DA12 project Kick-off webinar
9 - 11 March 2021

Selected climate change and disasters metrics in Latin America and the Caribbean

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UNITED NATIONS

ECLAC

1 CC Drivers

2 CC Mitigation

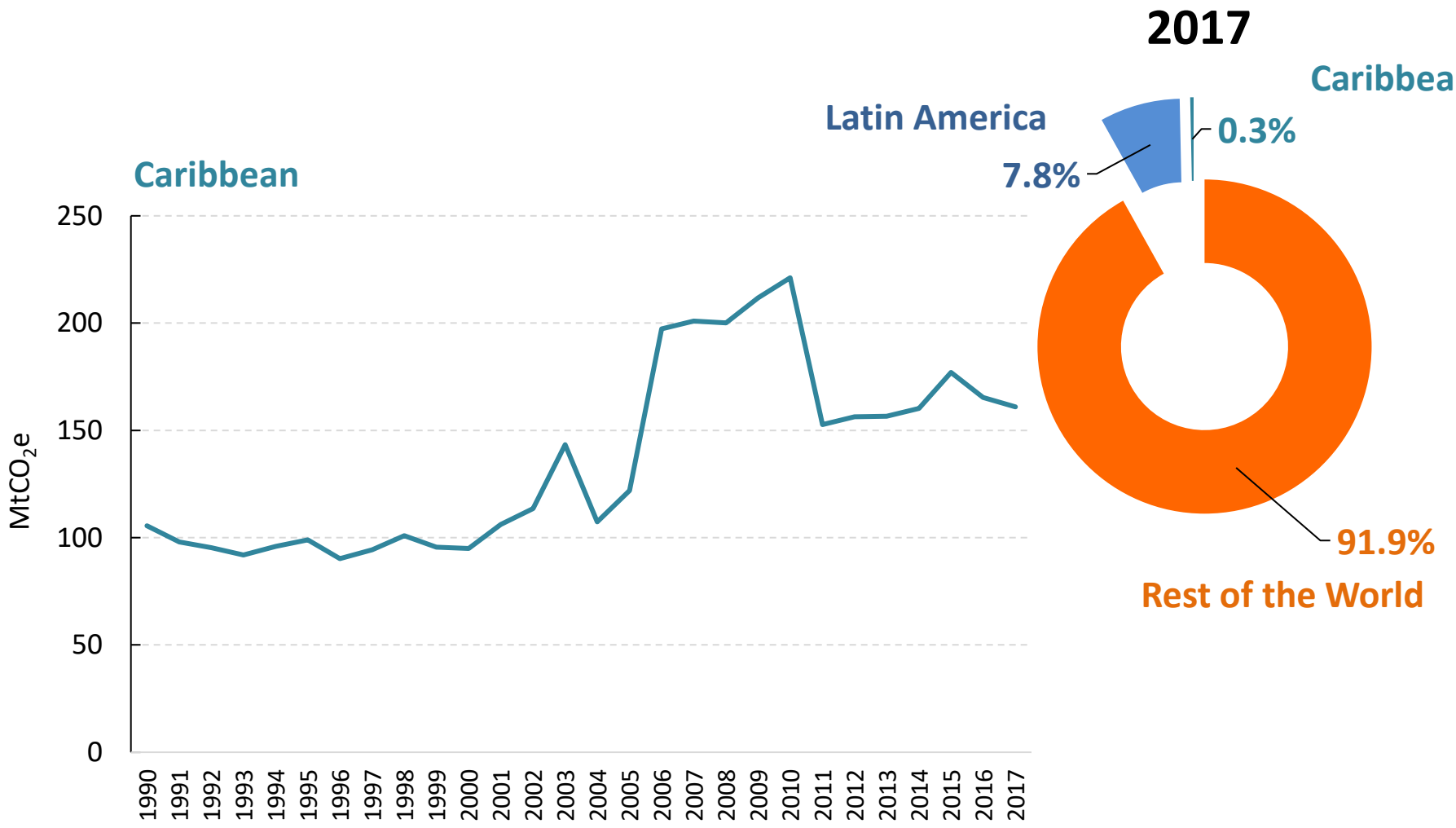
3 CC Evidence

4 Occurrence and impacts of disasters

1 Drivers of climate change:

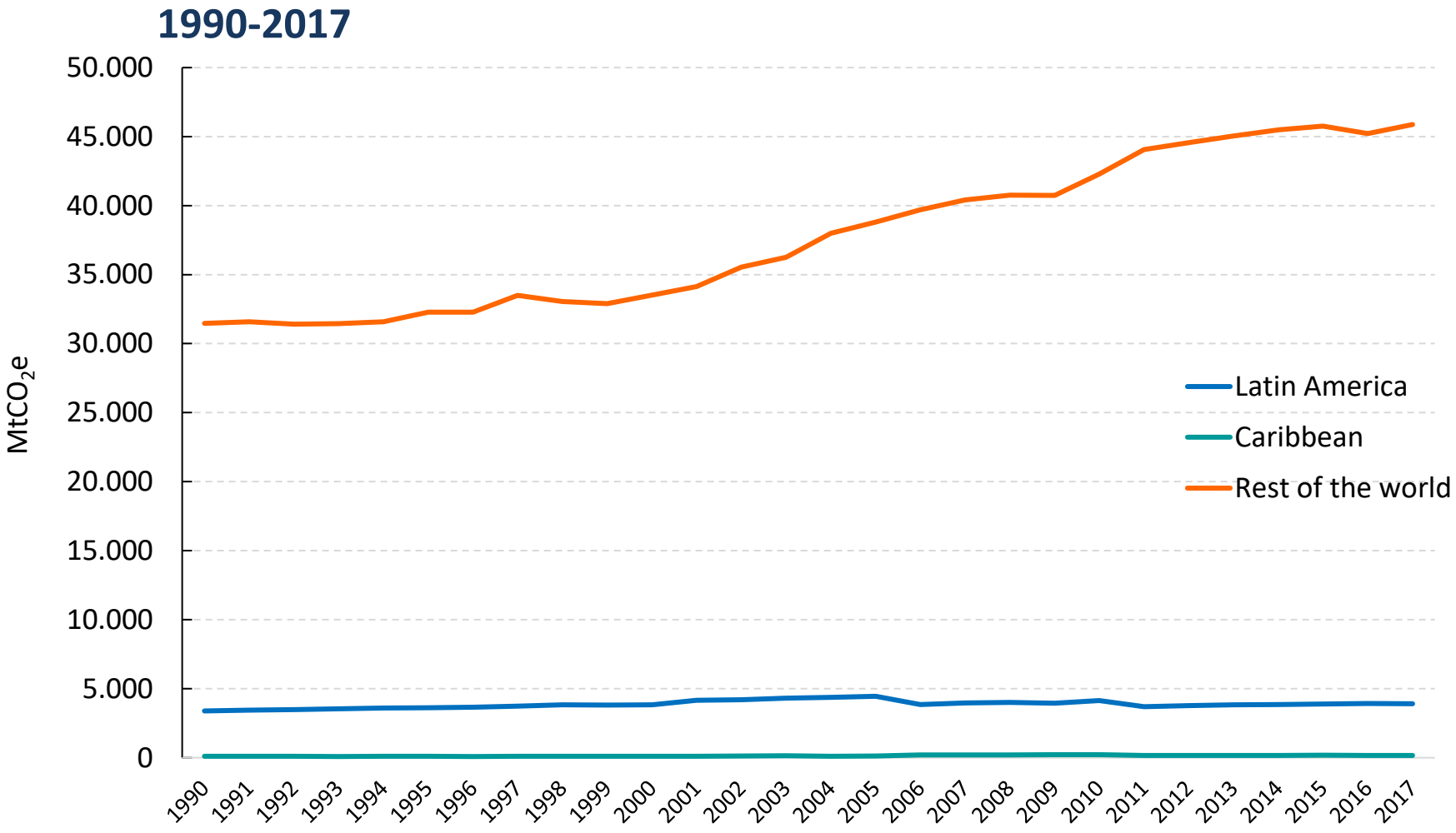
- GHG emissions

Evolution of GHG Emissions in the Caribbean ($MtCO_2e$) 1990-2017 and percentage in 2017



Source: CAIT - WRI: World Resource Institute, Climate Analysis Indicator Tool - CAIT Climate Data Explorer - http://cait.wri.org

Evolution of GHG Emissions in Latin America, the Caribbean and the rest of the world ($MtCO_2e$)



Source: CAIT - WRI: World Resource Institute, Climate Analysis Indicator Tool - CAIT Climate Data Explorer - http://cait.wri.org

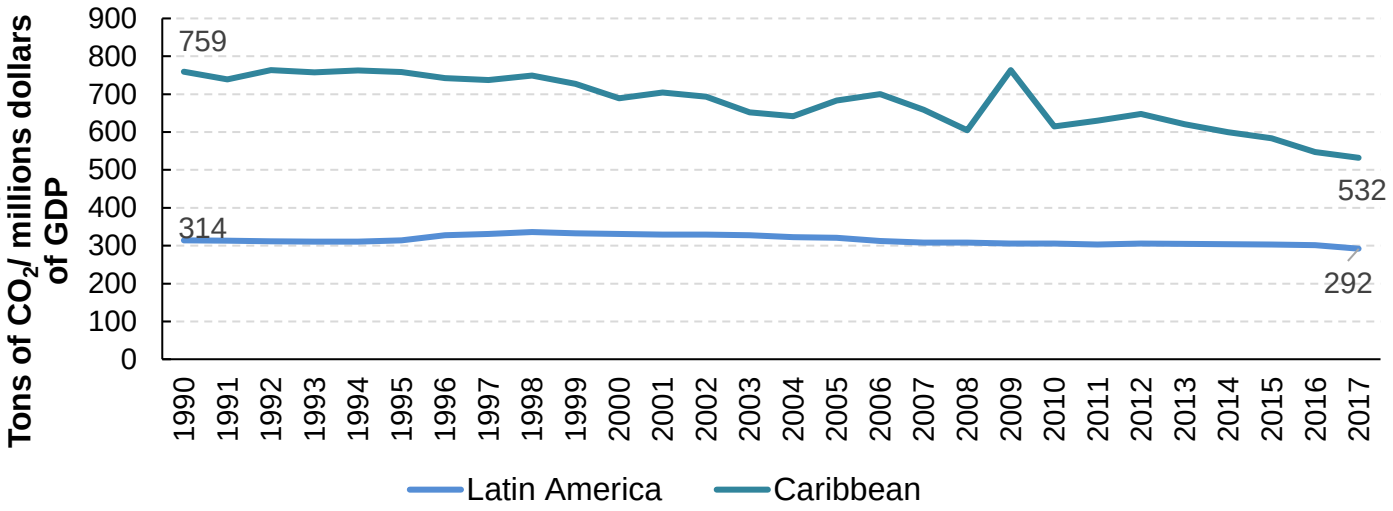
2 Mitigation of climate change

- Energy intensity of GDP
- Carbon intensity of GDP
- Renewable Energy

Carbon intensity of GDP tons of CO_2 per million dollars of GDP
Energy intensity of GDP consumption per unit of GDP

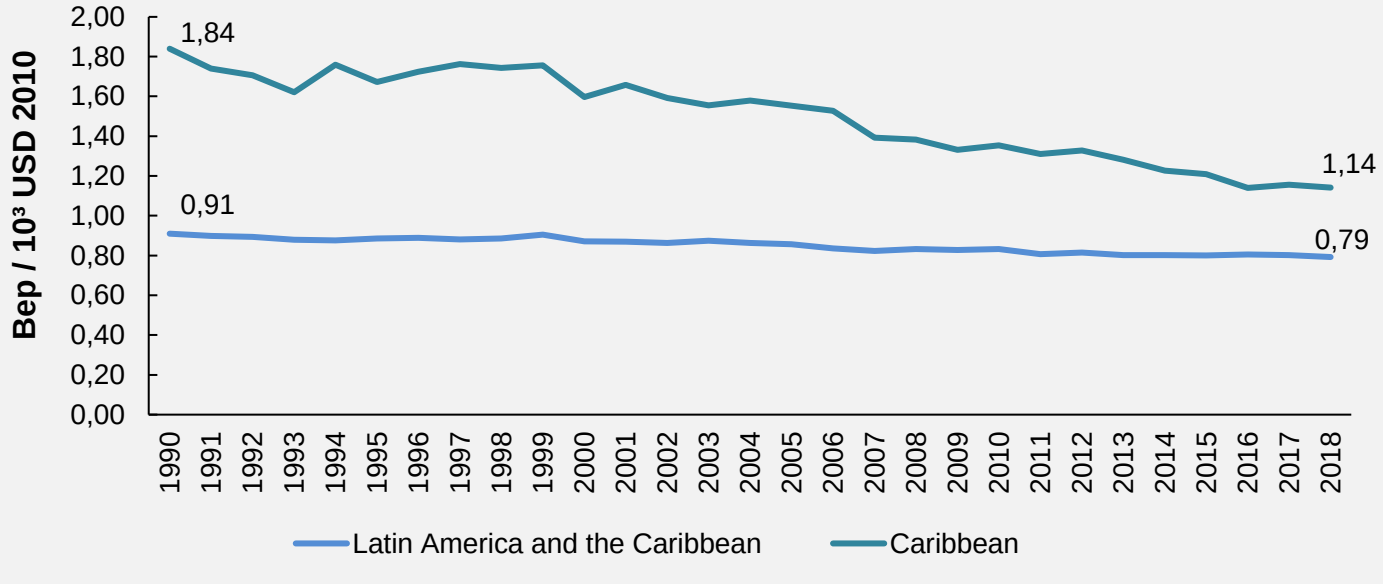
Carbon intensity of GDP

(tons of CO_2 per million dollars of GDP) [a]



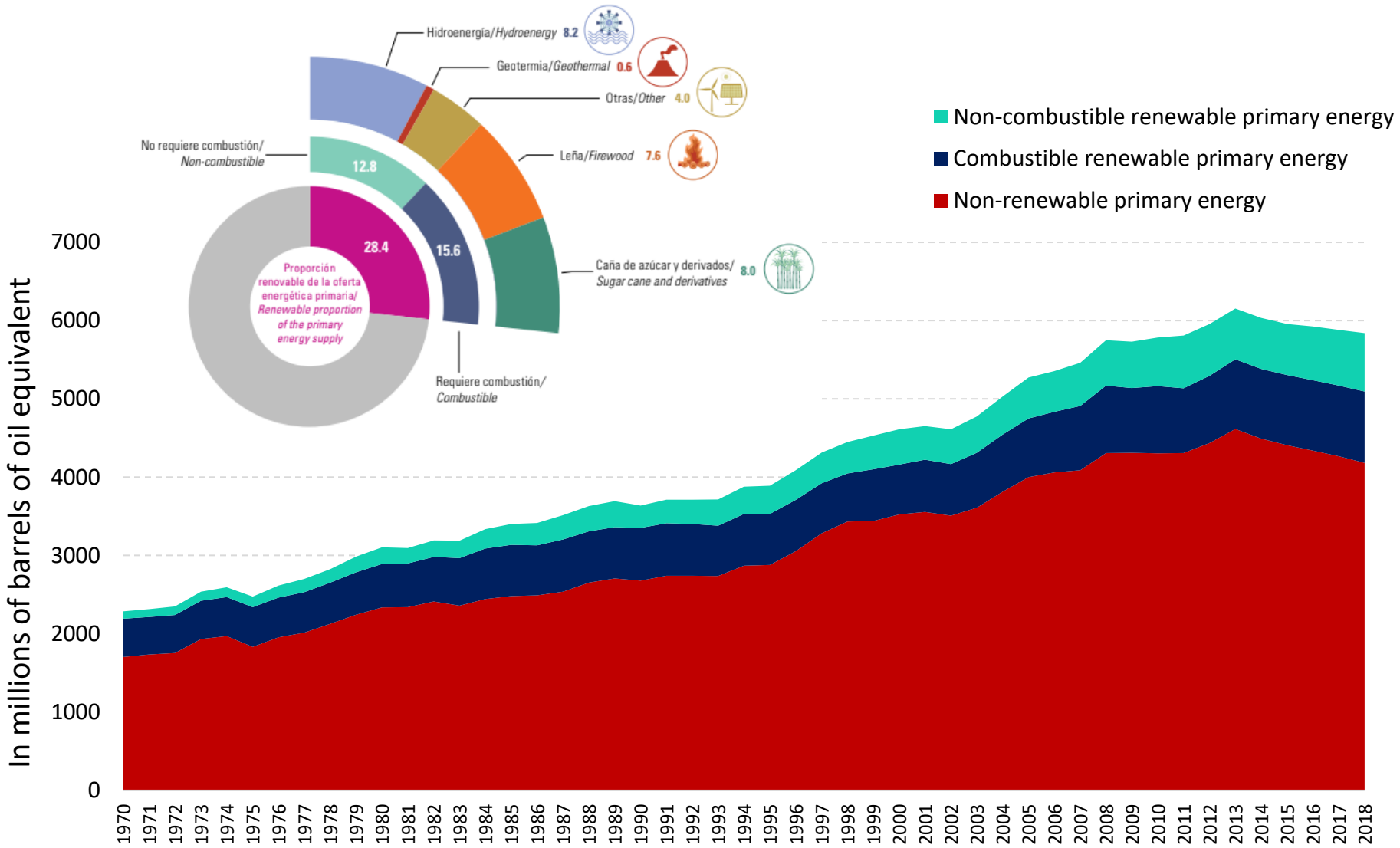
Energy intensity of GDP

(E consumption/GDP) [b]



[a]Source: Calculated by ECLAC based on CAIT, http://cait.wri.org/
[b]Source: ECLAC based on OLADE, http://www.olade.org/

LAC: Renewable and Non-Renewable Primary Energy Supply, 1970-2018 and supply of primary renewable energy by energy resource, 2018



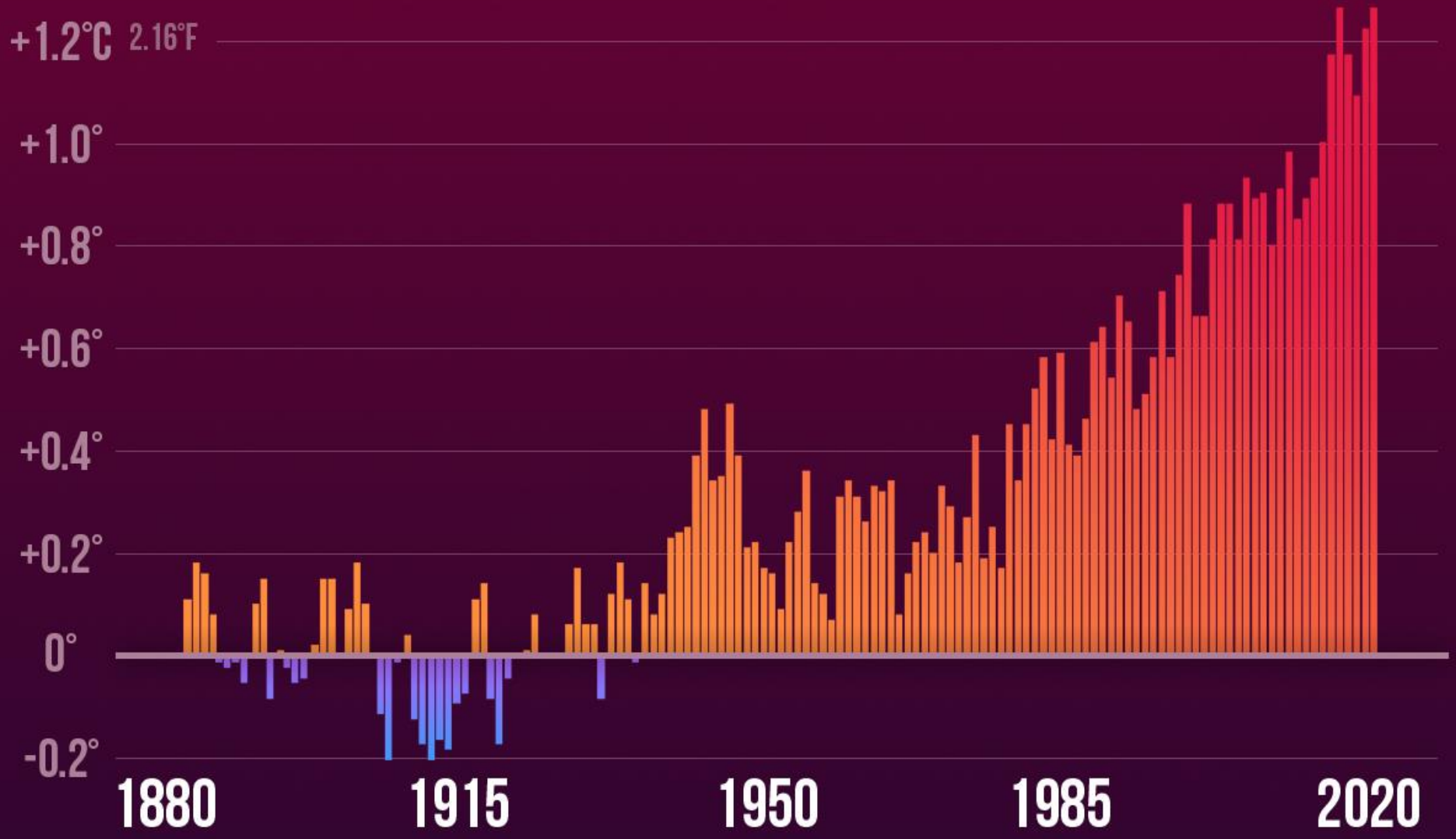
Source: ECLAC based in OLADE, Energy Information System of Latin America and the Caribbean (SIEE) [online] http://sier.olade.org

3 Evidence of climate change

- Terrestrial temperature rise
- Ocean temperature rise
- Sea level rise
- Forest cover loss
- Coral bleaching

GLOBAL TEMPERATURE

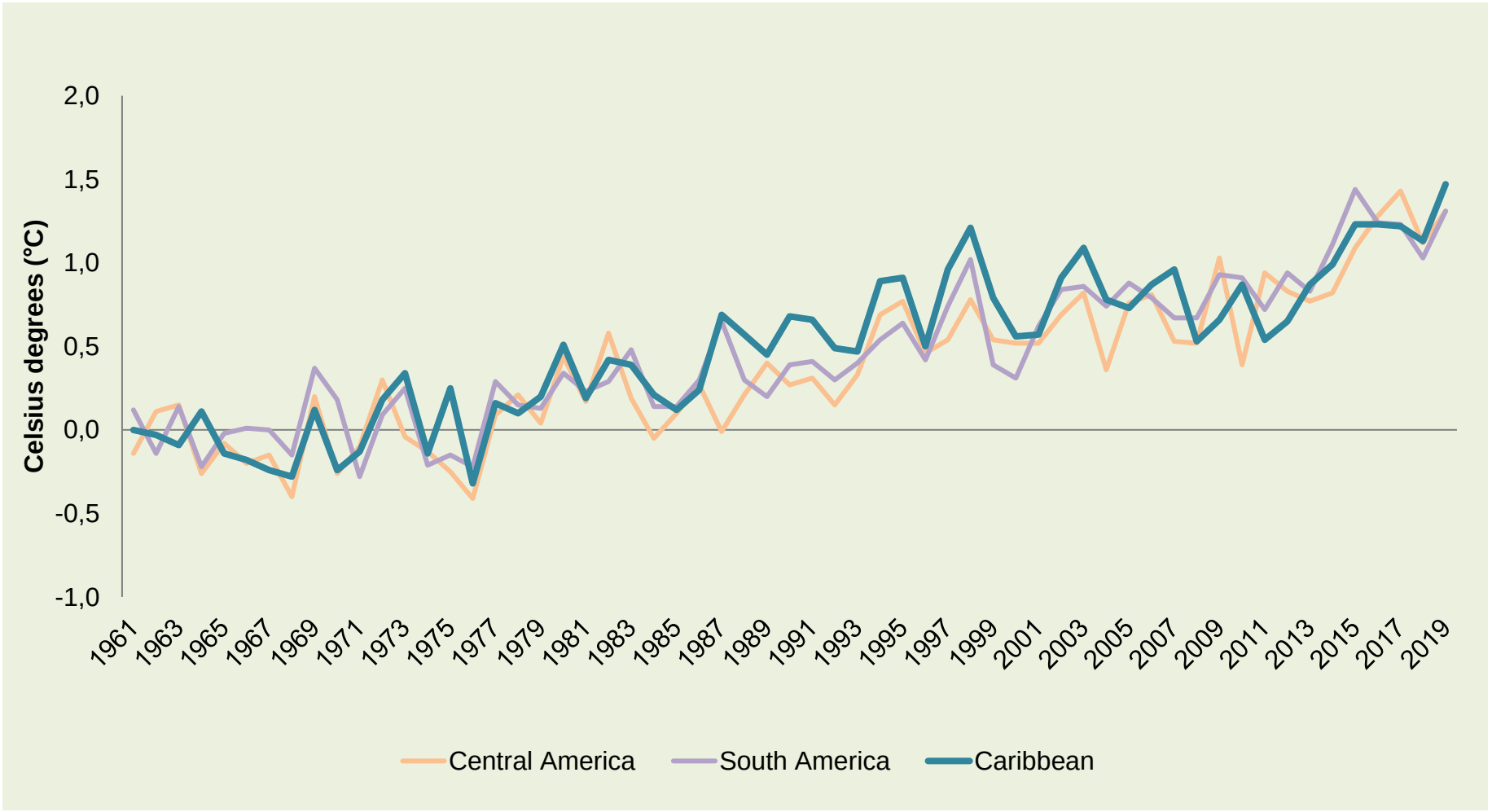
DEPARTURE FROM 1881-1910 AVERAGE



Source: NASA GISS & NOAA NCEI global temperature anomalies averaged and adjusted to early industrial baseline (1881-1910). Data as of 1/14/2021.

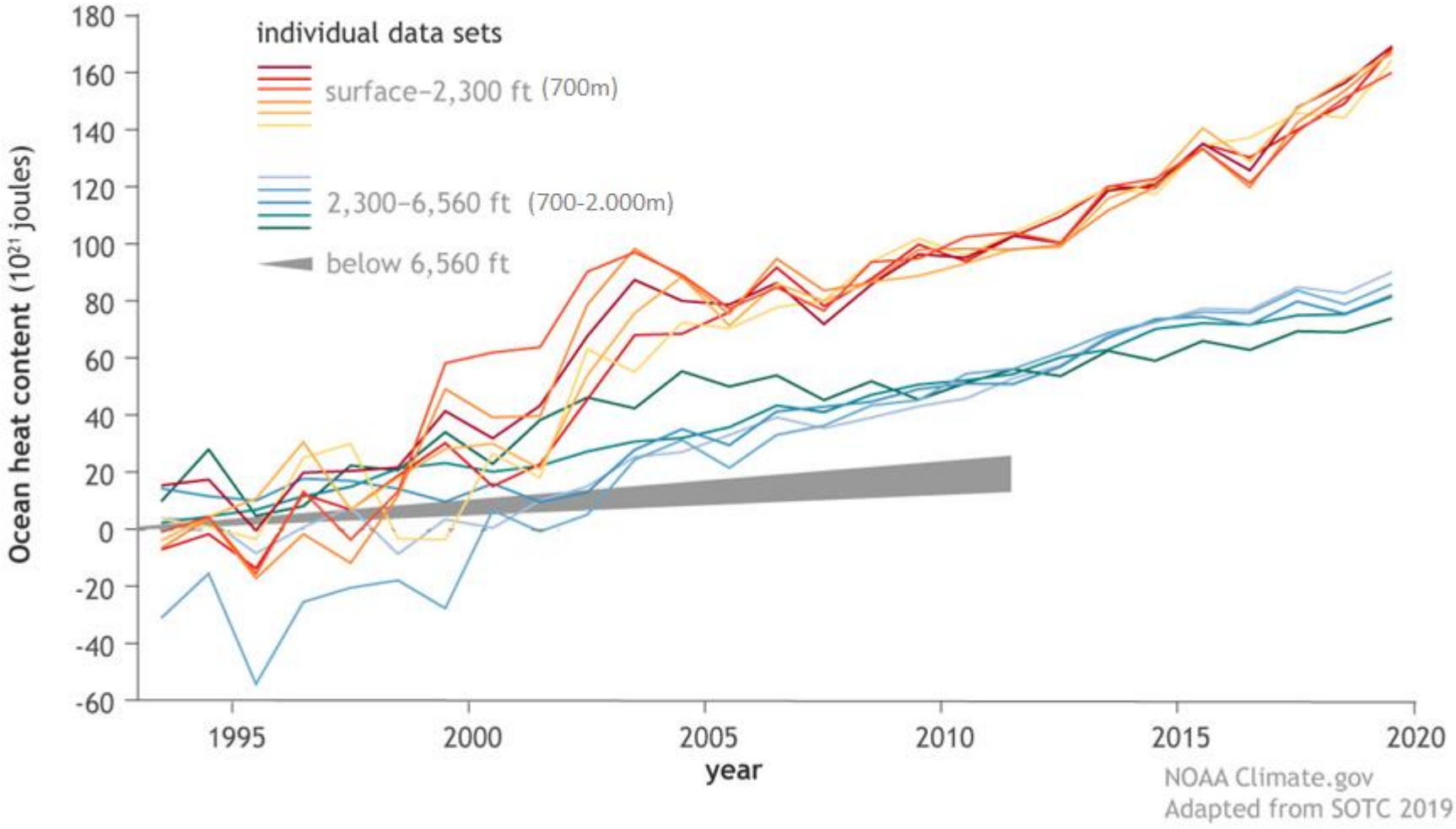
CLIMATE CENTRAL

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



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

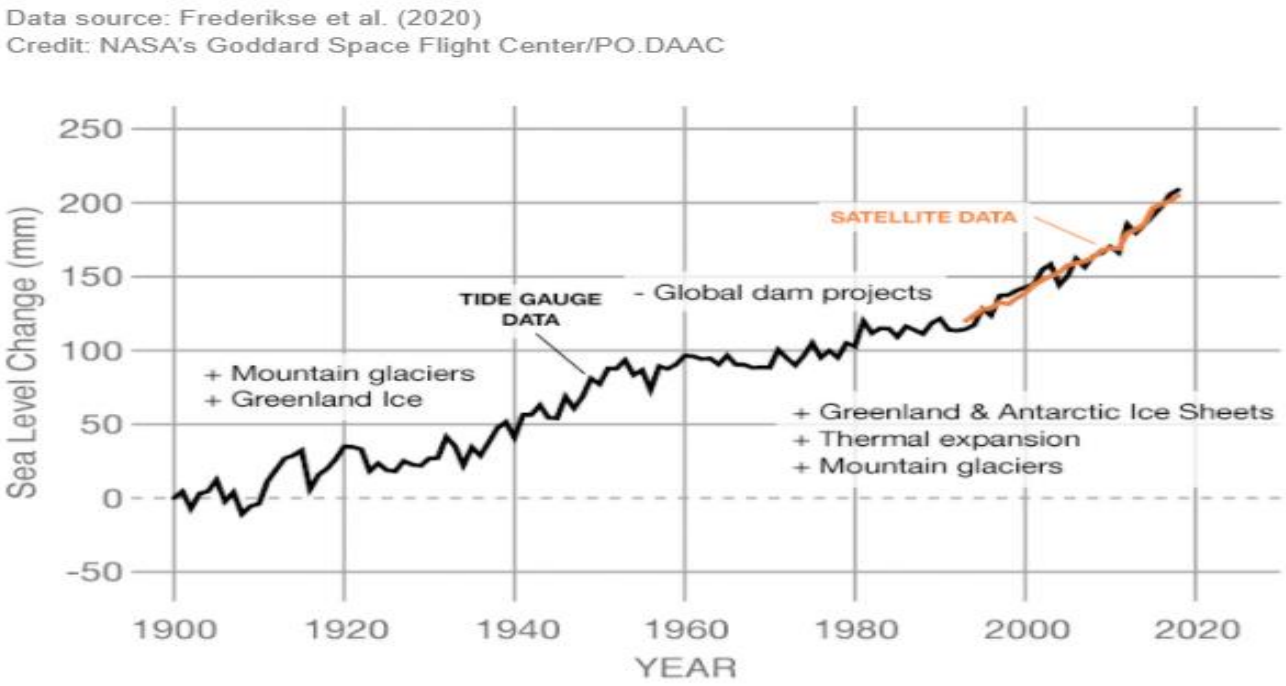
Annual ocean heat content from 1993-2019



Source: NOAA. Climate Change: Ocean Heat Content (online) https://www.climate.gov/news-features/understanding-climate/climate-change-ocean-heat-content

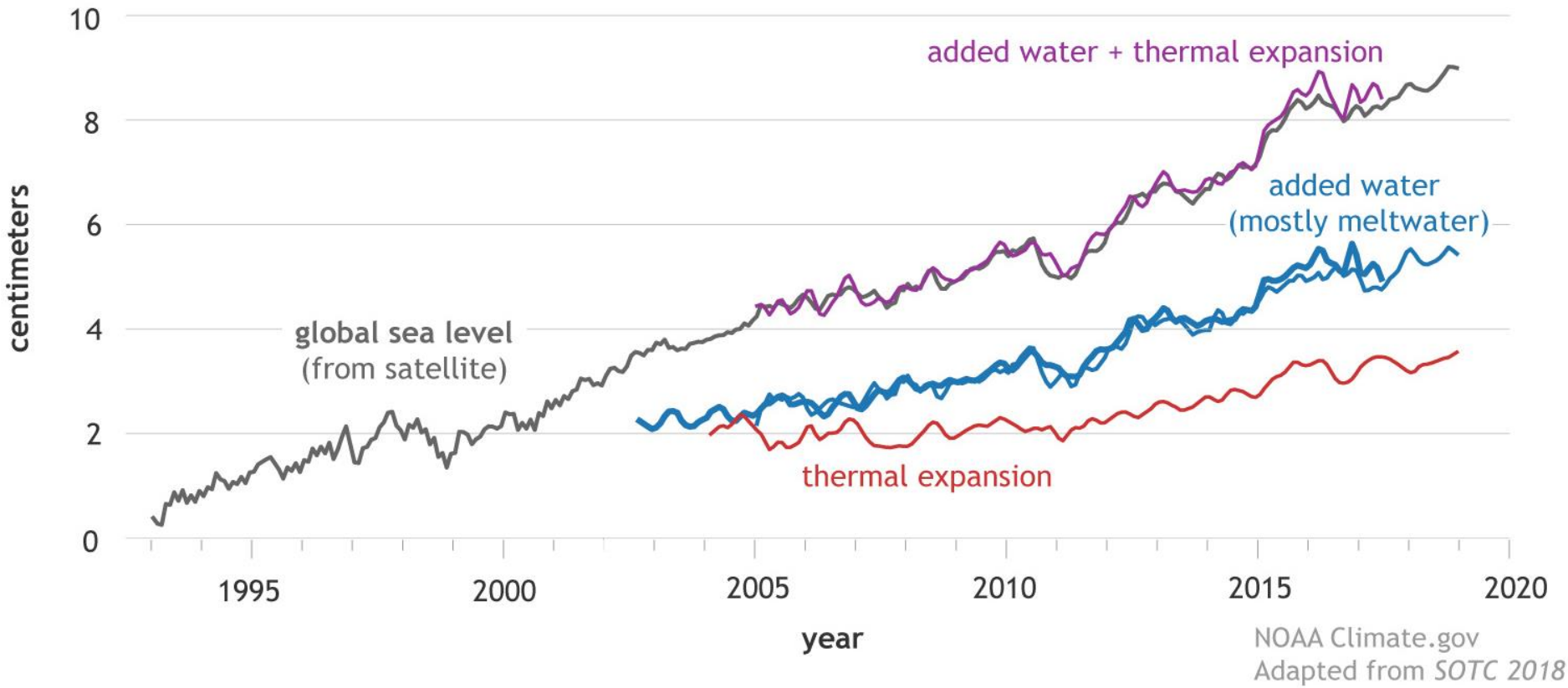
Sea Level Change 1900 - 2020 (tide gauge data and satellite data)

Global sea level rose about 8 inches (20 centimeters) in the last century. The **rate** in the **last two decades**, however, is **nearly double** that of the last century and accelerating slightly every year.



Source: NASA. Global Climate Change (online) https://climate.nasa.gov/vital-signs/sea-level/

Contributors to global sea level rise (1993 – 2018)



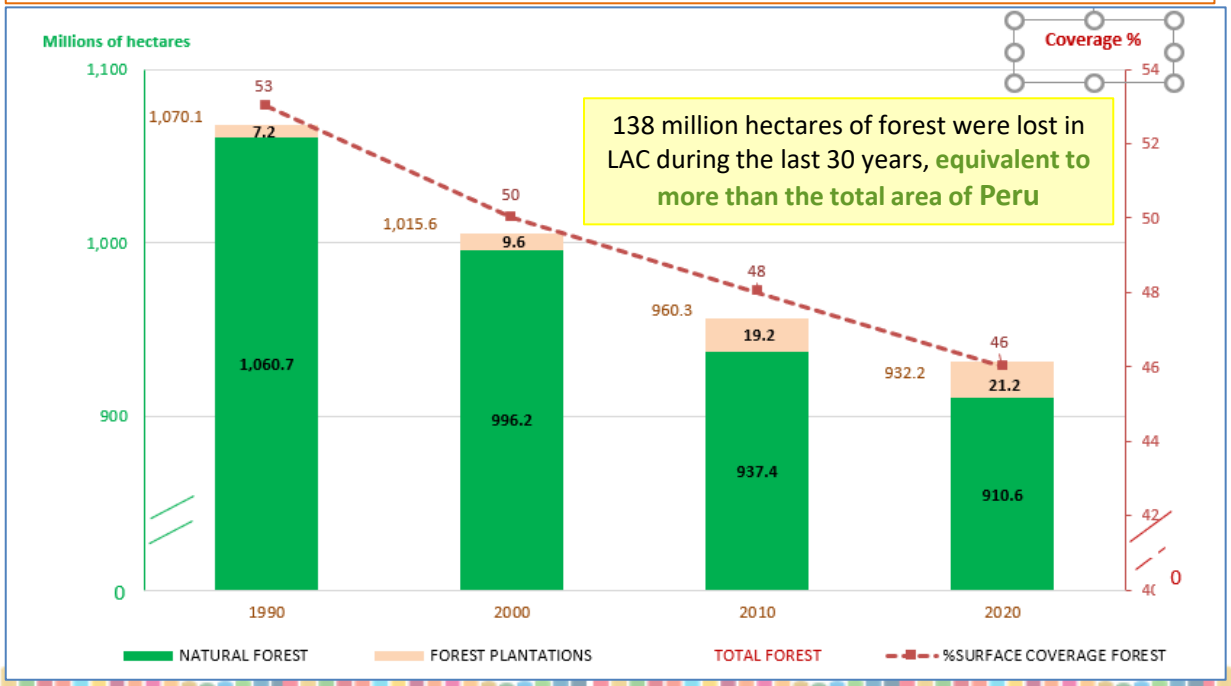
What's causing sea level to rise?

- Glaciers and ice sheets worldwide are melting and adding water to the ocean.
- Thermal expansion: the volume of the ocean is expanding as the water warms.
- Decline in the amount of liquid water on land—aquifers, lakes and reservoirs, rivers, soil moisture (liquid water from land to ocean due to groundwater pumping.

LAC Forest Cover

Caribbean: Increasing
Natural forest, forest plantations, and forest cover, 1990-2020

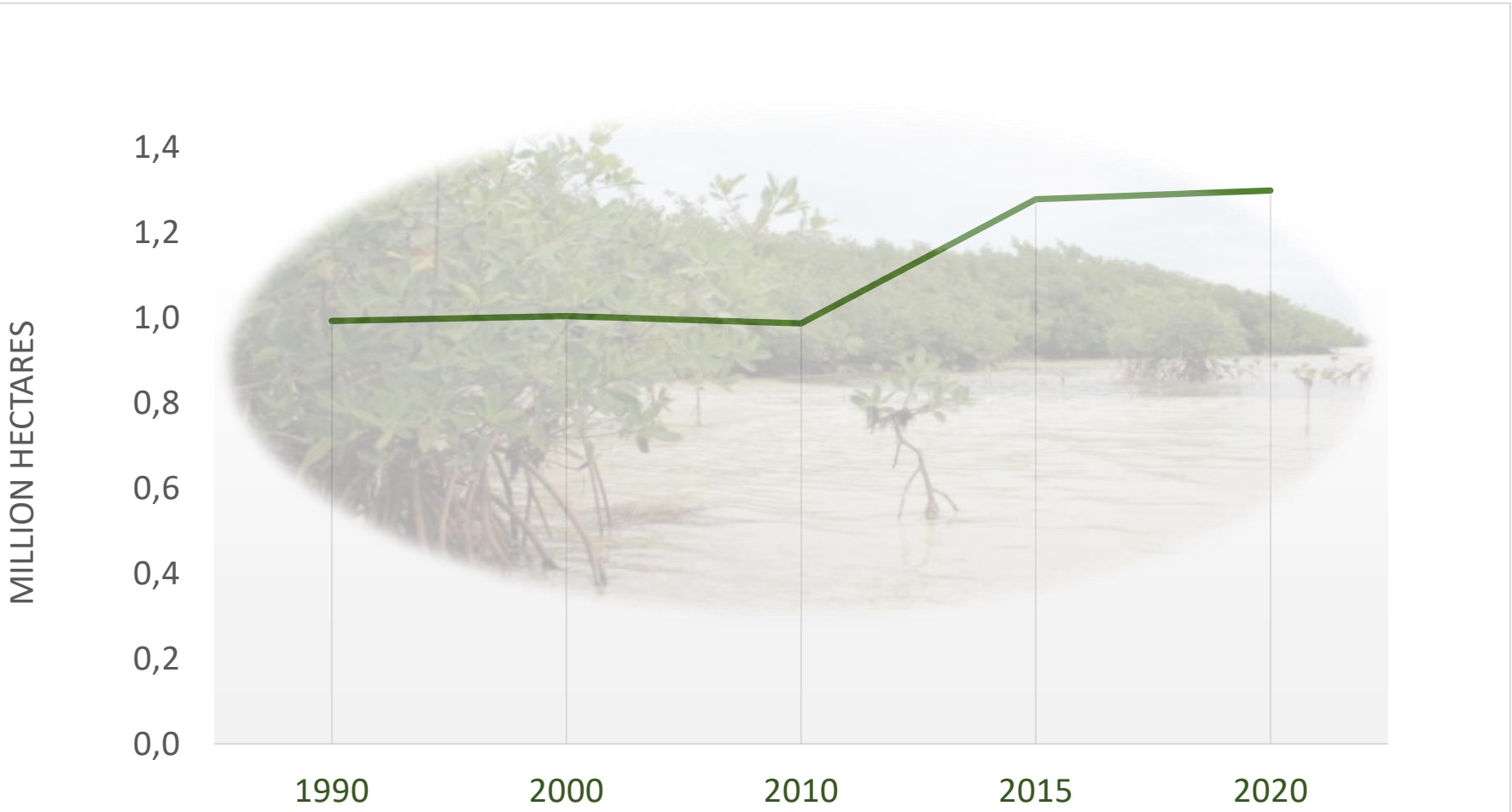
LAC: Decreasing Total, natural forest, forest plantations, and forest cover, 1990-2020



SOURCE: CEPALSTAT, based on FAO FRA 2020

NOTE: The total FRA forest figures show slight differences with the sum of the disaggregations due to omitted values of forest plantations in some countries

Caribbean: Area covered by mangroves, 1990-2020 (million hectares)



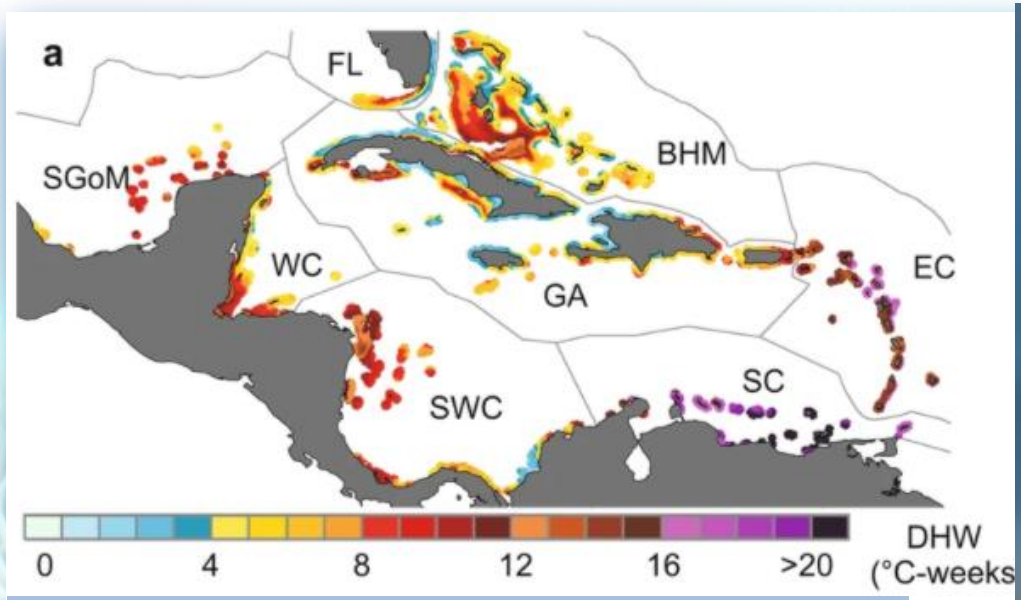
SOURCE: CEPALSTAT, based on data from the Food and Agriculture Organization of the United Nations (FAO) and the Global Forest Resources Assessment (FRA), 2020.

Ocean Acidification

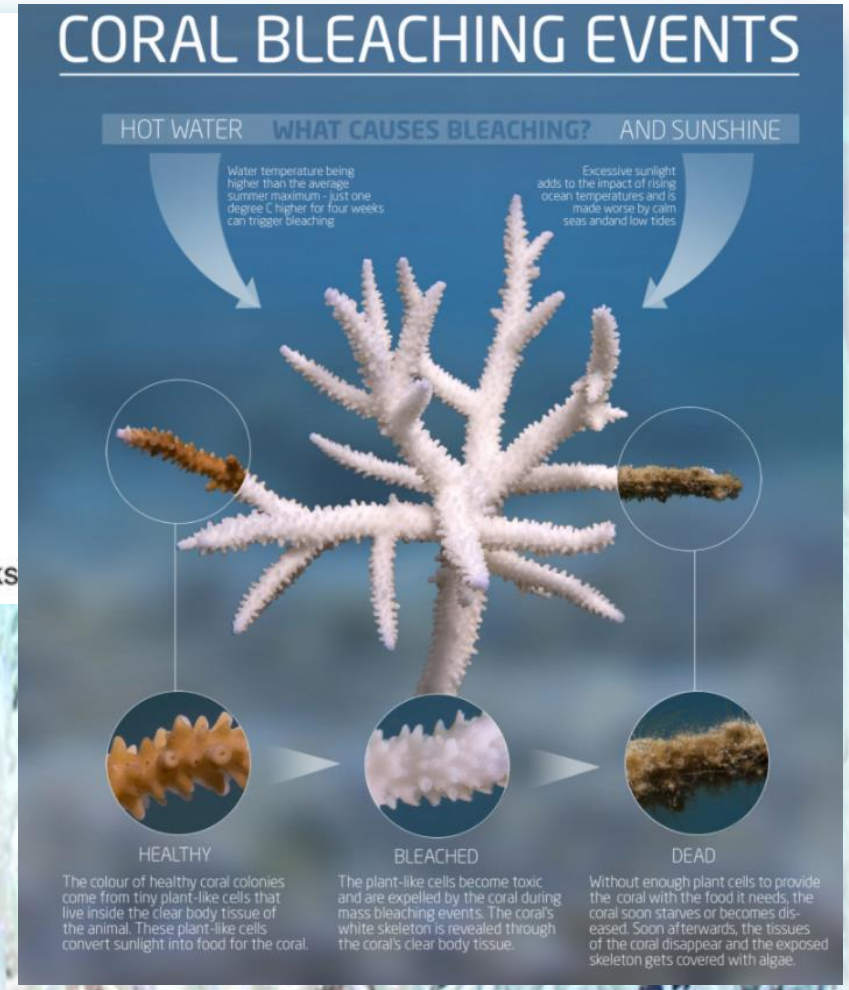
- Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30%.
- This increase is the result of humans emitting more carbon dioxide into the atmosphere and hence more being absorbed into the ocean. The ocean has absorbed between 20% and 30% of total anthropogenic carbon dioxide emissions in recent decades (7.2 to 10.8 billion metric tons per year).

Coral bleaching and coral death in the Caribbean

Caribbean Heat stress values

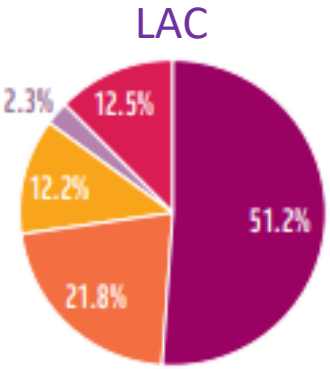


- **83%** of Caribbean reef area was exposed to "**bleaching risk**" (≥ 4 °C-weeks) at some time between 1985 and 2017.
- **42%** of the area was exposed to "**mortality risk**" (≥ 8 °C-weeks) at least once.



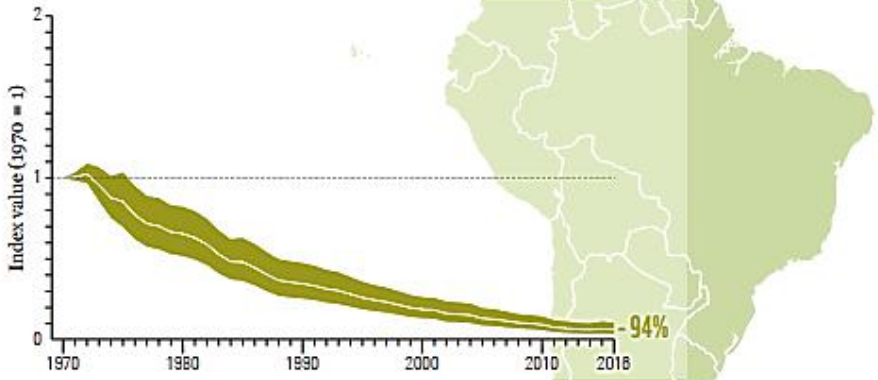
Source: Muñiz-Castillo, A.I., Rivera-Sosa, A., Chollett, I. *et al.* **Three decades of heat stress exposure in Caribbean coral reefs**: a new regional delineation to enhance conservation. *Scientific Reports* 9, 11013 (2019). **Nature** https://www.nature.com/articles/s41598-019-47307-0 https://www.barrierreef.org/

LAC: Living Planet Index, 2020



LAC: los of species: -94% last 5 decades

World was lower: - 68%



Using the data from 20,811 populations of 4,392 species, the 2020 global LPI shows global average 68% decline in monitored populations between 1970 and 2016 (range: -73% to -62%).

Graph note: The white line shows the index values and the shaded areas represent the statistical certainty surrounding the trend (95%). All indices are weighted by species richness, giving species-rich taxonomic groups in terrestrial and freshwater systems more weight than groups with fewer species. Source - WWF/ZSL (2020)

Threats to biodiversity

Changes in land and sea use, including habitat loss and degradation

This refers to the modification of the environment where a species lives, by complete removal, fragmentation or reduction in quality of key habitat. Common changes in use are caused by unsustainable agriculture, logging, transportation, residential or commercial development, energy production and mining. For freshwater habitats, fragmentation of rivers and streams and abstraction of water are common threats.

Species overexploitation

There are both direct and indirect forms of overexploitation. Direct overexploitation refers to unsustainable hunting and poaching or harvesting, whether for subsistence or for trade. Indirect overexploitation occurs when non-target species are killed unintentionally, for example as bycatch in fisheries.

Invasive species and disease

Invasive species can compete with native species for space, food and other resources, can turn out to be a predator for native species, or spread diseases that were not previously present in the environment. Humans also transport new diseases from one area of the globe to another.

Pollution

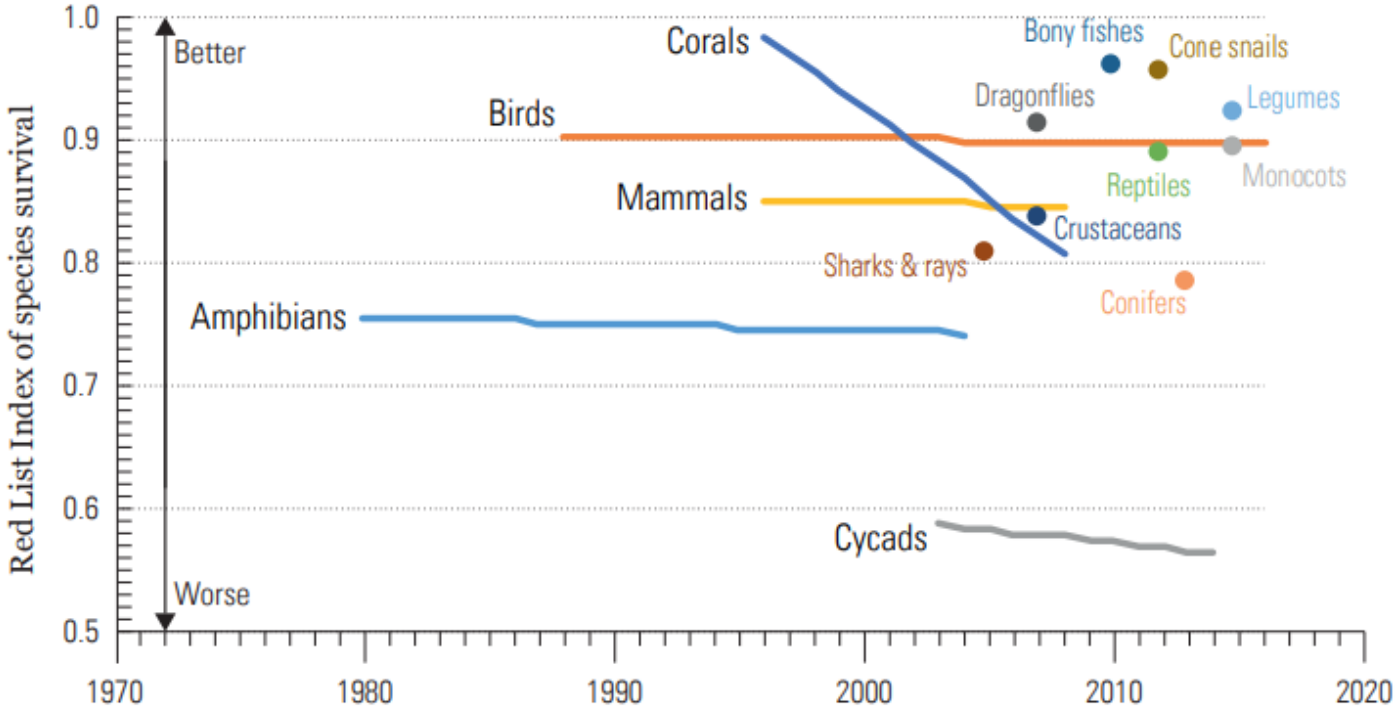
Pollution can directly affect a species by making the environment unsuitable for its survival (this is what happens, for example, in the case of an oil spill). It can also affect a species indirectly, by affecting food availability or reproductive performance, thus reducing population numbers over time.

Climate change

As temperatures change, some species will need to adapt by shifting their range to track a suitable climate. The effects of climate change on species are often indirect. Changes in temperature can confound the signals that trigger seasonal events such as migration and reproduction, causing these events to happen at the wrong time (for example misaligning reproduction and the period of greater food availability in a specific habitat).

SOURCE: Living Planet Report, 2020 - https://livingplanet.panda.org/es-es/

Red list index



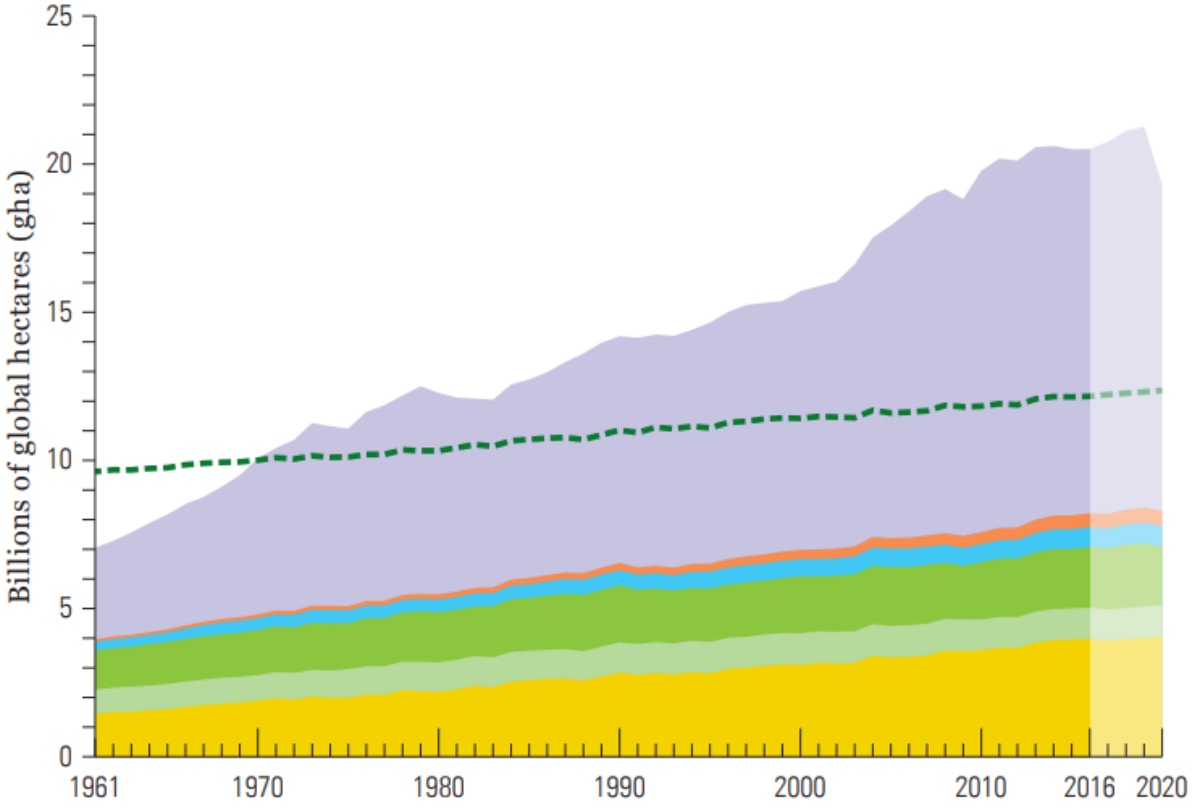
The Red List Index, based on data from the IUCN Red List of Threatened Species 15, shows trends in survival probability (the inverse of extinction risk) over time 22. A Red List Index value of 1.0 equates to all species within a group qualifying as Least Concern (i.e. not expected to become Extinct in the near future 22). An index value of 0 equates to all species having gone Extinct. A constant value over time indicates that the overall extinction risk for the group is unchanged. If the rate of biodiversity loss were reducing, the index would show an upward trend. A decline in the index means that species are being driven towards extinction at an accelerating rate

SOURCE: Living Planet Report, 2020 - https://livingplanet.panda.org/es-es/

Ecological Footprint and Earth's biocapacity

Humanity's Ecological Footprint against Earth's biocapacity in global hectares, 1961-2020
Global overshoot, starting in the early 1970s, has increased since.

The COVID-19 related footprint contraction - in lighter colors from 2016 onwards - is an estimate



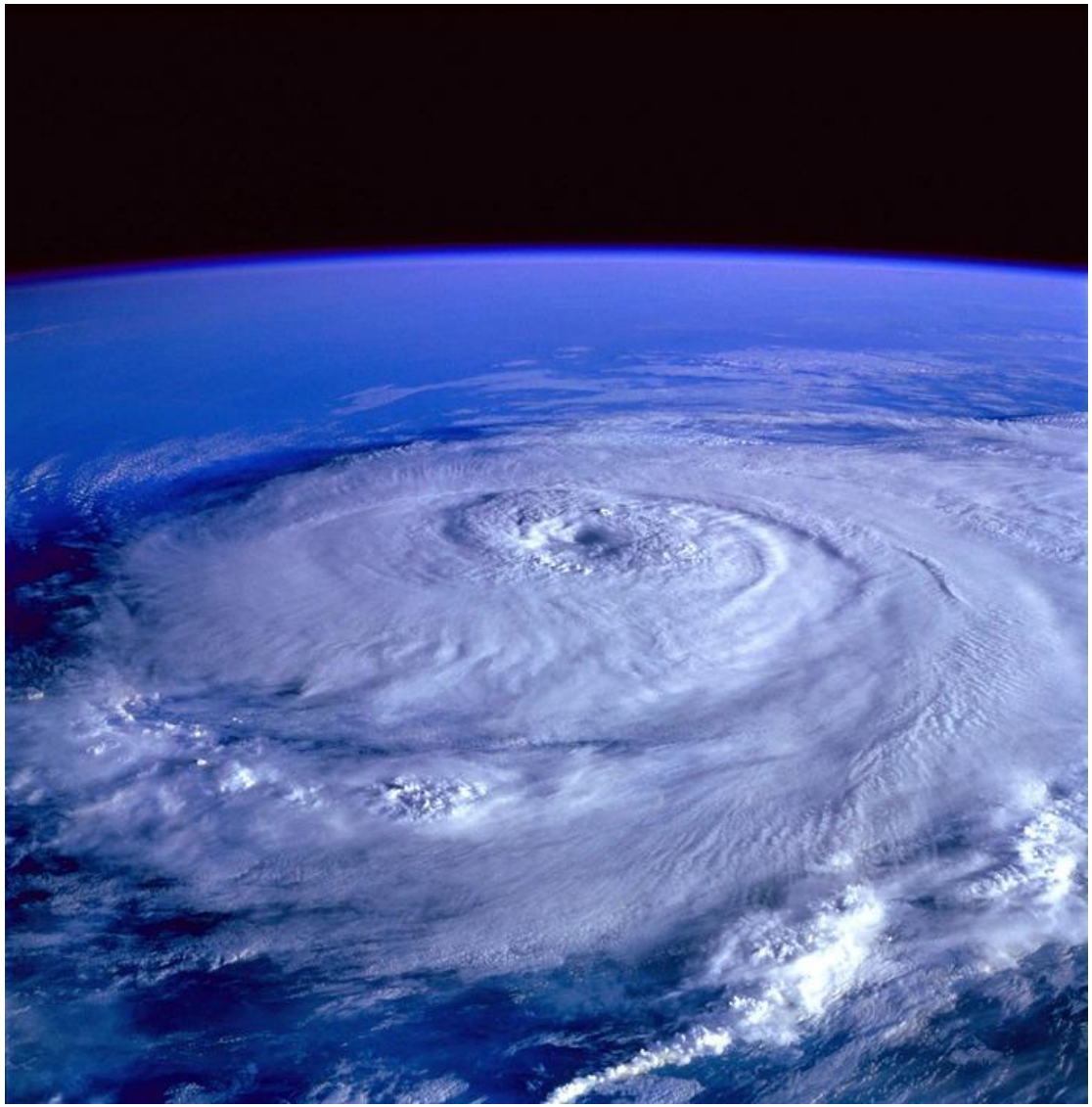
Key

- **Carbon footprint**[34] for absorbing emissions from fossil fuel burning and cement production
- **Built-up land footprint** for accommodating roads and buildings
- **Fishing grounds footprint** for wild and farmed seafood from oceans and freshwater
- **Forest product footprint** for fuel wood, pulp and timber
- **Grazing land footprint** for meat, dairy, leather and wool
- **Cropland footprint** for food, fibre, oil and feed crops, including rubber
- World biocapacity

SOURCE: Living Planet Report, 2020 - https://livingplanet.panda.org/es-es/

4 Occurrence and impacts of disasters

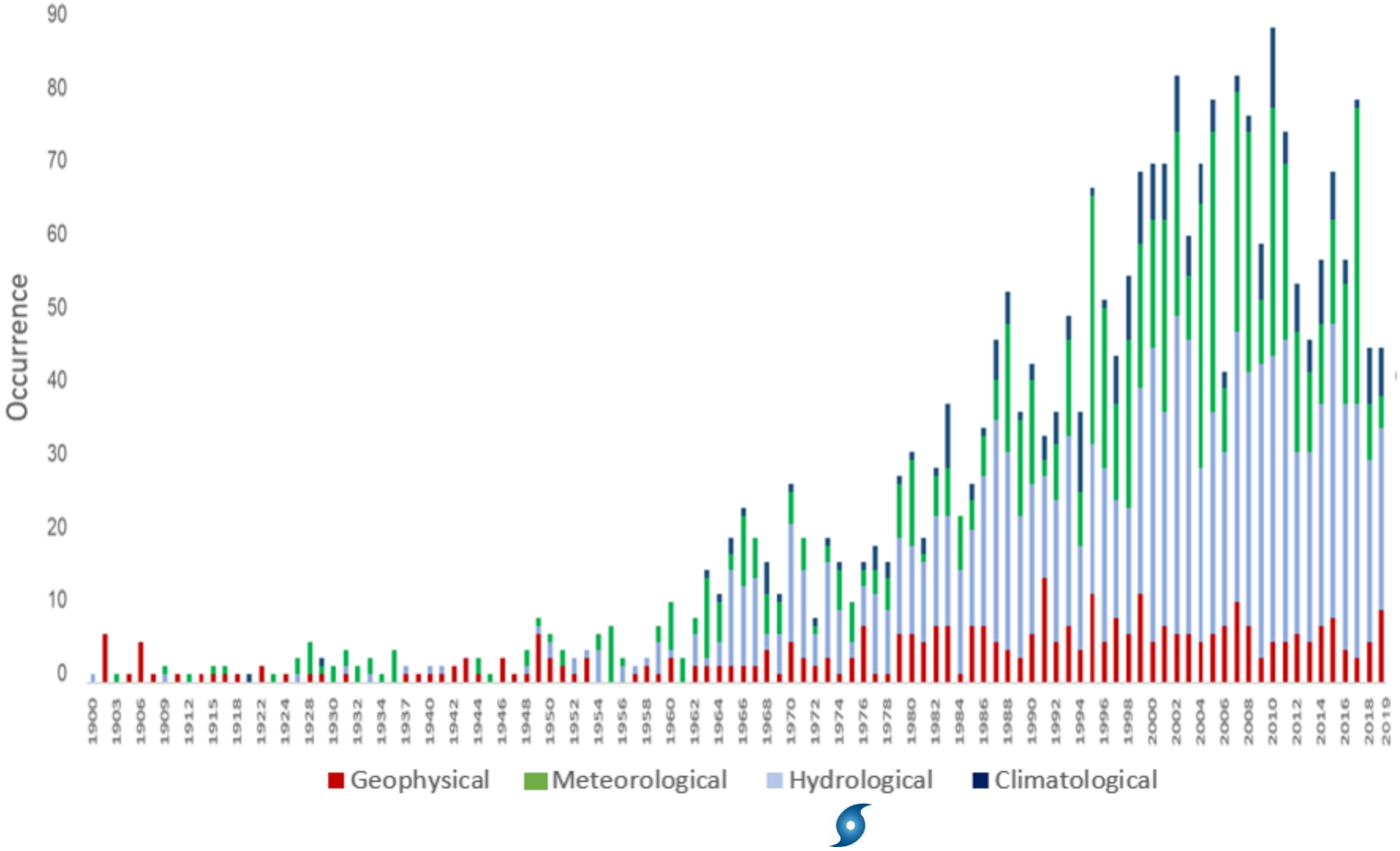
Irma, José, Maria: Intense 2017 hurricane season in a highly-vulnerable region



Roseau, Dominica's capital city after hurricane Maria, Sept. 2017

La Habana after hurricane Irma, Sept 2017

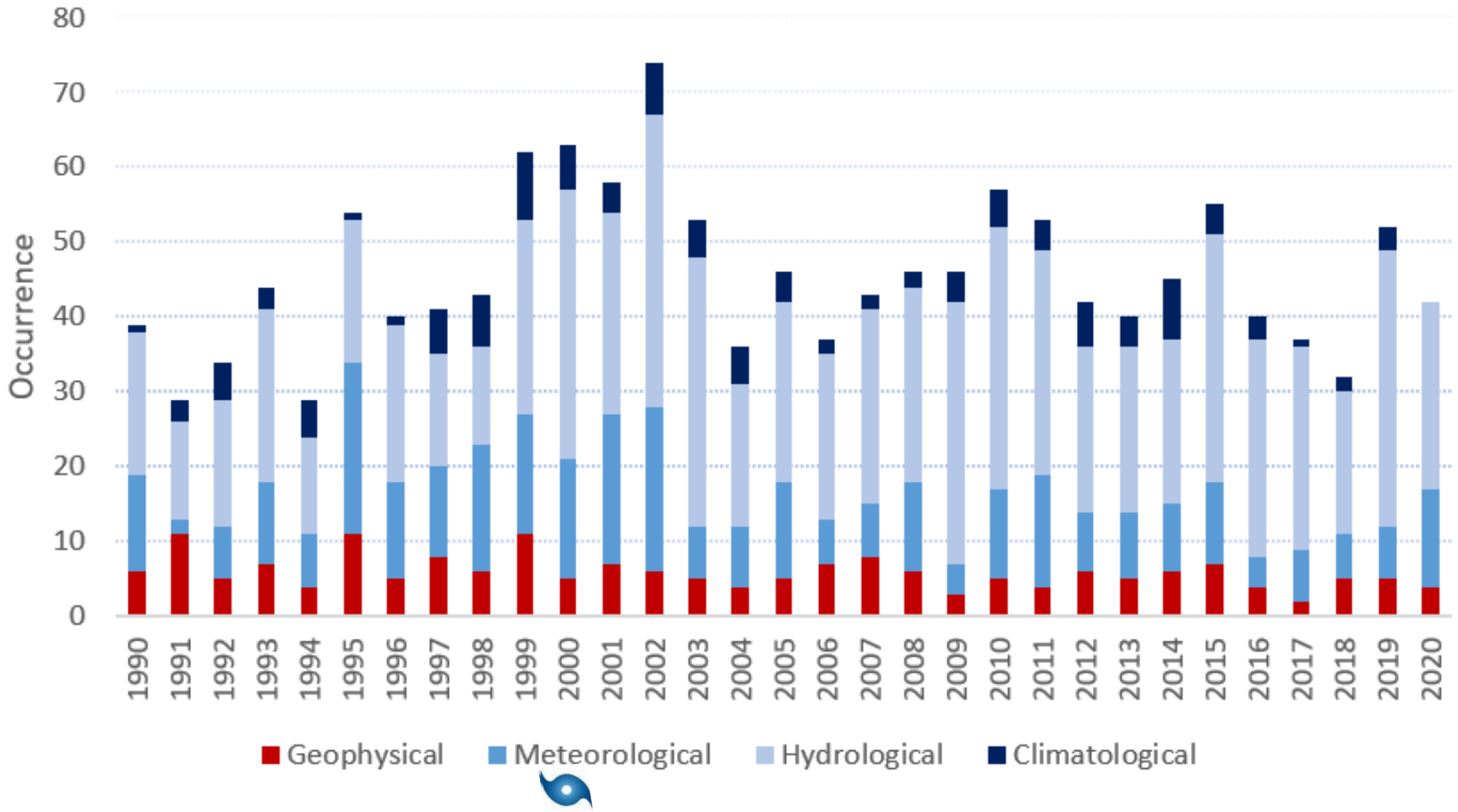
LAC: Number of disasters 1900-2019, by disaster type



[A] Centro de Investigaciones sobre la Epidemiología de los Desastres (CRED), Base de Datos Internacional sobre Desastres (EM-DAT) [en línea] http://www.emdat.be/.

[A] Centre for Research on the Epidemiology of Disasters (CRED), International Disaster Database (EM-DAT) [online] http://www.emdat.be.

Caribbean: number of disasters 1990-2020, by type of disaster[A]

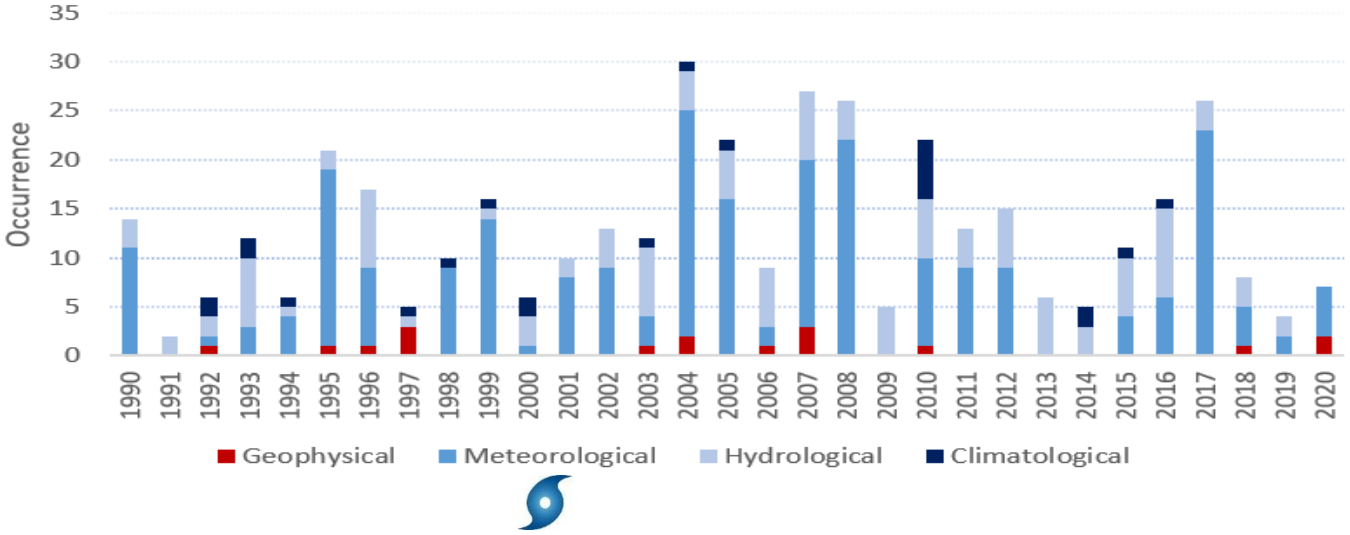


[A] Centro de Investigaciones sobre la Epidemiología de los Desastres (CRED), Base de Datos Internacional sobre Desastres (EM-DAT) [en línea] http://www.emdat.be/.

[A] Centre for Research on the Epidemiology of Disasters (CRED), International Disaster Database (EM-DAT) [online] http://www.emdat.be.

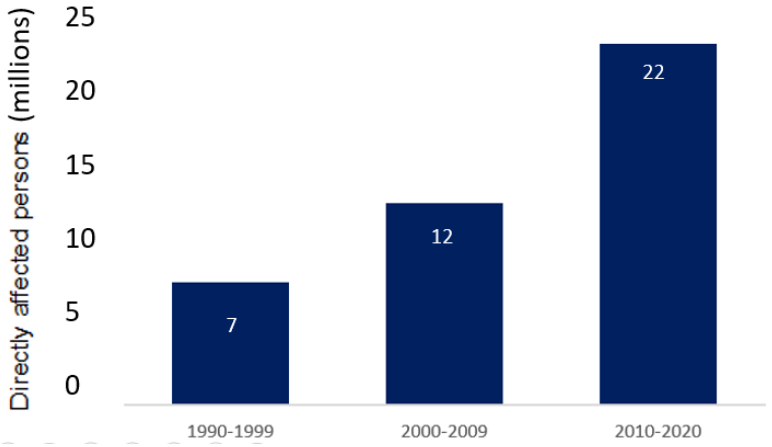
Caribbean: occurrence and impact of disasters by disaster type (1900 – 2020

Caribbean: number of occurred disasters

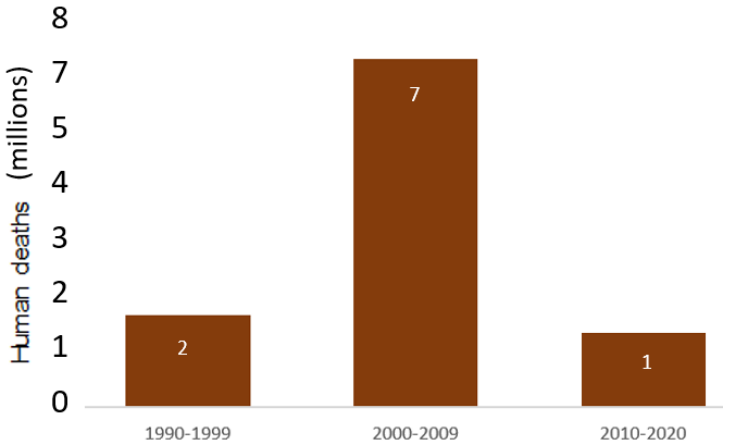


CARIBBEAN: Directly affected persons

Immediate basic needs (water, shelter, food) and/or in need of medical assistance



CARIBBEAN: Human deaths

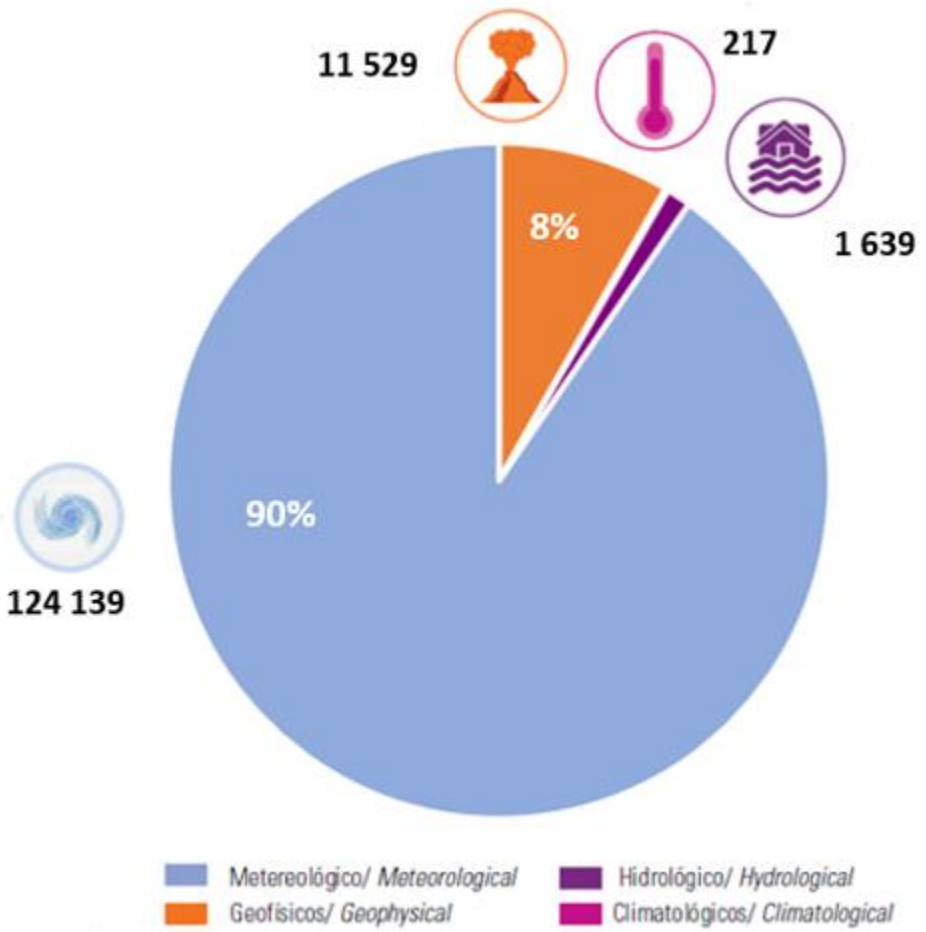


Source: ECLACSTAT based in EM-DAT (Centre for Research on the Epidemiology of Disasters (CRED) Catholic University of Louvain. The International Disaster Database)

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

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

Such damages and losses are only part of the story, since most disaster reports to EM-DAT (63%) contain no economic data



NOTE: Between 1970 and 2020, **91.46%** of disasters on this subregion had their origin in meteorological or hydroclimatic phenomena such as floods, storms and tropical cyclones. The value of all economic damages and losses directly or indirectly related to disasters in the last 5 decades reaches **$137** billion dollars.

[A] Centro de Investigaciones sobre la Epidemiología de los Desastres (CRED), Base de Datos Internacional sobre Desastres (EM-DAT) [en línea] http://www.emdat.be/.

[A] *Centre for Research on the Epidemiology of Disasters (CRED), International Disaster Database (EM-DAT) [online] http://www.emdat.be.*

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Thank you!

UNITED NATIONS

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

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