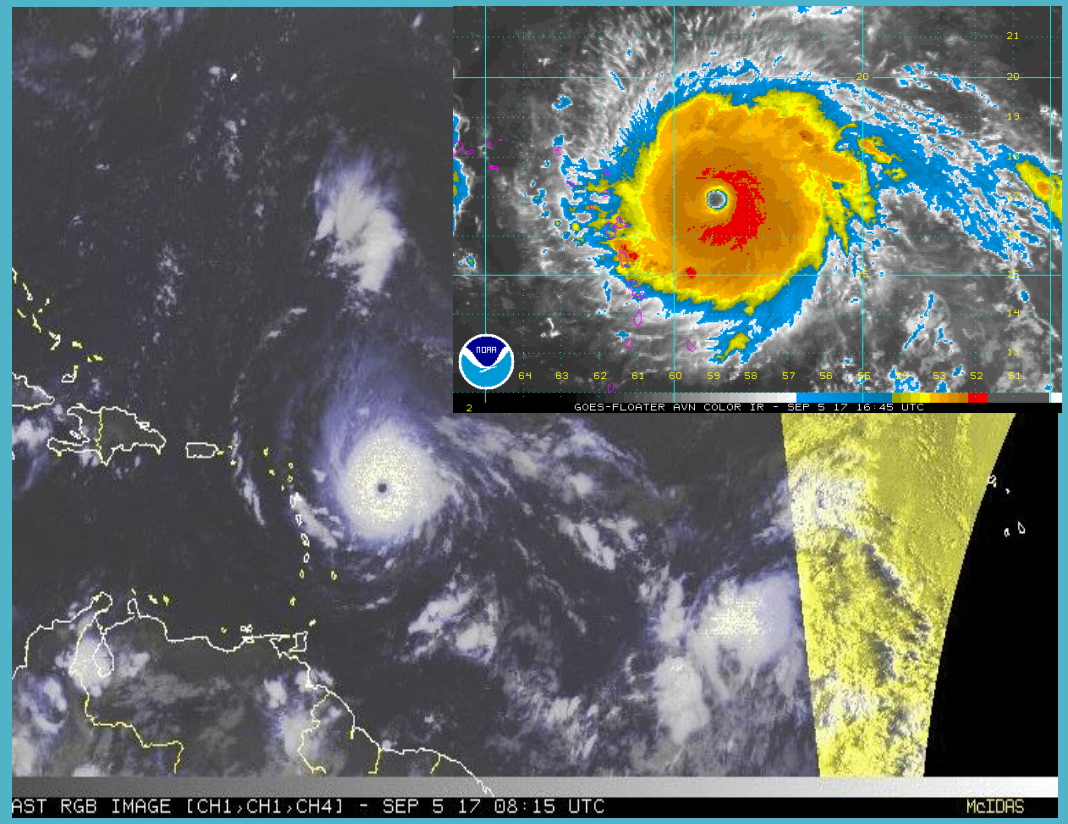
Facing the Challenges of Natural Hazards and Climate Change in the Caribbean



Yves Robert Personna, PhD in Environmental Sciences

Outline

- Caribbean and Natural Hazards
  - Level of Risk
  - Level of Disaster impacts
- Influence of Climate change on Disasters
- Taking Actions to Face the Challenges

Caribbean and Natural Hazards

Key terms

- Hazards
- Natural hazards
- Exposure
- Vulnerability

Key terms

- **Hazards:** threats to life, well being, goods and environment
- **Natural hazards :** Threats due to the extremes of natural processes

Geophysical : (motion in the ground)

Earthquake

Volcano

Landslide

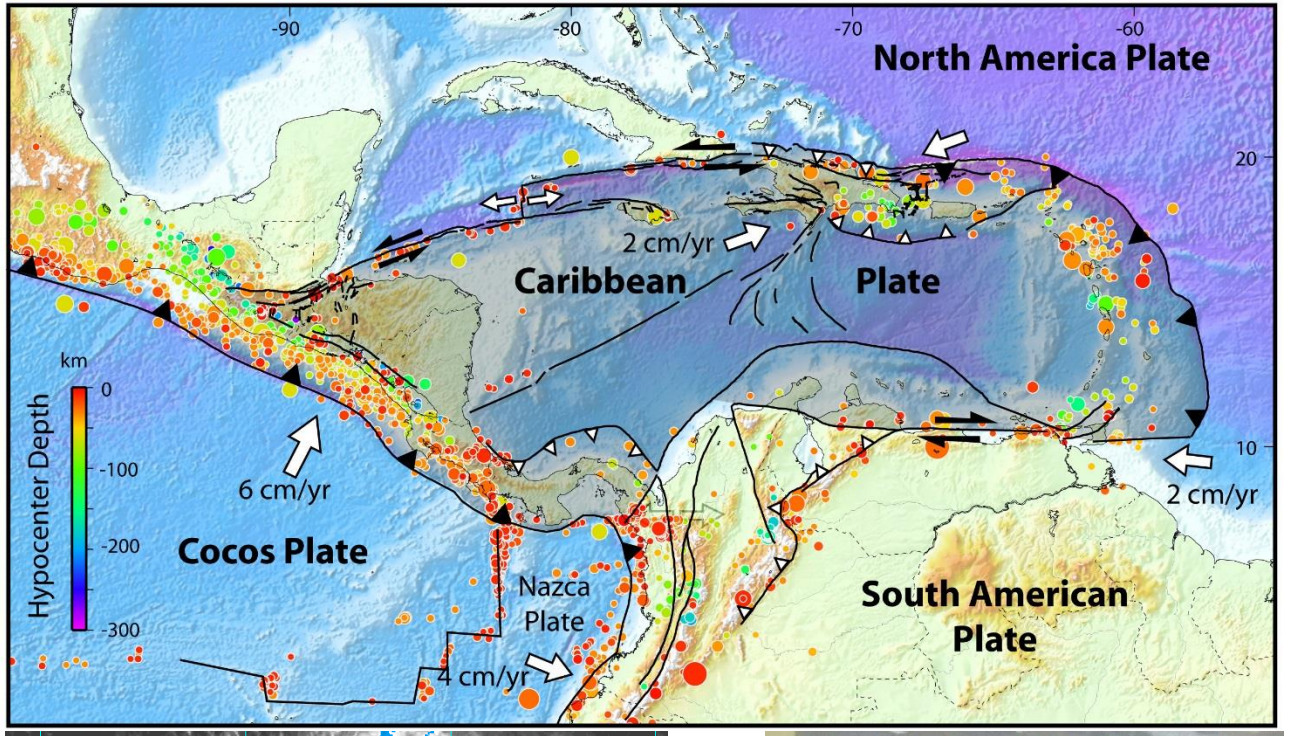
Hydro-meteorological and hydroclimatic
(related to the weather and climate conditions)

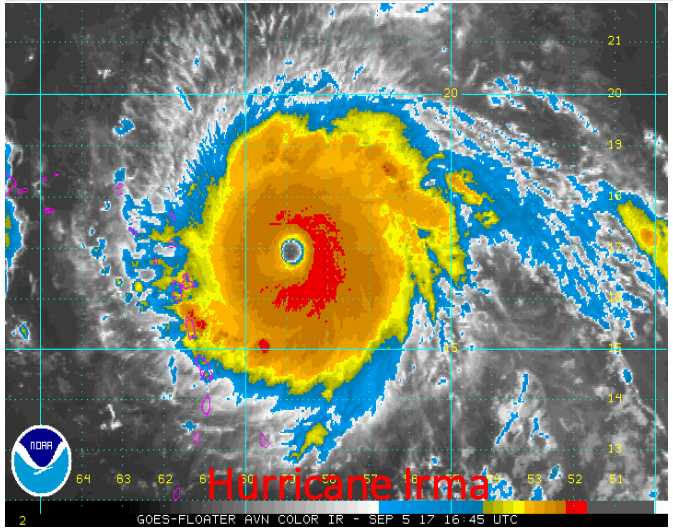
Tropical Storm

Hurricanes

Floods

Droughts





Hurricane Irma


Irma : Flooding in St Martin

Key terms

- **Exposure** :The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.

- **Vulnerability** : The propensity or predisposition to be adversely affected.

Questions

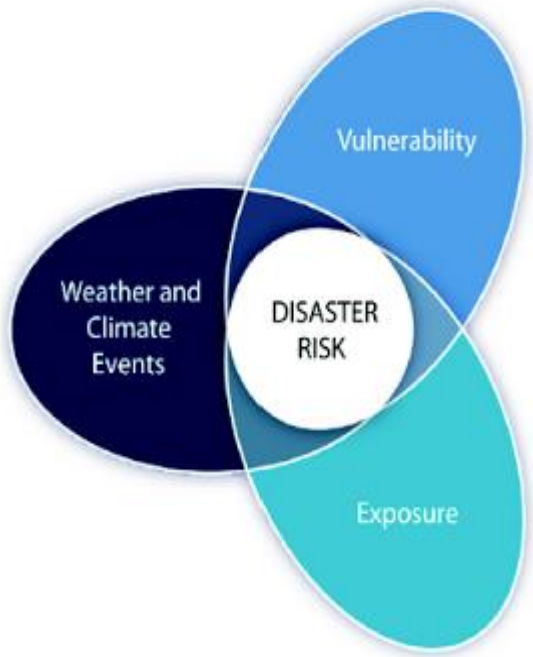
What are the natural hazards in the Caribbean?

Are the Caribbean people exposed ?

Are they vulnerable?

Disaster and Disaster Risk

Hazard x Vulnerability = Risk



Caribbean and Natural Hazards

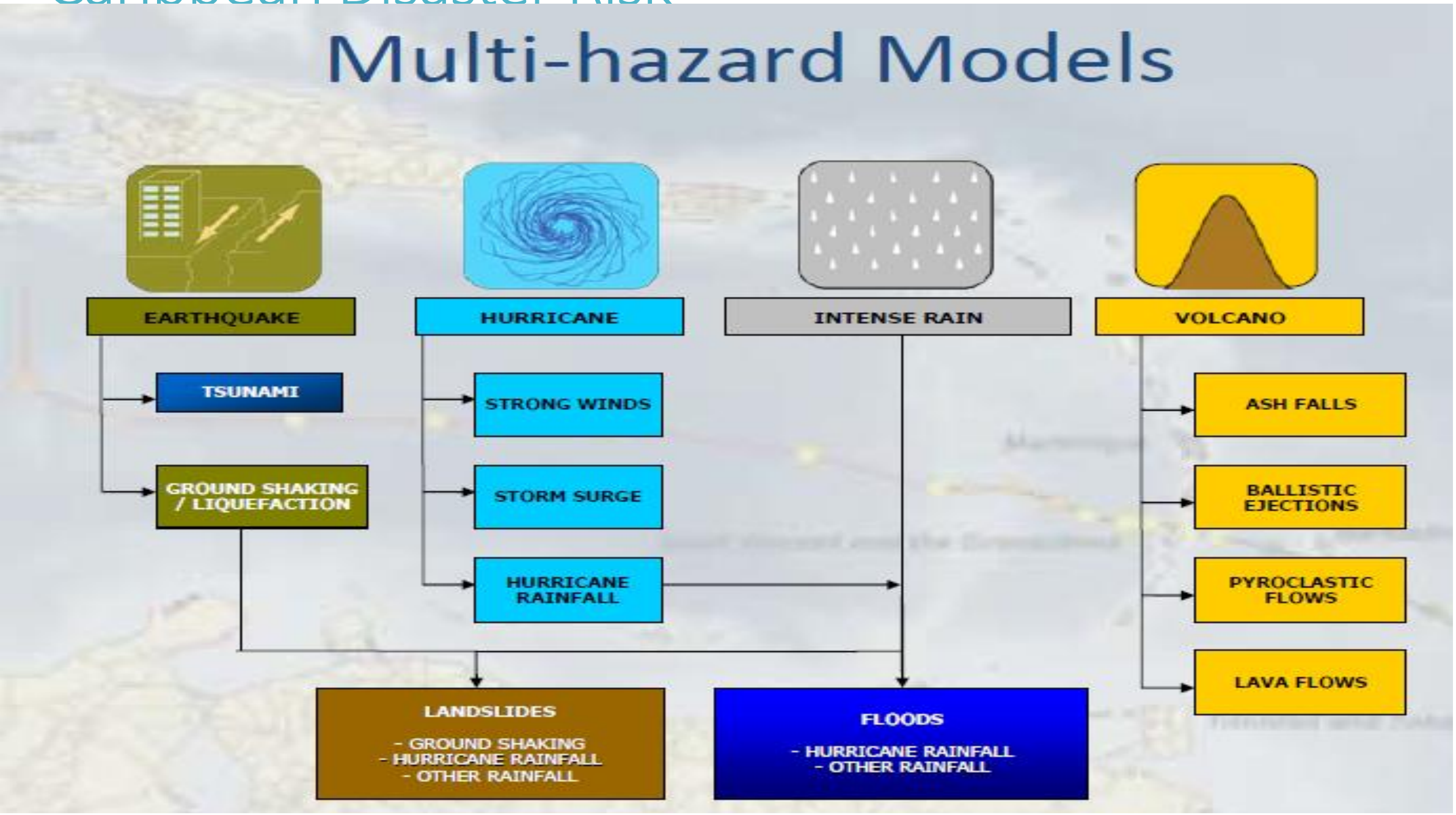
What is the level of Risk? What are the challenges?

Caribbean Risk to Natural Hazards

One of the most disaster-prone regions in the world

- Multi-hazards
- High Vulnerability

Caribbean Disaster Risk



Caribbean Risk to Natural Hazards

High Vulnerability

- High levels of poverty and inequality
- Unplanned urbanisation
- Accelerated environmental degradation

Caribbean : Cost of Disasters from Natural Hazards

PERIOD 1990-2016

Haiti : USD 8.6 billion

Bahamas : USD 2.7 billon

Jamaica : USD 1.6 billion

Belize : USD 0.6

Caribbean : Cost of Disasters from Natural Hazards

Tropical Storm and Hurricane Damage, 1950-2014

- 148 disasters
- $ US 52 billion in total
- $ US 352 million on average
- 82 % of GDP on average
- Greater 100 % of GDP for islands
  - Monserrat, damage of 434% of GDP : Hurricane Hugo, Cat 4 in 1989
  - St. Kitts and Nevis, 220 % GDP : Hurricane Georges, Cat 3 in 1998

Source : IMF, 2016 (Sebastian Acevedo). WP/16/199

What is the Impact of Climate Change on Disasters

Key terms

Weather

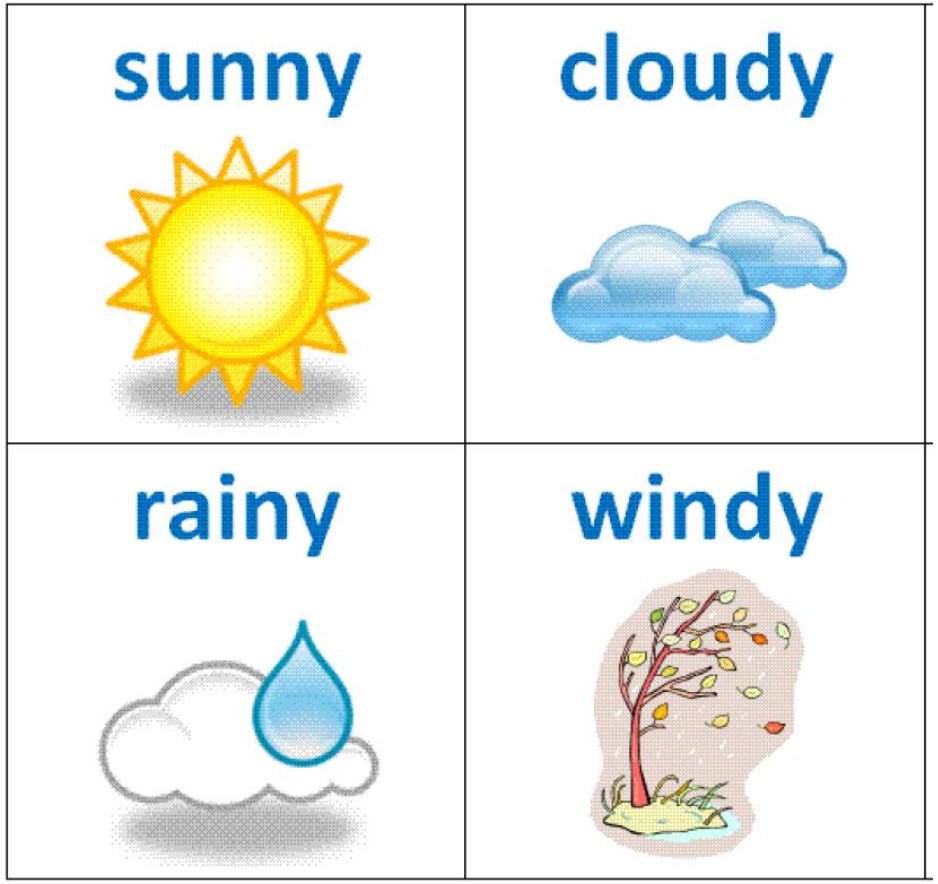
Climate

Climate Change

Key terms

- **Weather:** Daily conditions of the atmosphere -Short-term changes in temperature, clouds, precipitations, humidity and wind in a region or a city.
- **Climate:** Weather conditions prevailing in an area in general or over a long period. The climate of a region or city is its weather averaged over many years.
- **Climate change:** is a change in the typical or average weather of a region or city. This could be a change in a region's average annual rainfall, or a change in a city's average temperature for a given month or season.

Climate change is also a change in Earth's overall climate. This could be a change in Earth's average temperature, or a change in Earth's typical precipitation patterns.

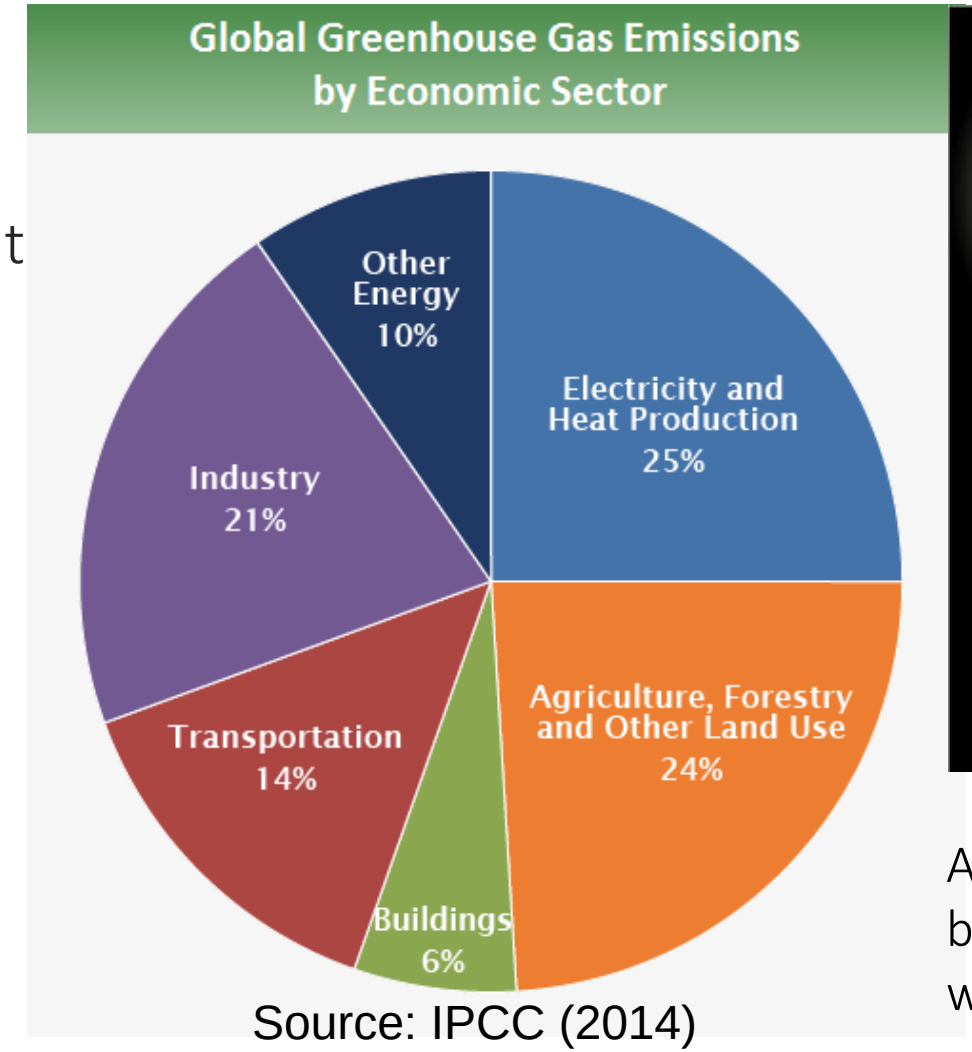


What is Causing Earth's Climate to Change?

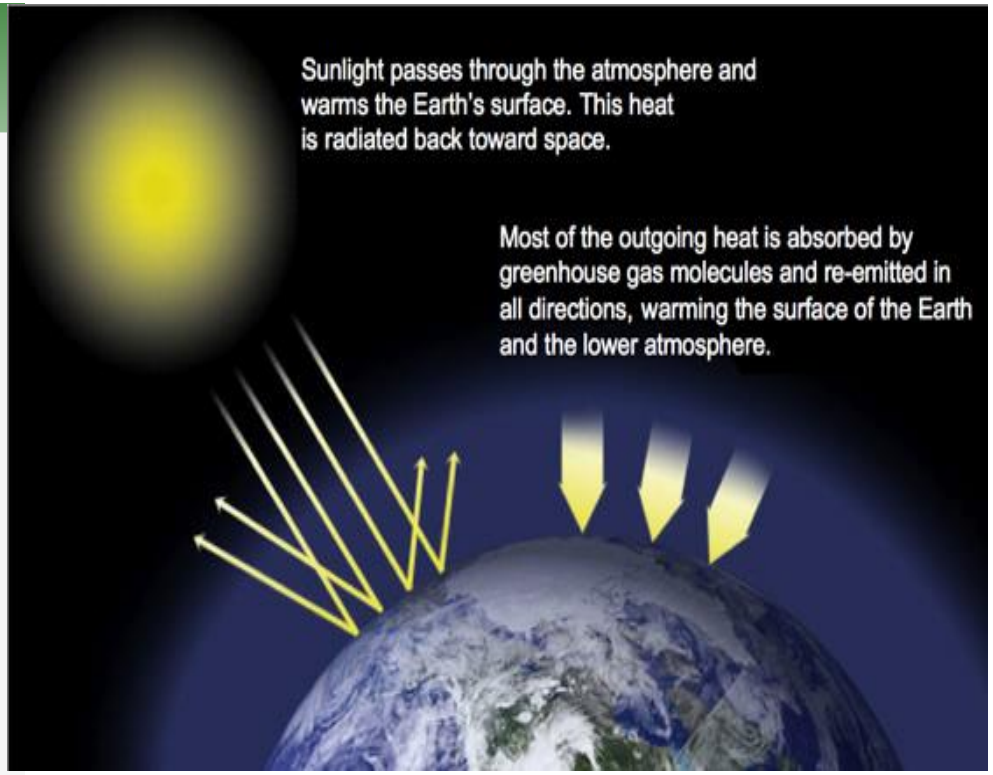
NATURAL CAUSES

- changes in Earth's orbit and in the amount of energy coming from the sun
- Ocean changes and volcanic eruptions

HUMAN CAUSES



Source: IPCC (2014)



Source: NASA

A layer of greenhouse gases acts as a thermal blanket for the Earth, absorbing heat and warming the surface.

What Is Causing Earth's Climate to Change?

Evidence of Global Warming from Human Activities

- IPCC: Scientific evidence of global warming from human actives
- Increase concentrations of greenhouse gases in the atmosphere
- Unprecedented rate of warming since 1950
- Northern Hemisphere : 1983- 2012 as warmest 30-year period over the 1400 years

Climate Change Prediction for the Caribbean

IPCC Prediction for the Caribbean by End of the Century

- An average annual increase in surface temperature of 1.2 - 2.3°C,
- A decrease in rainfall of about 5 - 6 %
- Sea level rise of 0.5 - 0.6 meters

What does Climate Change Prediction Really Mean for the Caribbean?

- Decrease of water resource availability
- Increase of coastal flooding
- Significant negative impacts of key economic sectors (agriculture, tourism)
- Increase in health issues (dengue fever, yellow fever, zika, chikungunya)
- More severe tropical storms and hurricanes

Summary

Climate change acts as a stressor on an already vulnerable Caribbean to multiple natural hazards.

Historically, the occurrence of these hazards have led to significant loss life and negative socio-economic impacts.

Thus, natural hazards and CC pose major challenges to the Caribbean development.

What are the options to face those challenges?

Take action at different levels:

- International
- Regional
- National
- Local (Community, Individual)

International level

- Global effort to reduce GHG emissions
- Advocacy for the Paris Agreement's implementation
- Ambitious efforts to combat CC and adapt to its effects

Regional Level

Enhance Regional Capacity

- To monitor extreme weather events and predict their impacts
- To generate and disseminate accurate and timely warnings to those at risks

Key Regional institutions : CIMH, CDEMA, CSGM/UWI, CCCCC

Key Initiatives for improvement

- Expansion and update of weather and climate observation networks across the Caribbean
- Delivery and awareness about Climate services to interested sectors
- Development of competent young Caribbean professional in the field

National level

- Develop an Effective Multi-Hazard Early Warning System (EWS):
  - *Hazard monitoring*
  - *Prediction*
  - *Disaster assessment*
  - *Communication and preparedness activities*
- Mainstream disaster risk reduction and climate change adaptation into development framework

-Consider and address risks as an integral part of the development process.

- Design and build resilient infrastructure (water supply system, telecommunication system, roads, buildings :schools, hospitals) to natural hazards

Community level

Enhance Community Preparedness and Response Capabilities

- Develop and implement community disaster risk management plan
- Establish effective dissemination and communication systems
- Conduct mock drill exercises-early warnings

Providence Church as a Community

Do we have a disaster risk management plan?

Do we know what to do if an earthquake occurs right now?

Do we know how to evacuate the church quickly?

Individual/Family level:

- Stay informed
- Make an Emergency Plan

- How will I receive emergency alerts and warnings?

- What is my shelter plan?

- What is my evacuation route?

- What is my family/household communication plan?

- Do I have a disaster kit?

- Vote climate
- Invest in “Climate Smart” companies
- Reduce GHG in your daily life

Thank you!


Le Petit Cluny
alamy stock photo


Less Fuel
Less Pollution
Less Stress
More
Carpool
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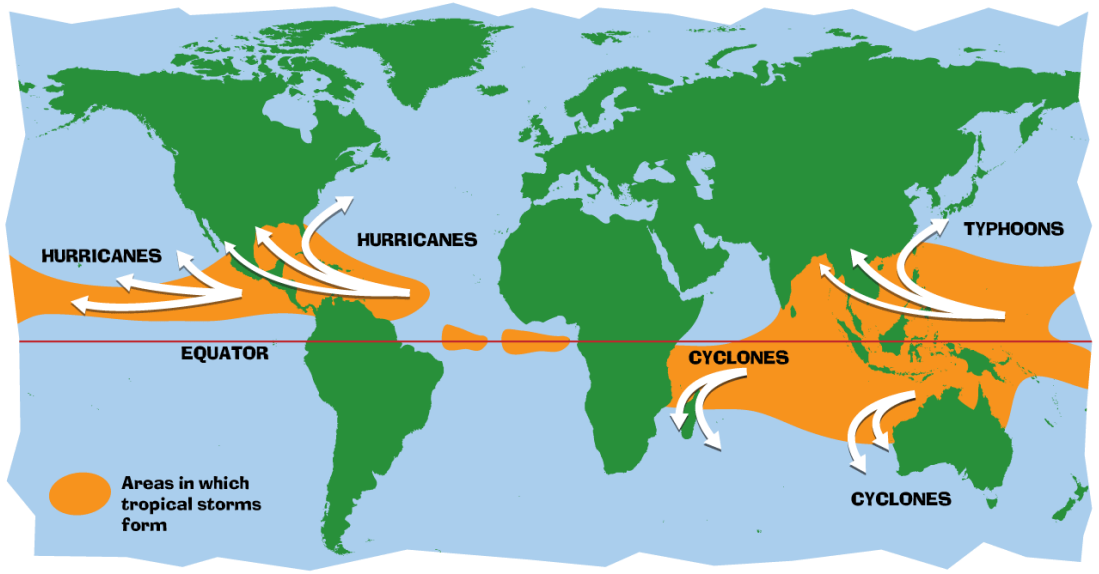
Supplement : Tropical Cyclone

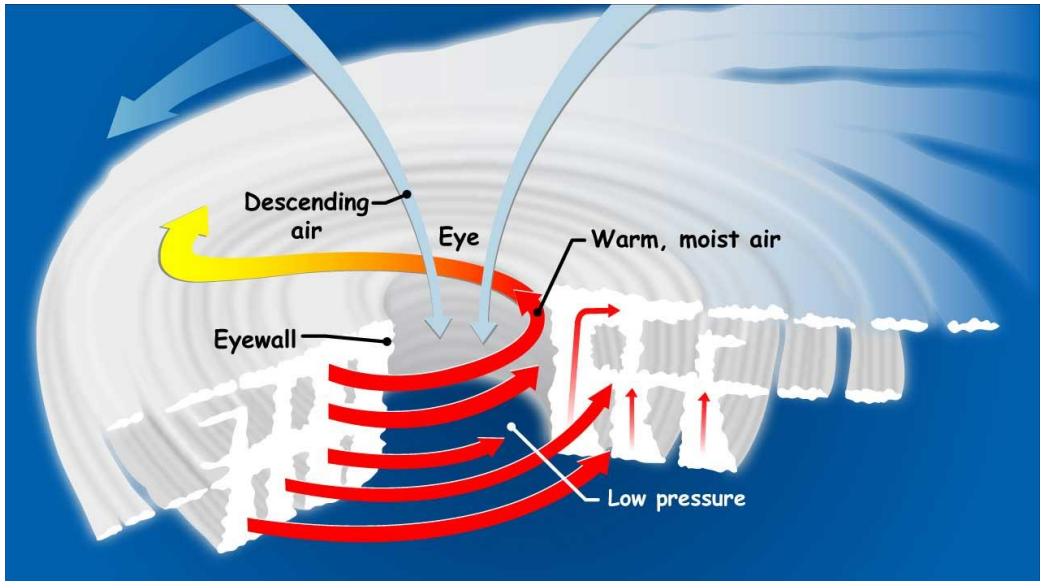
Tropical cyclones are like engines that require warm, moist air as fuel.

First ingredient : warm ocean water (>= 80 degree F at the top 50 m).

Second ingredient : wind.

Category	Wind Speed (mph)	Damage at Landfall
1	74-95	Minimal
2	96-110	Moderate
3	111-129	Extensive
4	130-156	Extreme
5	157 or higher	Catastrophic





Storm surge

Storm surge is the rise in seawater level caused solely by a storm.

Storm surge is the abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide. The surge is caused primarily by a storm's winds pushing water onshore.

Storm tide is the total *observed* seawater level during a storm, which is the combination of storm surge and normal high tide. *Storm*