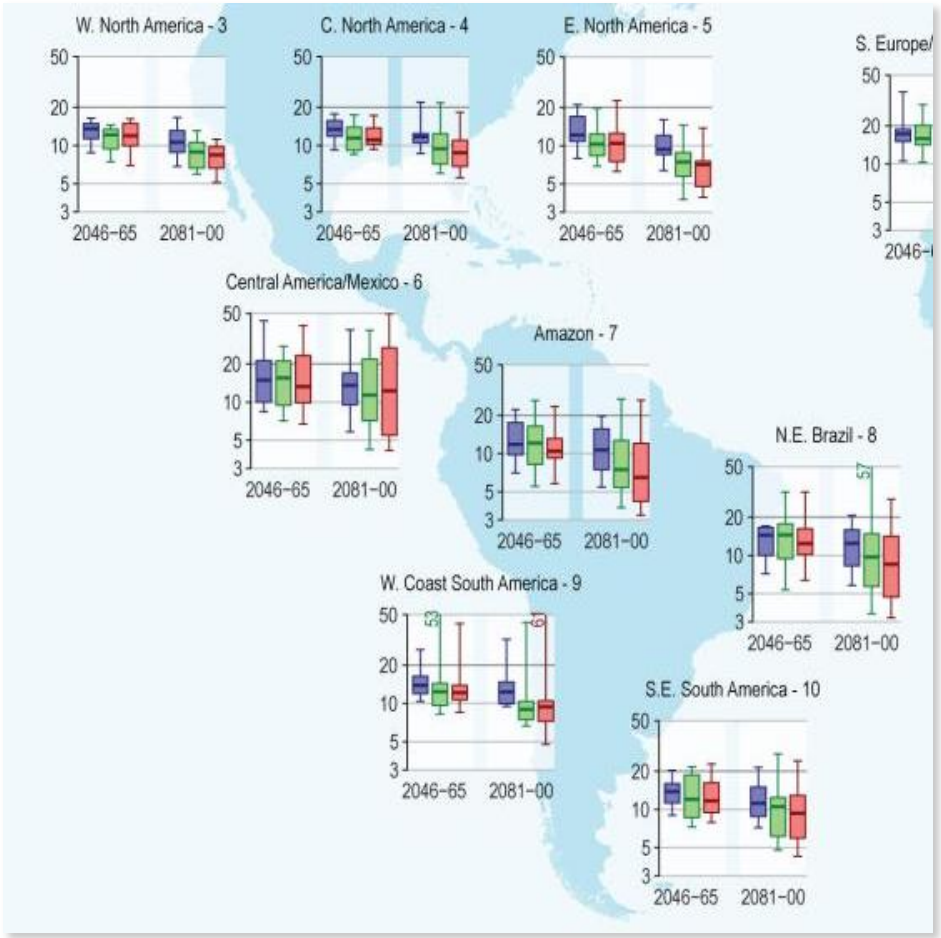
Large-scale, land only, regions used for temperature & precipitation extremes: *More detail than AR4*





- A1B, A2**:** A (late 20th-century**) 1-in-20 year hottest day is *likely* to become a *1-in-2 year* event by the end of the 21st centur**y** in most regions, except in the high latitudes of the Northern Hemisphere, where it is *likely* to become a *1-in-5 year* event

- B1: ***likely* to become a *1-in-5 year* event** (*1-in-10* in NH high latitudes)



- A (late 20th-century) **1-in-20 year annual maximum daily precipitation amount is *likely to* become a *1-in-5 to 1-in-15 year*** event by the end of the 21st century in many regions.

- In most regions the higher emissions scenarios (A1B and A2) lead to a stronger projected decrease in return period

Observed changes in T and precip. extremes in LA since 1950.

↑ increase; ↓decrease; ↕ varing trend; ≈insuficient evidence

Level of confidence: low (L); medium (M) and high (H)

Source : CDKN (2012) based on SREX (2011)

	Trend Tm Warm cold days	Trend heavy precipitation	Trends dryness and drought
Amazon	≈ L	↕ (M)	↕ (L)
NE Brazil	↑ (M)	↕ (M)	≈ (L)
SE S Brazil	↕ (M)	↑ in N. areas (M) ≈ insuffient in S (L)	≈(L)
W coast S America	↕ (M)	↕ (M)	≈ (L)
C. America and Mexico	↑(M)	↕ (M)	≈ (L)

Projected changes in T and precip. extremes in LA for period 2071-2100 (compared 1961-1990) or 2080-2100 (compared 1980-2000) .

↑ increase; - no change ; ↕ varying trend; ≈insufficient evidence

Level of confidence: low (L); medium (M) and high (H)

Source : CDKN (2012) based on SREX (2011)

	Trends Tm Warm cold days	Trend s heavy precipitation	Trends dryness and drought
Amazon	↑ (H)	↑(M)	↕ (L)
NE Brazil	↑ (H)	- (L)	↑(M)
SE. S. Brazil	↑ (H)	↑ in N. areas (M) ≈ insufficient in S (L)	≈(L)
W. coast S. America	↑ (H)	↑ in tropics. Insuf. evidence extra tropics	≈ (L)
C. America and Mexico	↑(H)	≈(L)	↑(M)

SREX´s selected case studies

-***Early Warning Systems*:** Adapting to Reduce Impacts. (9.2.11).

-***Effective Legislation*** for Multilevel Governance of Disaster Risk Reduction and Adaptation. (9.2.12.)

- ***Risk Transfer:*** The Role of Insurance and Other Instruments in Disaster Risk Management and Climate Change Adaptation in Developing Countries. **(**9.2.13)

-***Education, Training, and Public Awareness*** Initiatives for Disaster Risk Reduction and Adaptation. (9.2.14.)

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Special Report of the Intergovernmental Panel on Climate Change.

www.ipcc.ch

-Climate and Development Knowledge Network (2012), *Managing climates extremes and disasters in Latin America and the Caribbean :Lessons from the SREX* Report. CDKN

www.cdkn.org/srex