Regional situation of climate change and disaster statistics in Latin America and the Caribbean

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Chief, Environment, Climate Change and Disaster's Statistics
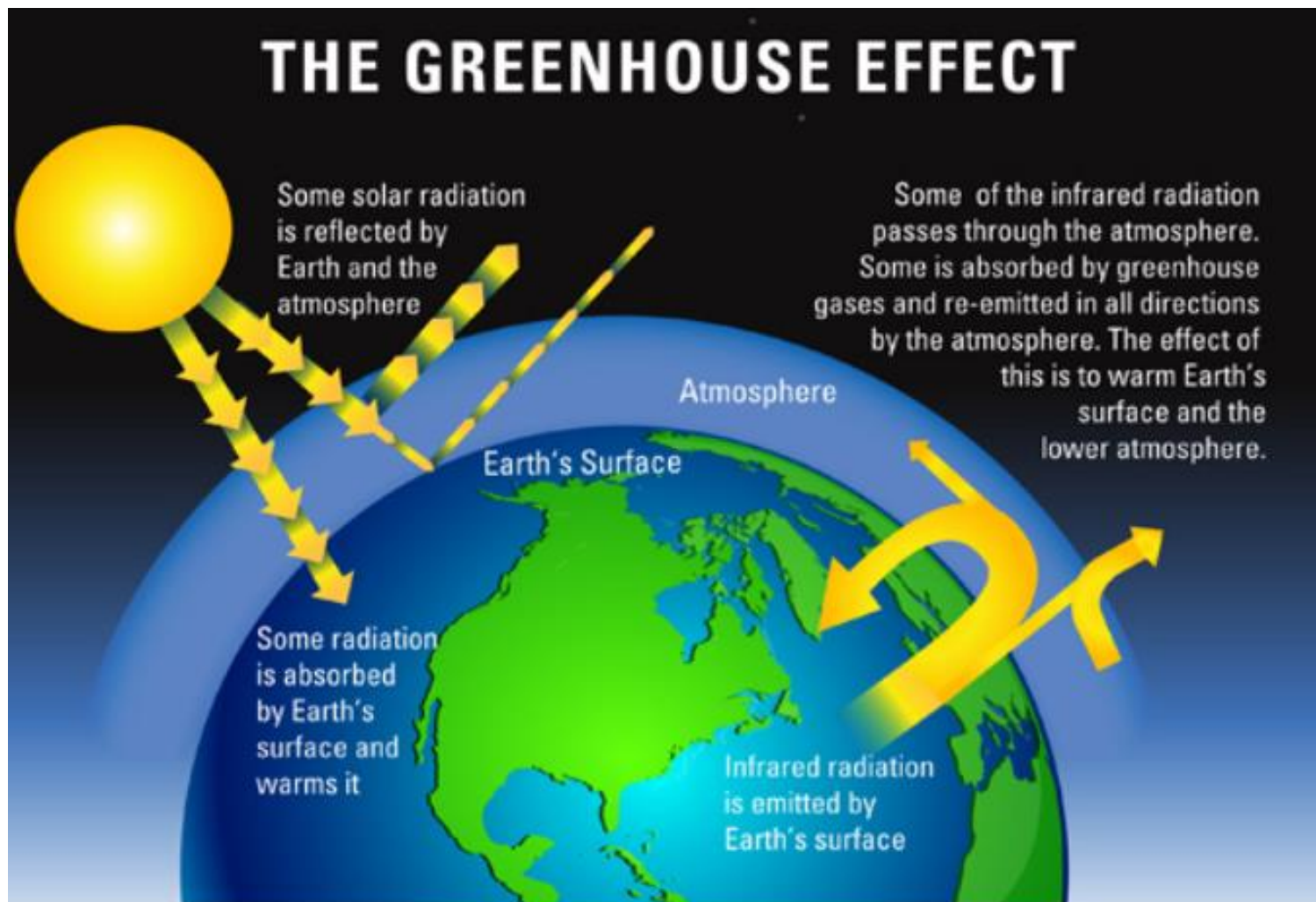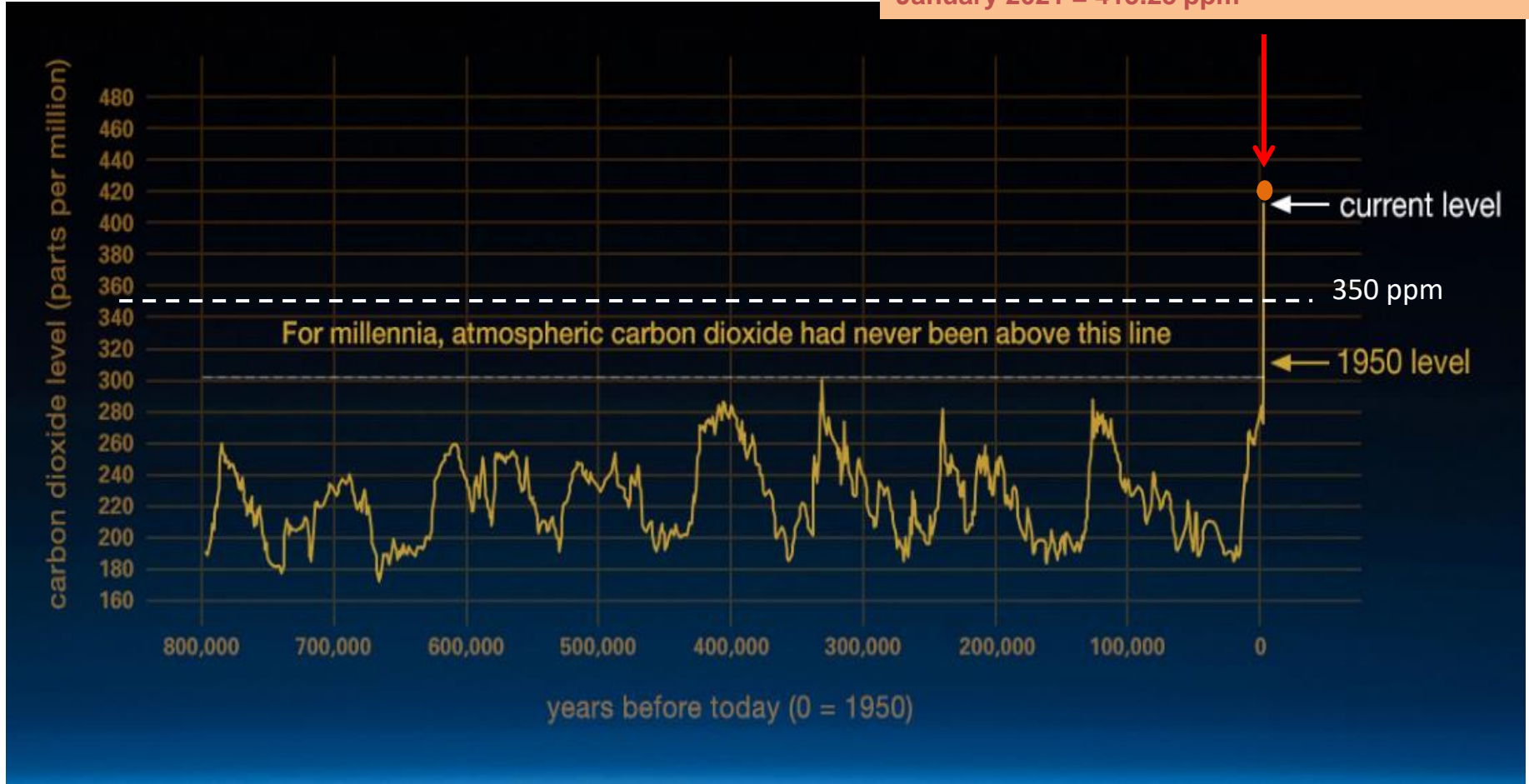Statistics Division, Economic Comission for Latin America and the Caribbean (ECLAC)

1 The global and regional context : Evidence of climate change and its impacts in the LAC region

Green House Gas effect (GHG including CO_2)

# Global CO$_2$ athmospheric concentration: historical data and current level

Historical máximum is latest measurement: January 2021 = 415.25 ppm

current level

350 ppm

1950 level

For millennia, atmospheric carbon dioxide had never been above this line

carbon dioxide level (parts per million)

years before today (0 = 1950)

GLOBAL CLIMATE CHANGE
Vital Signs of the Planet

Source: NOAA

Projecting emissions: planet not yet able to reach Paris 2015 goals with current NDCs commited by countries (and even those are not being met)
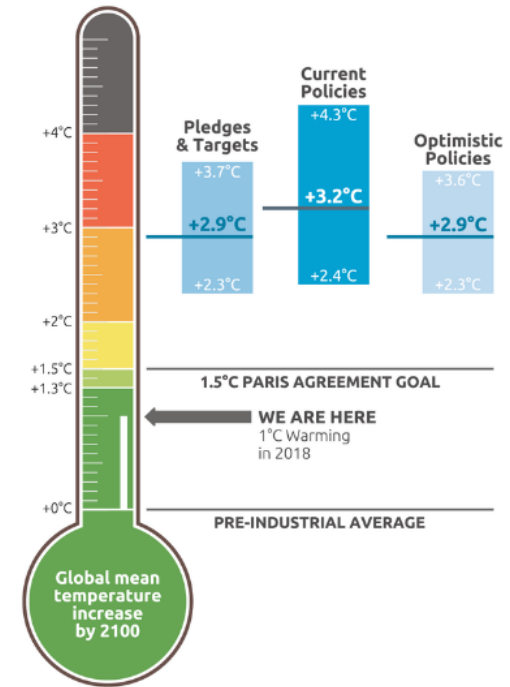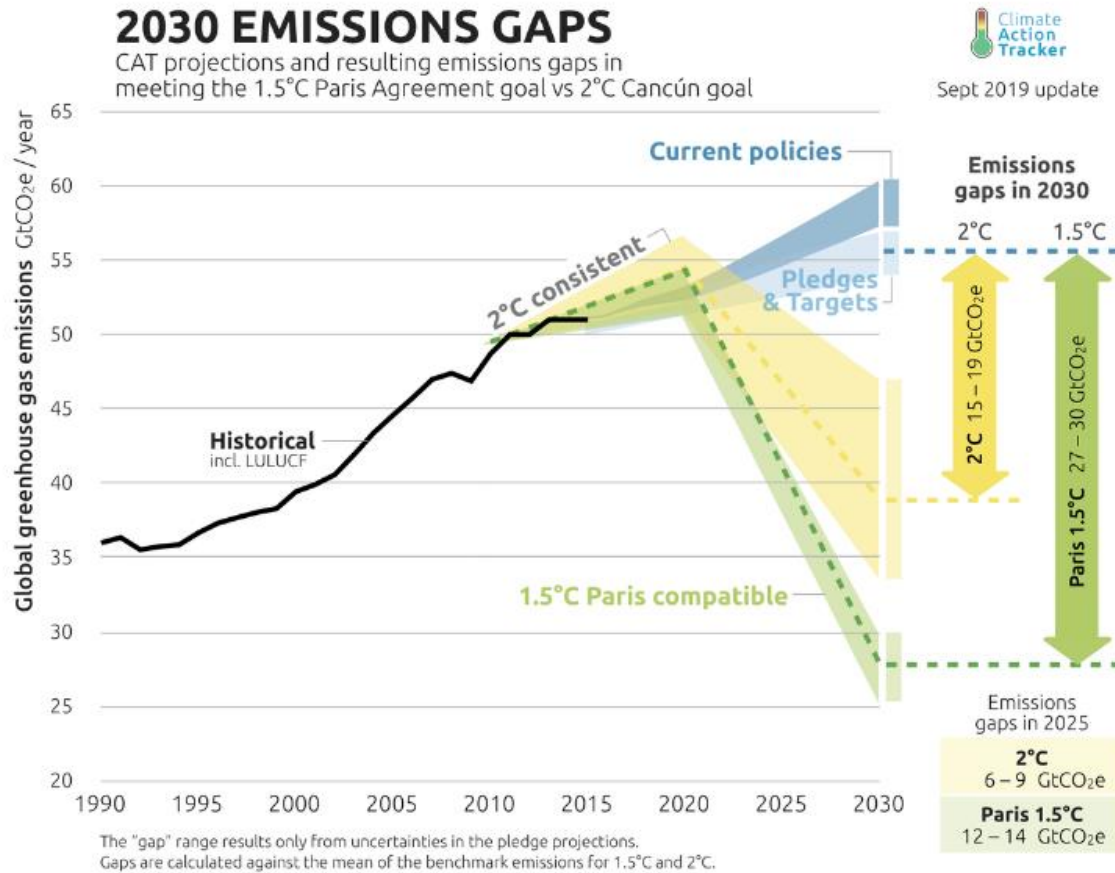
We need climate action and more ambition for next COP26 in Nov 2021, and we need transformational roadmaps including energy transition.

DECLARE 'STATE OF CLIMATE EMERGENCY',
UN ANTONIO GUTERRES URGES WORLD LEADERS

- Five years after Paris, we are still not going in the right direction.
- If we don't change course, we may be headed for a catastrophic temperature rise of more tan 3 degrees this century.
- I call in all leaders worldwide to declare a state of <u>climate emergency</u> in their countries, until carbon neutrality is reached.
- We need meaningful cuts now, to reduce global emission by 45% by 2030 compared with 2010 levels"
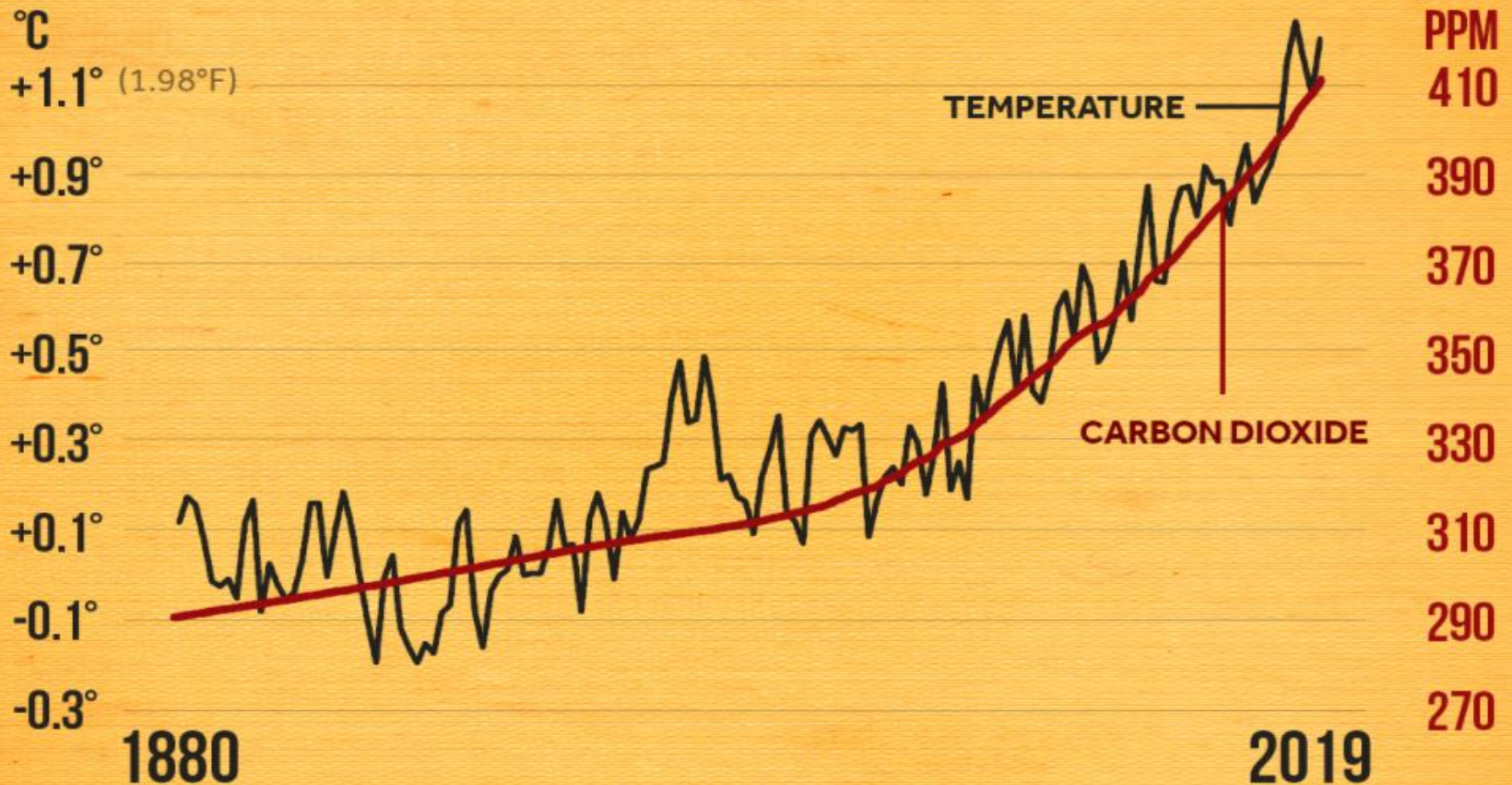
UN SG: Climate Ambition Summit 2020   https://www.youtube.com/watch?v=zW5XGJC2MKc

Scientific evidence for warming of the climate system is unequivocal.
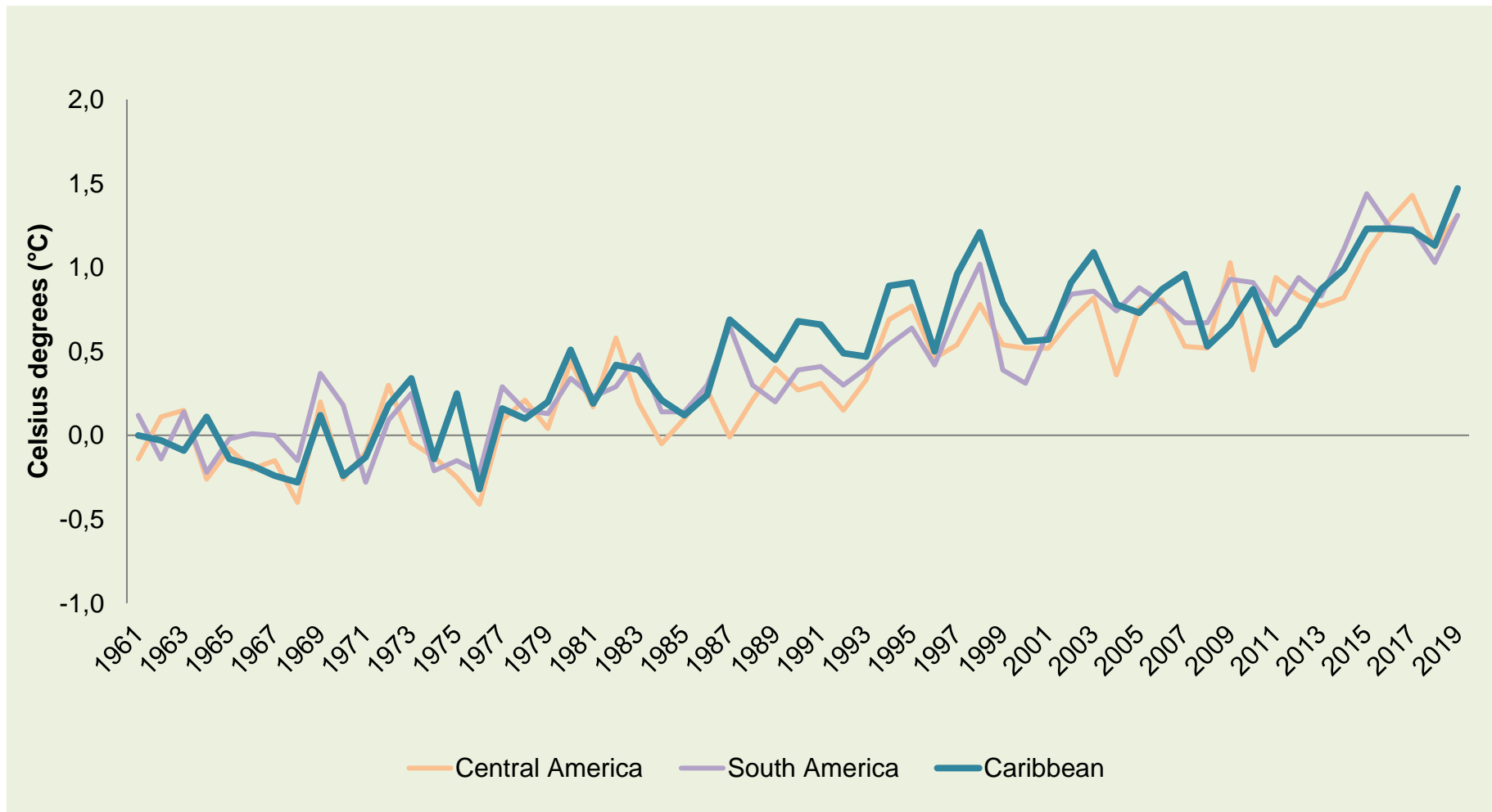- Intergovernmental Panel on Climate Change (IPCC)

LAC: Annual average temperature variation (°C) 1961-2019

Source: ECLACSTAT based on FAOSTAT, 2020 http://www.fao.org/faostat/en/#data/ET

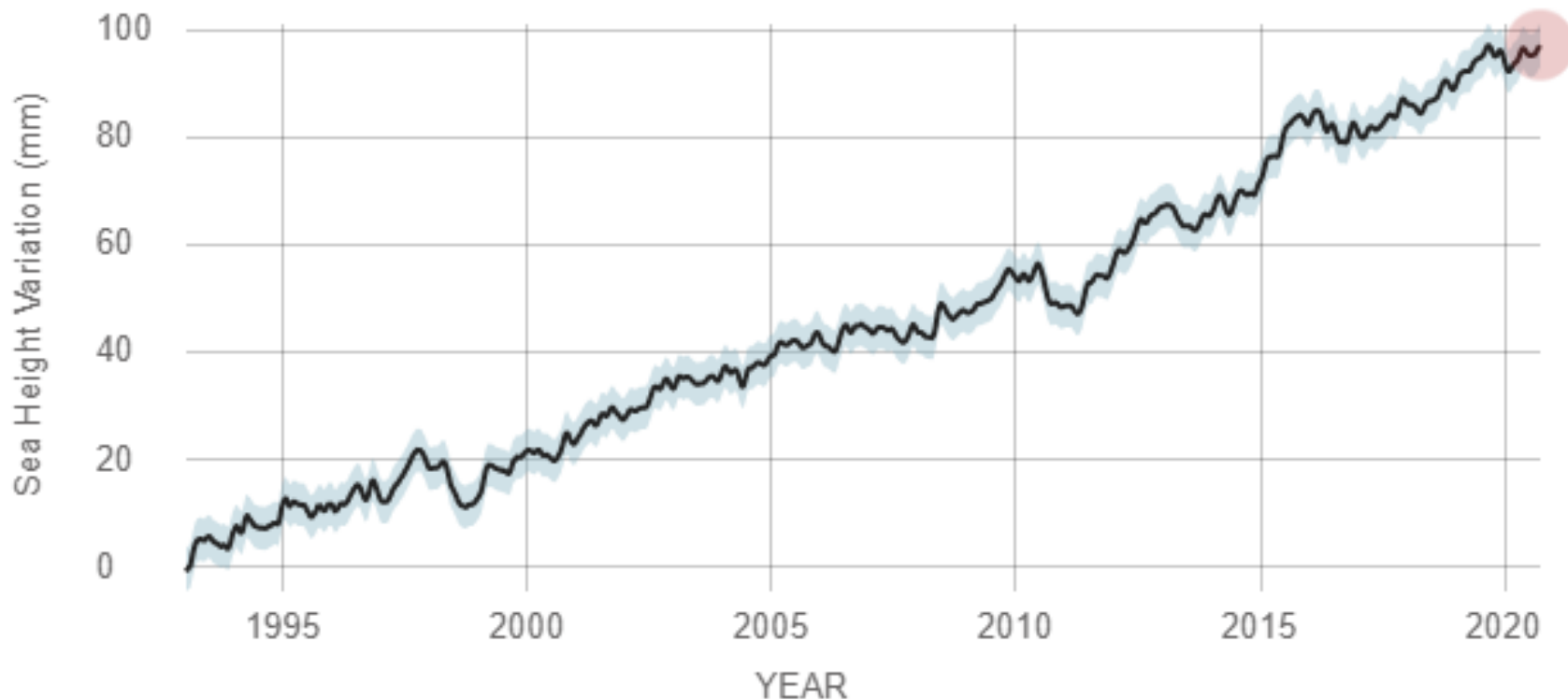# Sea Level Variation 1993 – 2020 (satellite data)

SATELLITE DATA: 1993-PRESENT

Data source: Satellite sea level observations.
Credit: NASA's Goddard Space Flight Center

RATE OF CHANGE

↑ 3.3

millimeters per year

THREATS TO CORAL REEFS CLIMATE CHANGE

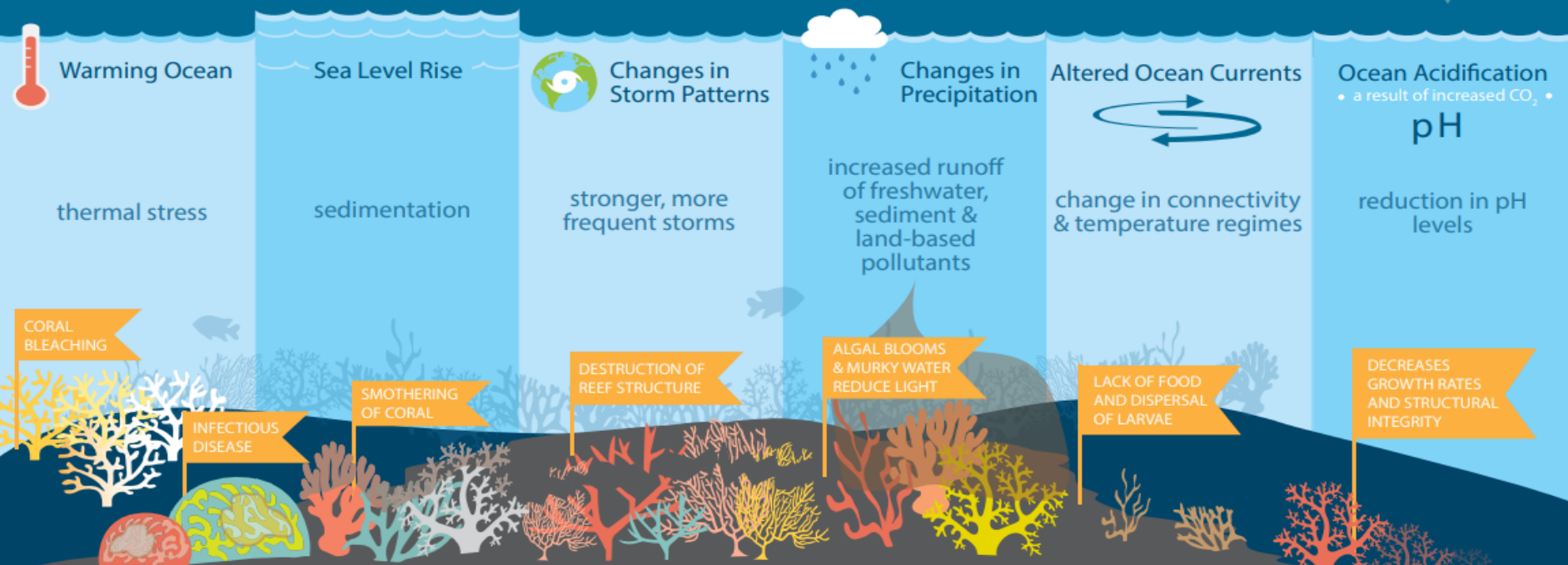Increased greenhouse gases from human activities result in climate change and ocean acidification.

CLIMATE CHANGE = OCEAN CHANGE

burning fossil fuels for heat and energy

producing some industrial products

raising livestock

fertilizing crops

deforestation

CO$_2$

The world's ocean is a massive sink that absorbs carbon dioxide (CO_2). Although this has slowed global warming, it is also changing ocean chemistry.

CLIMATE CHANGE dramatically affects CORAL REEF ECOSYSTEMS

Warming Ocean

thermal stress

Sea Level Rise

sedimentation

Changes in Storm Patterns

stronger, more frequent storms

Changes in Precipitation

increased runoff of freshwater, sediment & land-based pollutants

Altered Ocean Currents

change in connectivity & temperature regimes

Ocean Acidification
• a result of increased CO_2 •

pH

reduction in pH levels

CORAL BLEACHING

INFECTIOUS DISEASE

SMOTHERING OF CORAL

DESTRUCTION OF REEF STRUCTURE

ALGAL BLOOMS & MURKY WATER REDUCE LIGHT

LACK OF FOOD AND DISPERSAL OF LARVAE

DECREASES GROWTH RATES AND STRUCTURAL INTEGRITY

Impacts are immediate and long term, direct and indirect - A weakened coral is vulnerable.

Coral bleaching and coral death in the Caribbean

Caribbean Heat stress values
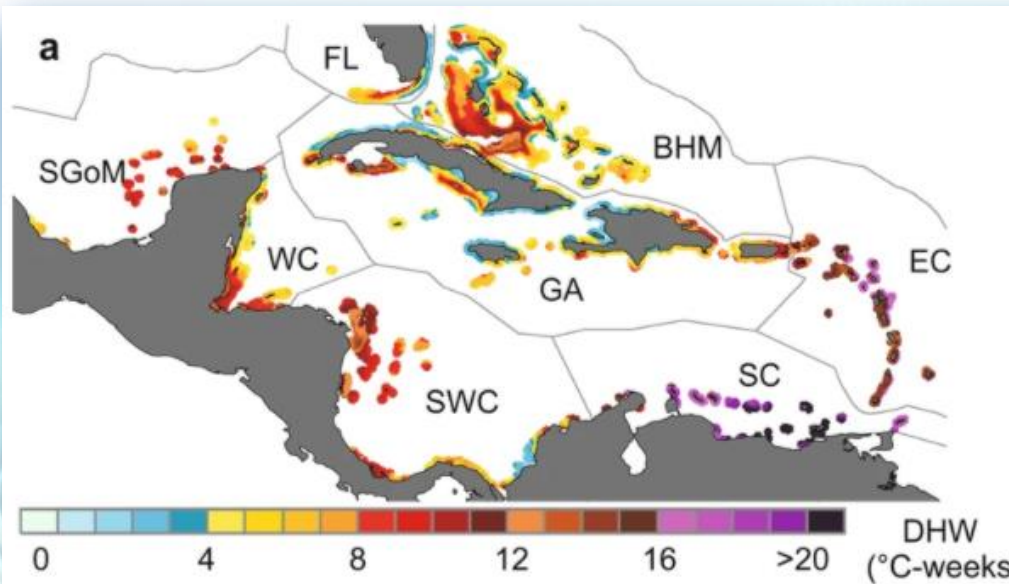
- **83%** of Caribbean reef area was exposed to "**bleaching risk**" (≥ 4 °C-weeks) at some time between 1985 and 2017.
- **42%** of the area was exposed to "**mortality risk**" (≥ 8 °C-weeks) at least once.
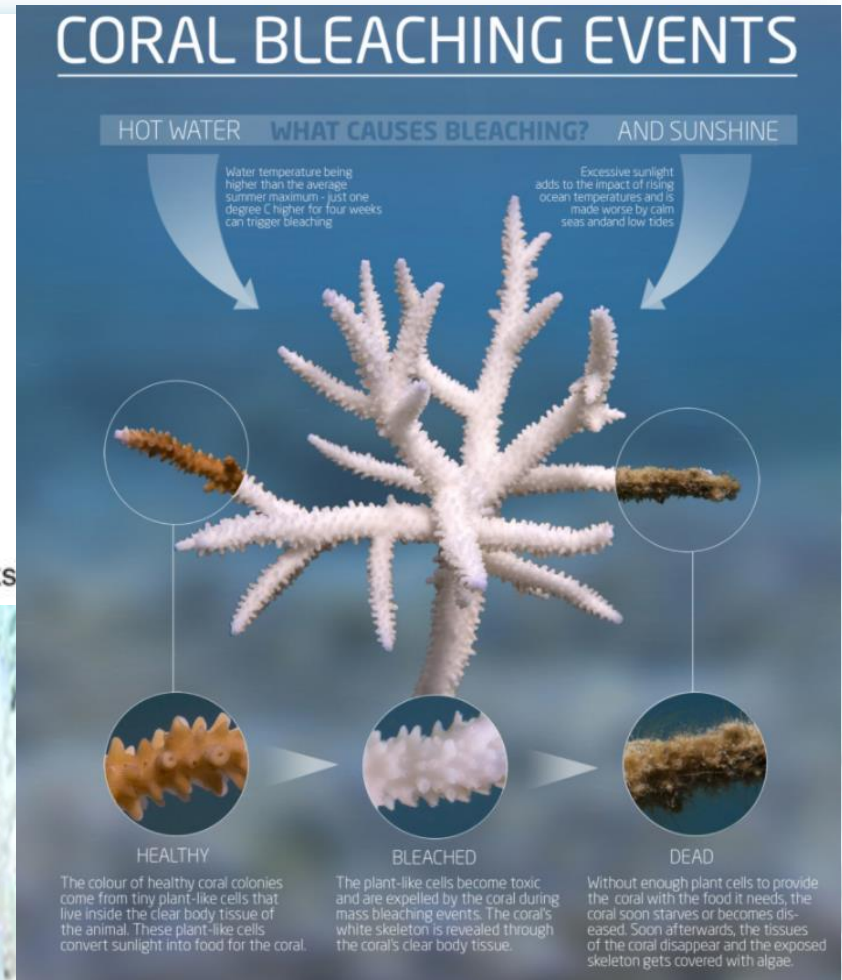
Source: Muñiz-Castillo, A.I., Rivera-Sosa, A., Chollett, I. *et al.* **Three decades of heat stress exposure in Caribbean coral reefs**: a new regional delineation to enhance conservation. *Scientific Reports* 9, 11013 (2019). **Nature** https://www.nature.com/articles/s41598-019-47307-0 https://www.barrierreef.org/

2 | **Latin America and the Caribbean: Disaster's occurrence and impacts**

The Caribbean, Climate Change and Disasters

The Caribbean is in an **asymmetrical position** in relation to climate change. The LAC region has made a historically **very small contribution** to climate change (of total GHG global emissions: **7 to 8% LAC** region, while Caribbean only **0,3%**), yet it is **highly vulnerable** to its effects including **disasters** and its impacts on people, housing, infrastructure, economic activity and sustainable development.

Between 1970 and 2020, **91.5% of disasters** of Caribbean disasters originated in meteorological or hydroclimatic phenomena such as droughts, floods, storms and tropical hurricanes.

One of the unique features of the Caribbean is that disasters may engulf an entire country and, in relative terms, be of a magnitude that outstrips that of any other region. For example, during the **2017 hurricane season**, the **total cost of the destruction wreaked by Hurricane Irma and Hurricane María in the British Virgin Islands and Sint Maarten exceeded 100%** of the gross domestic product (**GDP**) of these countries.

Irma, José, Maria: Intense 2017 hurricane season impact in the highly vulnerable Caribbean region
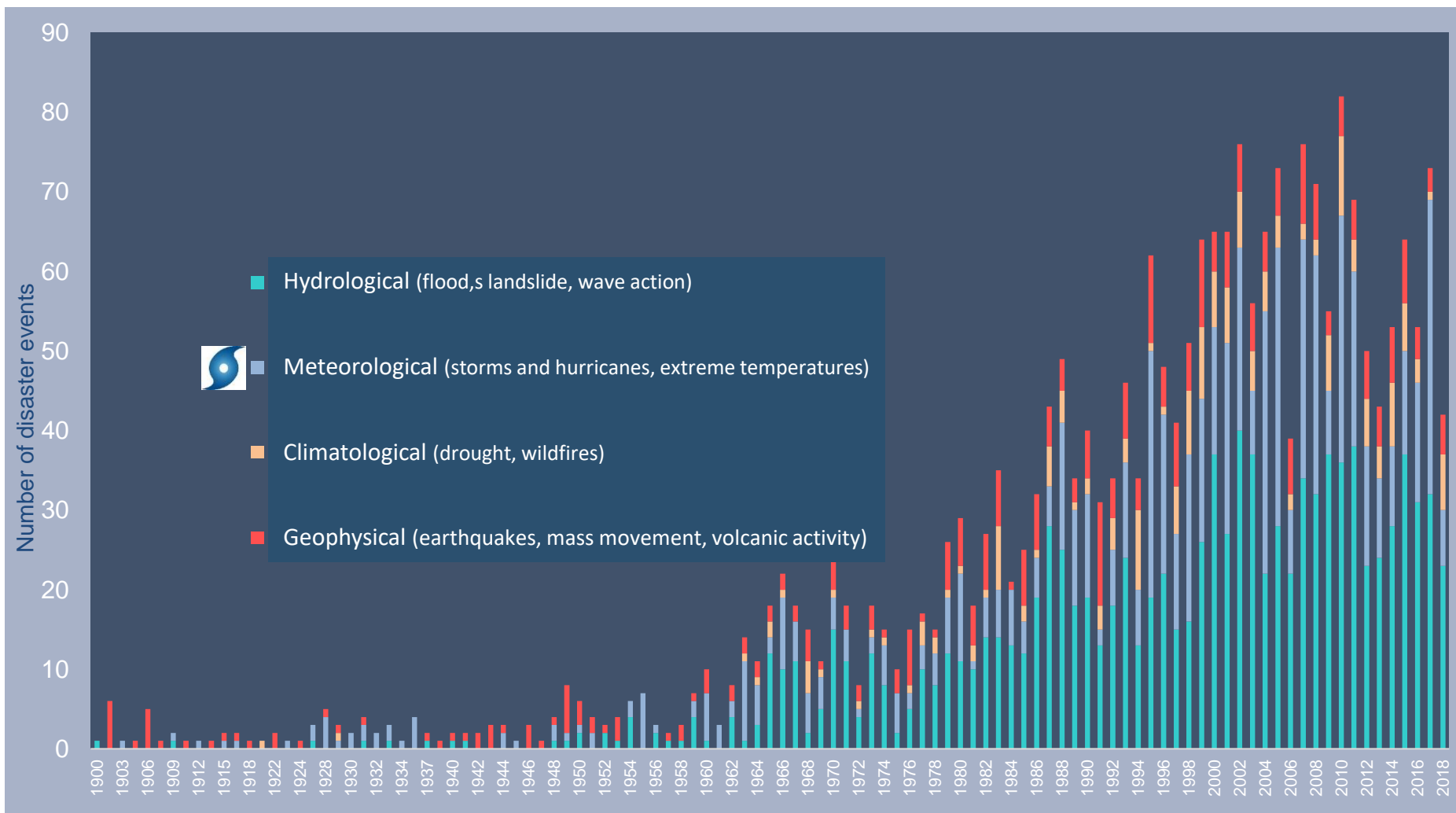

Roseau, Dominica after Maria, Sept. 2017

La Habana, after Irma, Sept 2017

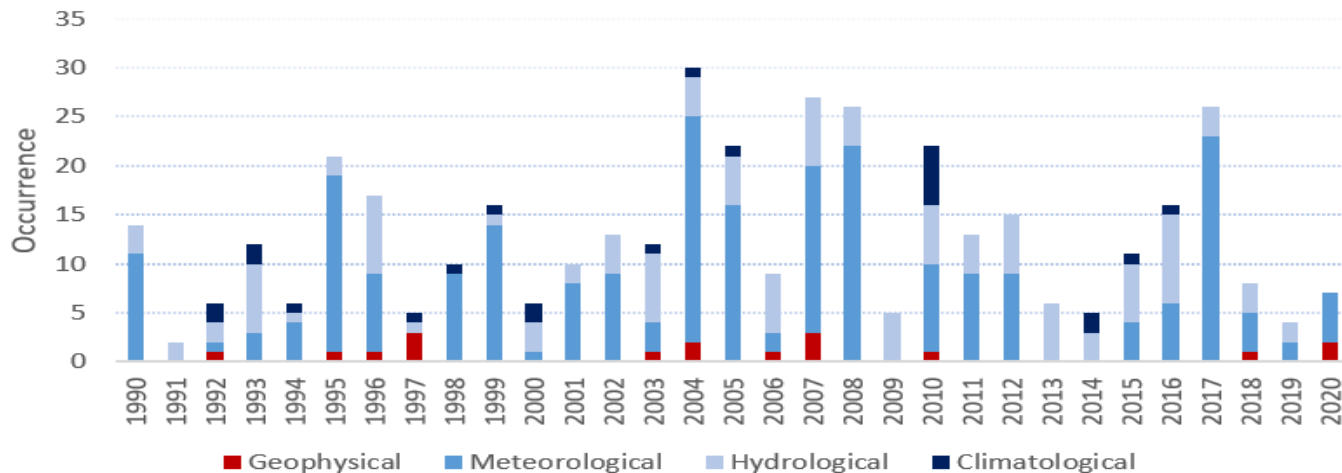The Bahamas after Dorian, Sept. 2019

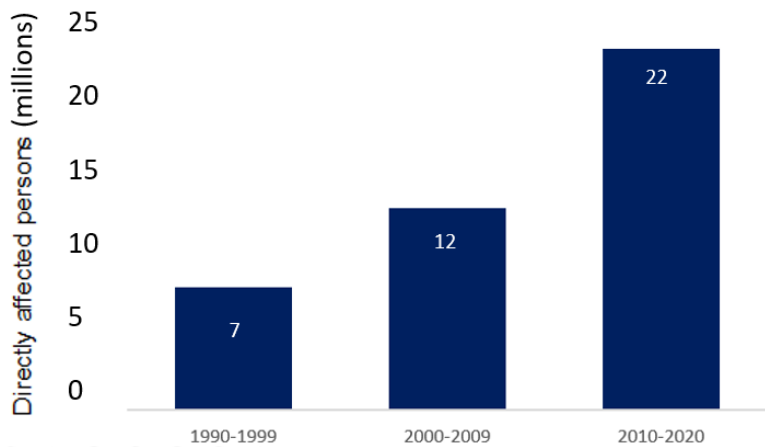# Ocurrence of disasters in LAC region, by type
1900 -2018

Caribbean: occurrence and impact of disasters by disaster type (1900 – 2020

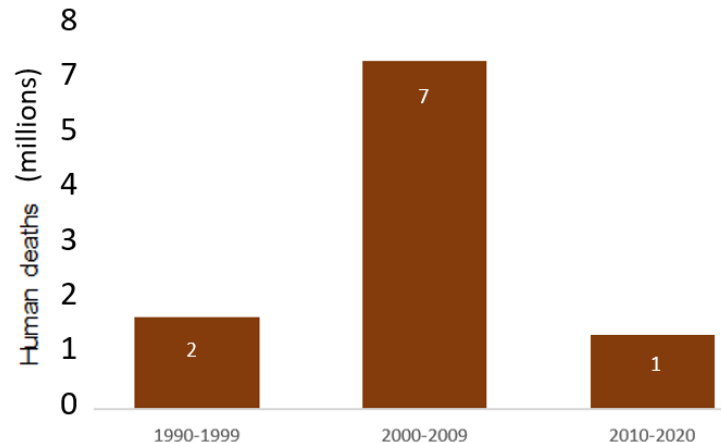Caribbean: number of occurred disasters

CARIBBEAN: Directly affected persons
Immediate basic needs (water, shelter, food) and/or in need of medical assistance
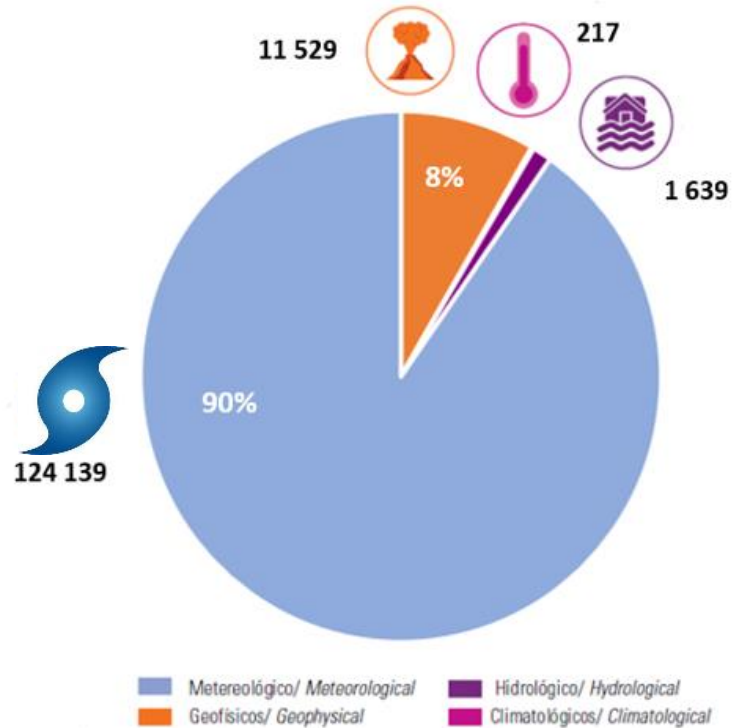

CARIBBEAN: Human deaths

Caribbean: accumulated economic cost of disasters 1970-2020 by type of disaster[A]

(En millones de dólares y porcentajes/Millons of dollars and percentages)

UNITED NATIONS

ECLAC

- Between 1970 and 2020, **91.5%** of disasters of the Caribbean were associated with **climate change**, i.e. meteorological or hydroclimatic phenomena such as floods, storms and hurricanes.
- The value of **all economic damages and losses** related to disasters in the last 5 decades reaches **$137** billion dollars.

11 529   217

8%

1 639

90%

124 139

- Metereológico/ *Meteorological*
- Geofísicos/ *Geophysical*
- Hidrológico/ *Hydrological*
- Climatológicos/ *Climatological*

These economic cost statistics are estimated and portray only part of the story, since most disaster in the global source EM-DAT (63%) do not contain economic cost data. Situation is worse in developing countries

ECLAC's recent DALAs in the Caribbean

Since 2015, ECLAC has led **nine** Damage and Losses Assessments (**DALA)** in the Caribbean, all of them were associated with **Hurricanes**. These technical cooperation missions were carried out in Anguilla, Bahamas, Belize, the British Virgin Islands, Sint Maarten, and Turks and Caicos Islands.

The last of these assessments was after **Hurricane Dorian in the Bahamas**, which cost USD **3.6 billion**.

In the coming months, ECLAC will publish the database with the results of these disaster assessments. It is a unique database since it allows to see the **effects of these events by economic sectors and by institutional, public and private sectors**. This is important for studying the impacts of climate change in the Caribbean.
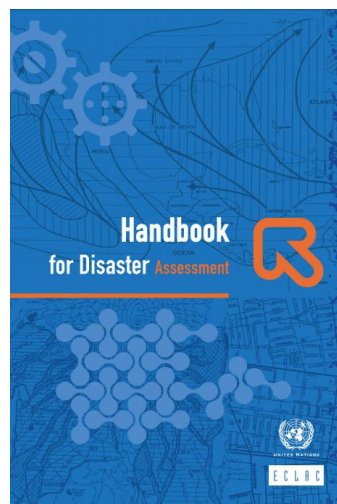
3   Statistically informing about climate change and disasters

- **Methodological guidance and data availability**

How to measure climate change & data availability

Climate change sequence (main statistical topics)

Climate Process Drivers

Include GHG emissions and use of ozone depleting substances (ODSs);

Climate Change Evidence

Include slow and rapid onset events on the atmosphere, climate and weather as well as occurrence of extreme weather events

Climate Change Impacts and Vulnerability

Include impact of extreme events and disasters (resulting from extreme event and vulnerability) on humans, its settlements and the environment

Mitigation and Adaptation
~ human response to climate change

Include changes in energy renewability/carbon intensity, C&P patterns, levels of environmental protection expenditure, existence of regulation and instruments and level of disaster preparedness

more Available data

less Available data

+

Available data

Available data

–

Depending on the country the situation varies, but in general:

➢ **Climate process drivers:**
  - Statistics relatively more available (energy, agriculture, other economic activities and GHG net emissions).

➢ **Climate change evidence:**
  - Historical data series available for precipitation and temperature variation (terrestrial and seas).

➢ **Climate change impacts and vulnerability:**
  - Data available for occurrence and impact of disasters on affected people. Economic losses due to disasters less available.
  - Sea level rise data is less available
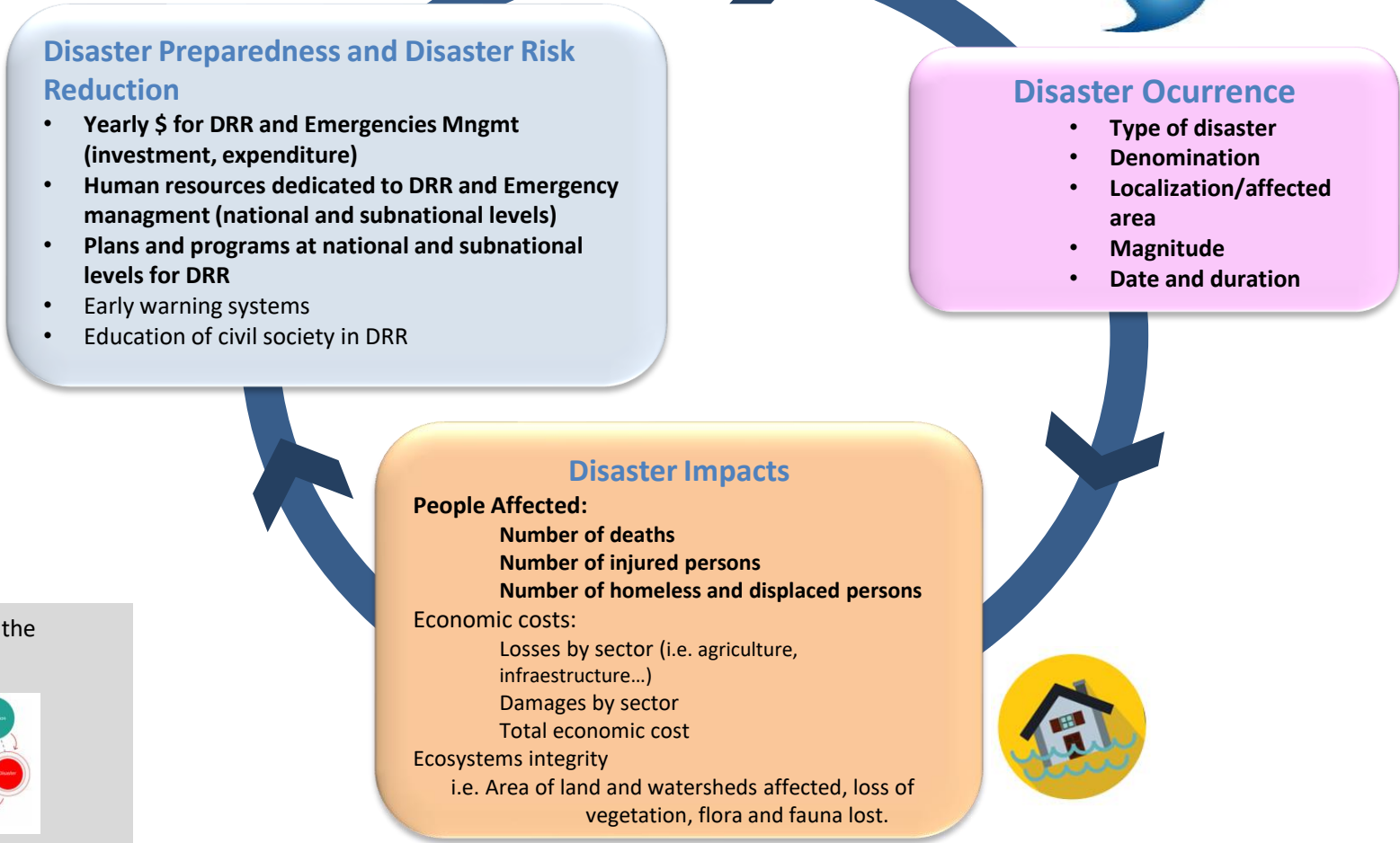
➢ **Mitigation**
  - Energy renewability, energy intensity of GDP, forest cover and disaster preparedness data relatively more available.

➢ **Adaptation:**
  - The least developed and more difficult to capture statistically (spatially specific programs and measures).

Disaster sequence and useful statistics needed to compile key indicators

Disaster Preparedness and Disaster Risk Reduction

- **Yearly $ for DRR and Emergencies Mngmt (investment, expenditure)**
- **Human resources dedicated to DRR and Emergency managment (national and subnational levels)**
- **Plans and programs at national and subnational levels for DRR**
- Early warning systems
- Education of civil society in DRR

Disaster Ocurrence

- **Type of disaster**
- **Denomination**
- **Localization/affected area**
- **Magnitude**
- **Date and duration**

Disaster Impacts

People Affected:

    Number of deaths

    Number of injured persons

    Number of homeless and displaced persons

Economic costs:

    Losses by sector (i.e. agriculture, infraestructure…)

    Damages by sector

    Total economic cost

Ecosystems integrity

    i.e. Area of land and watersheds affected, loss of vegetation, flora and fauna lost.

Note: Simplification of the disaster sequence

for statistical purposes

Text in Bold: relatively more available statistics

4

Progress of regional production of environment, climate change and disaster statistics and indicators

State of the art in the LAC region of environment, climate change and disasters statistics

- There is an ever-growing **demand** for these metrics, both from **international and national agreements and development plans and policy targets.**

- Indicators that require environment, climate change and disaster statistics:
  - Of **SDG** targets and goals almost **70%**, and **50%** of SDG indicators
  - Of **SENDA**I FW: **100%** of indicators
  - Of **Paris 2015** Agreement on Climate Change: **100%**

- Of the three pillars of sustainable development, the newer and weakest is monitoring/measuring **environment, climate change and disasters**

- Statistical production of climate change and disaster statistics is insuficient and **heterogenous** in the LAC region.

What is **not measured, can not be properly managed nor solved**

Environment statistics:
third wave of statistical development in LAC region

Economic statistics

Social statistics

Environment statistics

1940's 1950's

1960's 1970's

Since 2000's
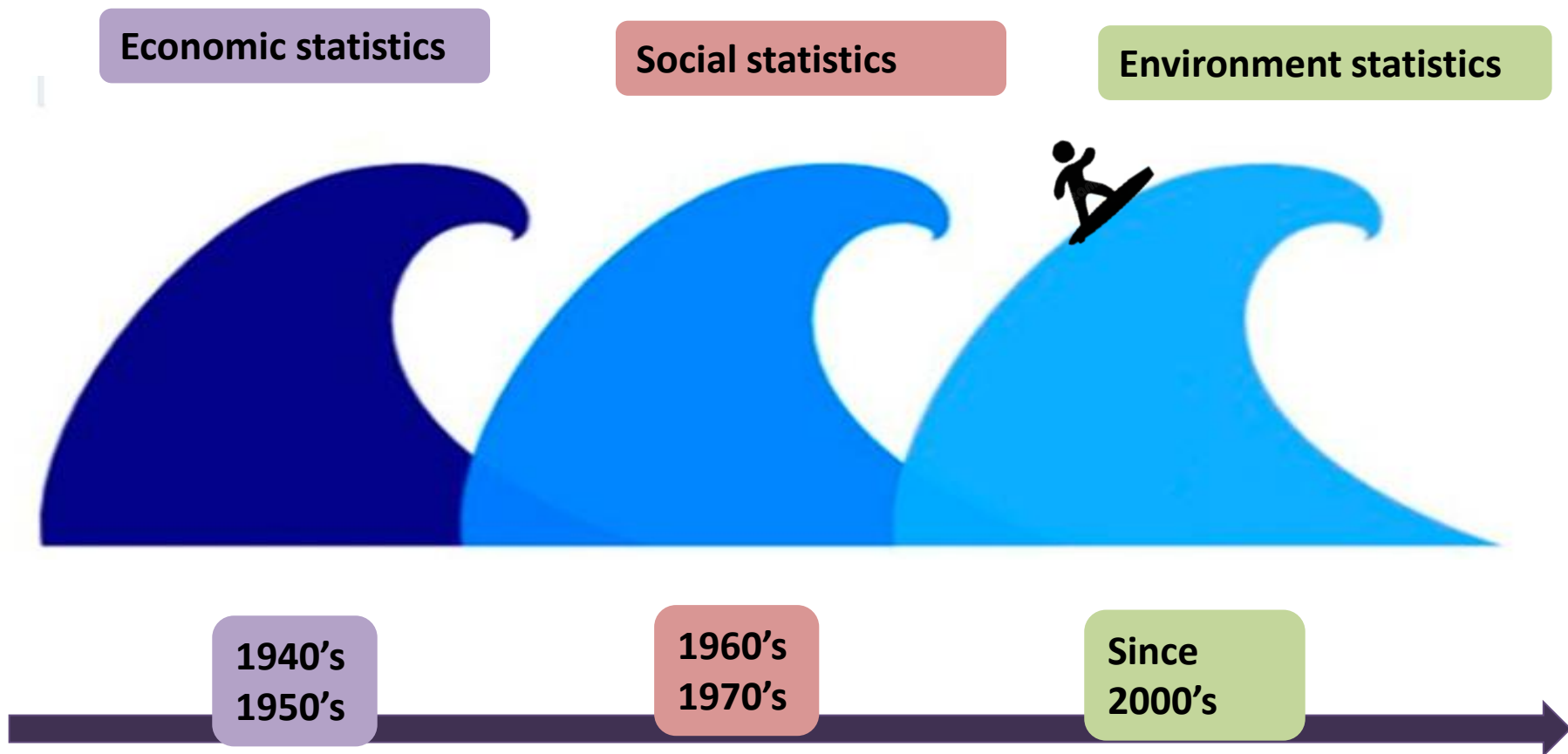
Decades of start/emphasis of ECLAC´s statistical technical support and capacity building in 3 statistical domains.

Progress of LAC Environmental Statistics (ES)

Situation 1999

- Mandates for the production of "environmental information"
- Regular environmental statistical operations had not been started - NSOs
- Pioneering publications:
  - **Compendium of environmental statistics 1986**
  - **National environmental indicators** and forthcomming **SD indicators 2000**
- Most countries lacked inter-institutional coordination
- Lack of methodological documents in Spanish and Portuguese
- Limited technical experience in the region
- There was no regional network of institutions and experts

2009

- **Advances in:**
- Greater environment statistical development
- Progress in inter-institutional coordination (committes)
- Development of regional networks and **GTEA SCA** + **GTIIA ILAC**
- Institutionalization of some environmental statistics units

- **Challenges:**
- Insufficient production of environmental statistics to meet growing demand
- Heterogeneity persists in the level of environmental statistics development among countries.

2018/9

- **Advances in:**
- 22 countries have a legal mandate to produce ES
- Human resources dedicated to ES increased (avg 3)
   Max 26, Min 0
- Inter-institutional coordination improved
- Regional projects to strengthen Es
- **Regional network ES**
- **Challenges:**
- **Some countries have not yet officially started working on Environmental statistics**
- Only **33%** of NSOs have a **dedicated ES unit**
- ES specialized units are not at the same **level** as those of economic and social statistics
- Insufficient EA production to produce environmental reports, indicators and accounts

Regional challenges to **produce** environment, climate change and disasters statistics and indicators:

Statistical challenges:

- Insufficient and/or irregular collection of environmental, climate change and disasters **data** within National Statistical Systems.

- **Newer sources** of statistical information underutilized (i.e. remote sensing, geospatial, monitoring stations and administrative records)

- **Methodologies** to measure some aspects of climate change and adaptation, and disaster risk, impact and resilience are under development

Institutional challenges:

- **Institutionalization** and regular **budget** allocation needed in both NSOs and line ministries and authorities in the context of National Statistical Systems

- **Inter-agency technical capacities and common language** is needed (hence this project) for all teams in all relevant institutions

- Insufficient **institutionalized regular statistical cooperation** among NSO - Ministry of Environment – Disaster/Emergency, line Ministries and academia

DA12 project Kick-off webinar
9 - 11 March 2021

Thank you!

https://www.cepal.org/en/headquarters-and-offices/eclac-caribbean
https://www.cepal.org/en/topics/environmental-statistics