Changement climatique et Assistance aux Catastrophes Naturelles

WEBINAIRE 08/09/2020

Commission Dommages

(présentation en français, support en anglais)

Agenda

- **Introduction** (5 minutes)
  - Michel Josset (Commission Dommages)
- **Webinaire interactif** (60 minutes)
  - Christelle Castet et Huu-An PHAM (AXA Climate)
- **Retour d'expérience de Faurecia** (10 minutes)
  - Michel Josset (Faurecia)
- **Questions et Réponses** (15 minutes)

Intervenants

Christelle CASTET

Climatologue | Ingénieur météorologue
PhD CNRS I CEA I Florida State University

Huu-An PHAM

Directeur de CYMO | Assistance aux CatNat
AXA Climate

to provide you with scientific fundamental concepts about climate change

Rule

Please pay attention

… after the session, I will designate 7 people to answer 7 questions

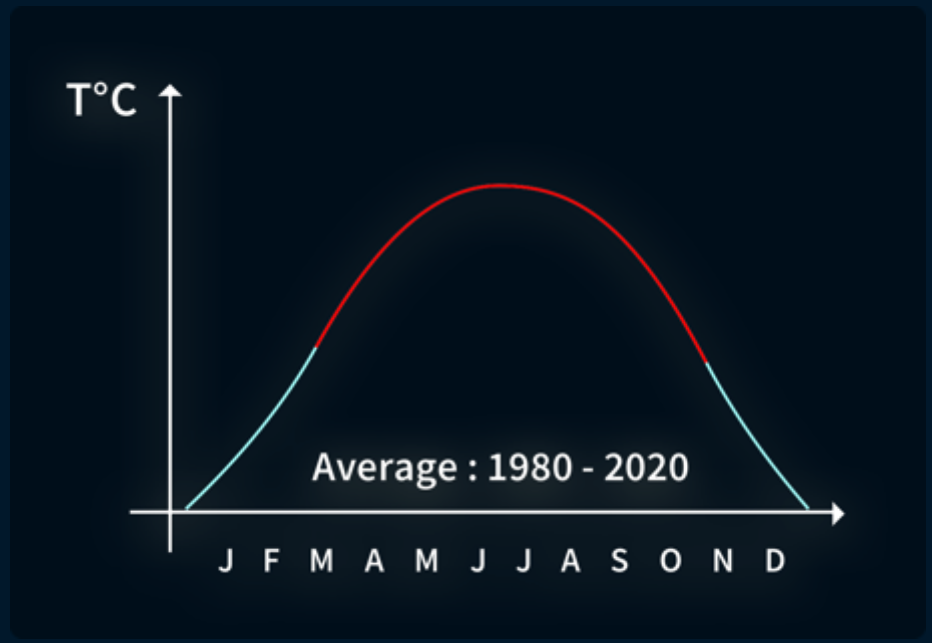
… chosen randomly

… answered « live » and publicly

Unlike the Weather, we don’t « feel » Climate

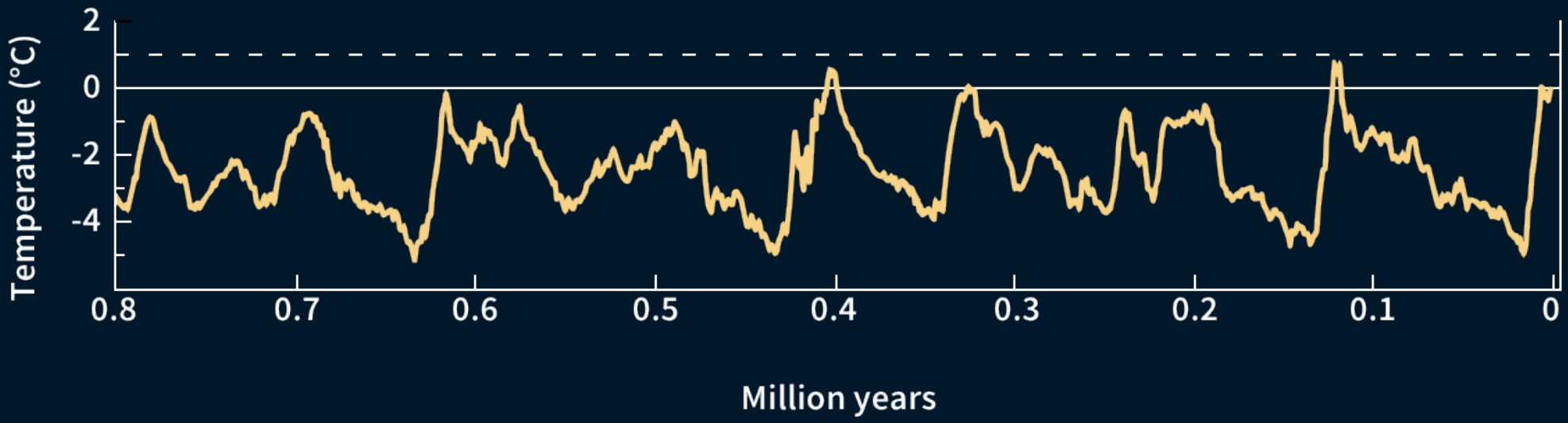
Weather

Climate



What is the 'natural' variation in temperatures?

The Earth's climate has followed cycles of 100k years with temperature oscillations of 5°C



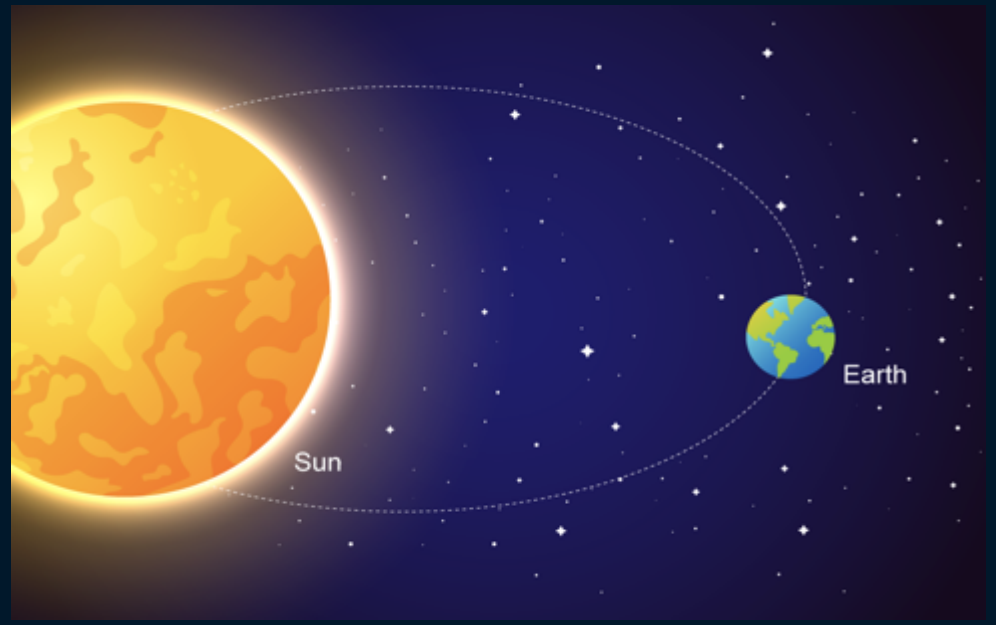
100k years / 5°C

Sources : IPCC, NASA

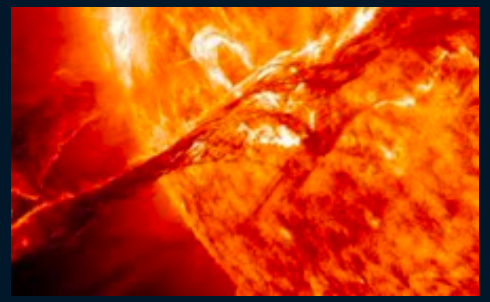
In large part these cycles are explained by the evolution of the Earth's orbital parameters

10 000 – 100 000 year timescale

Earth Orbit



Solar radiations variation



Volcanic eruptions

+ some others

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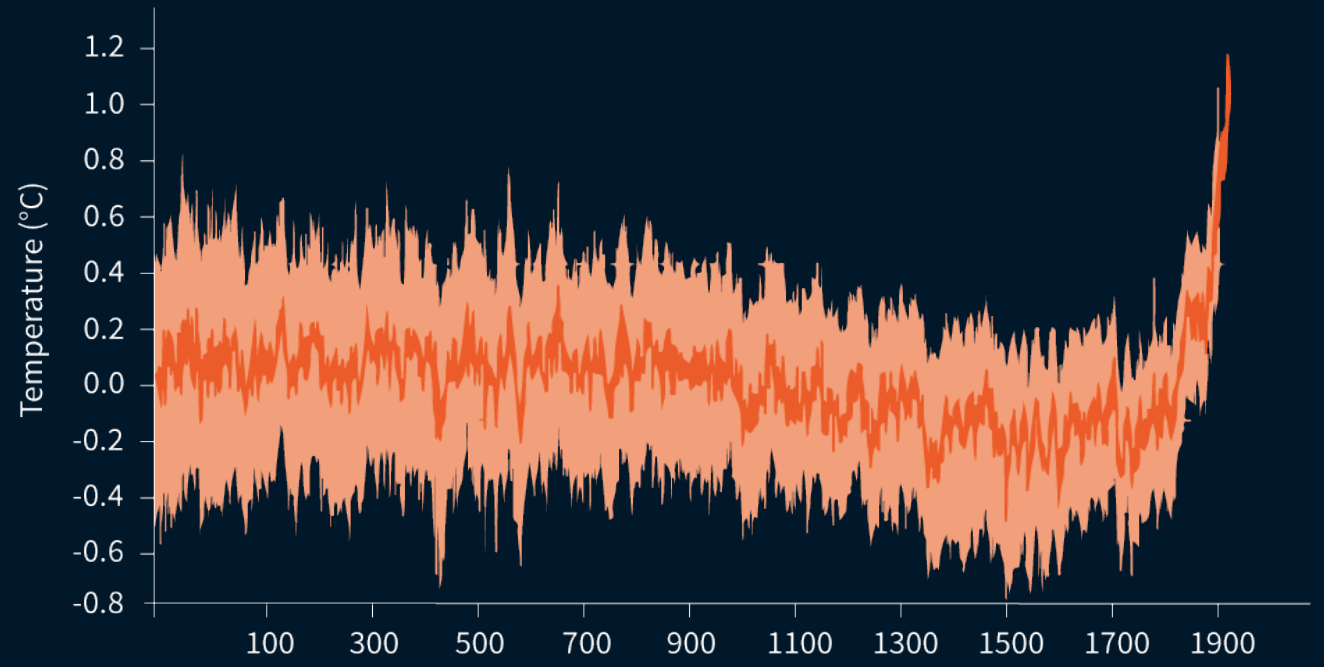
Sources : NASA

CLIMATE CHANGE ACADEMY

And today, what's going on?

The industrial era has seen a drastic increase in temperatures, highly differentiated by geographies



+ 1,1°C vs. 1850 on average

+ 4°C vs. 1960 for the Arctic

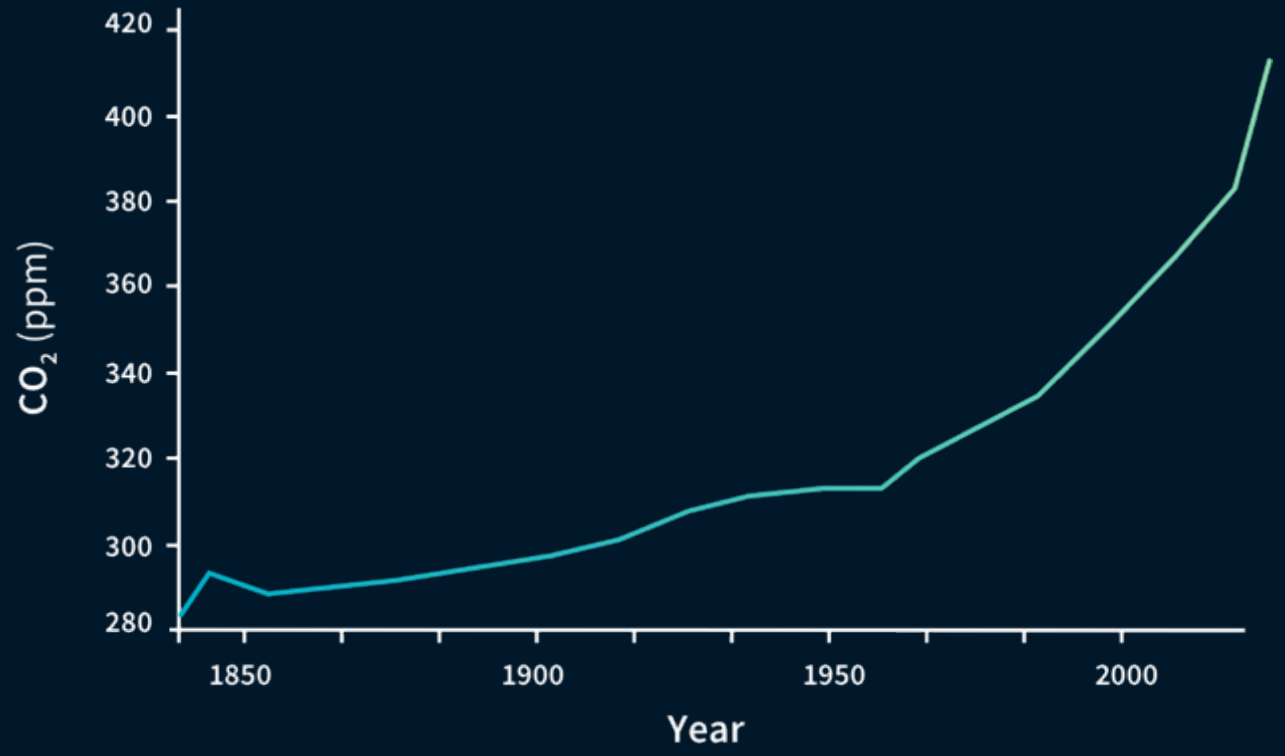
19 out of **20** warmest years in France since 2001

Climate

Sources : IPCC

CLIMATE CHANGE ACADEMY

Highly correlated, there has been a dramatic increase in CO_2 concentration



CO_2

417 ppm (part per million)

+ 50% versus **1850**

Sources : IPCC

CO_2 is the most prominent anthropogenic greenhouse gas. It either stays in the atmosphere or is absorbed in two natural sinks

CO_2

Power and Industries

60 %

Residential

Transport

30 %

Deforestation

10 %

→ **50 %** **Atmosphere**

→ **25 %** **Ocean**

→ **25 %** **Vegetation**

Climate

Sources : IPCC, World Resources Institute

CLIMATE CHANGE ACADEMY

Beyond CO_2, our atmosphere is composed of many other greenhouse gases

Water vapour

More than half of the greenhouse gases

CO_2

> 100 years

Methane

X 25 warming potential of CO_2 but smaller concentration

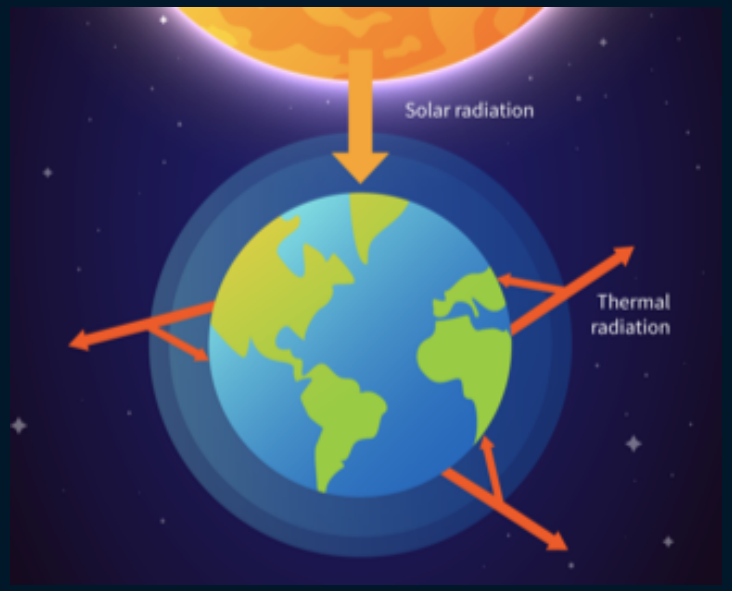
Sources : IPCC, US EPA

The greenhouse effect is a natural phenomenon that makes our earth liveable. Additional greenhouse gases emitted reinforce it, generating an excess of energy

WITHOUT greenhouse effect

-18°C

WITH greenhouse effect



+15°C

→ **For the Earth :**
An EXCESS of ENERGY to manage!

Sources : NASA

What impact does this excess of energy have on the components of our climate system?

This excess of energy warms the ocean and atmosphere, melts ice, and dissipates into the soil

Excess of energy

93 %
in oceans

3 %
in the soil

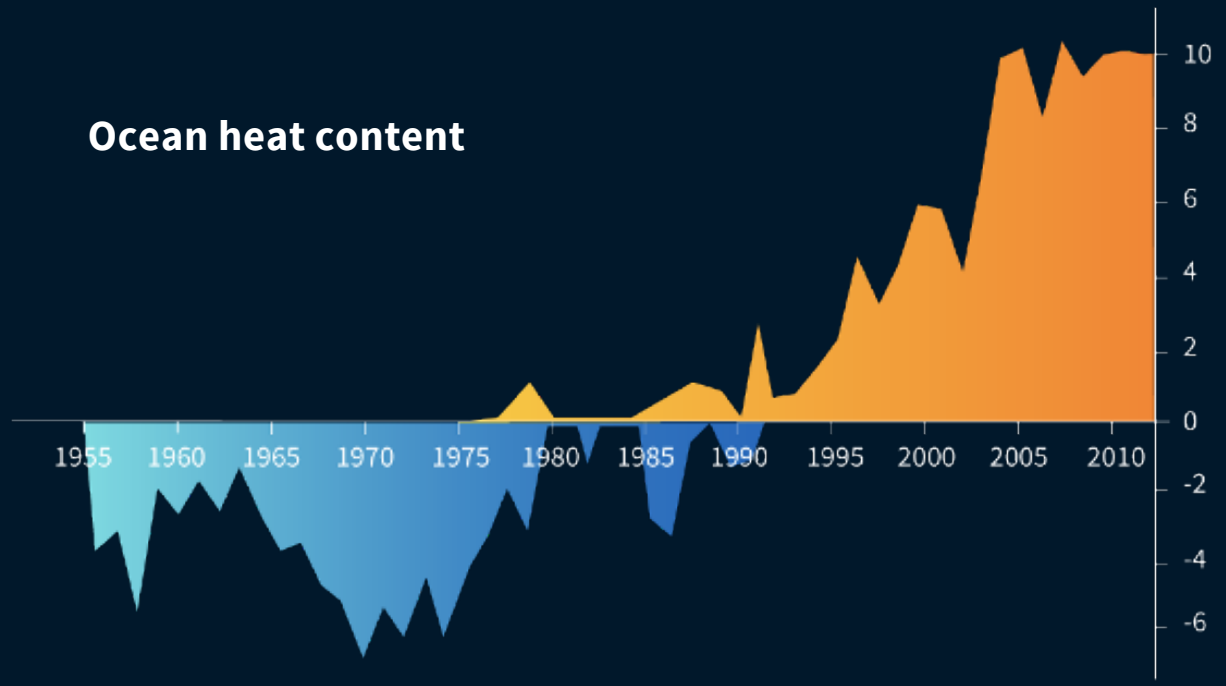
3 %
in ice melting

1 %
in the atmosphere

Sources : IPCC, NOAA

As temperature increases, the sea level rises due to thermal expansion

Ocean heat content



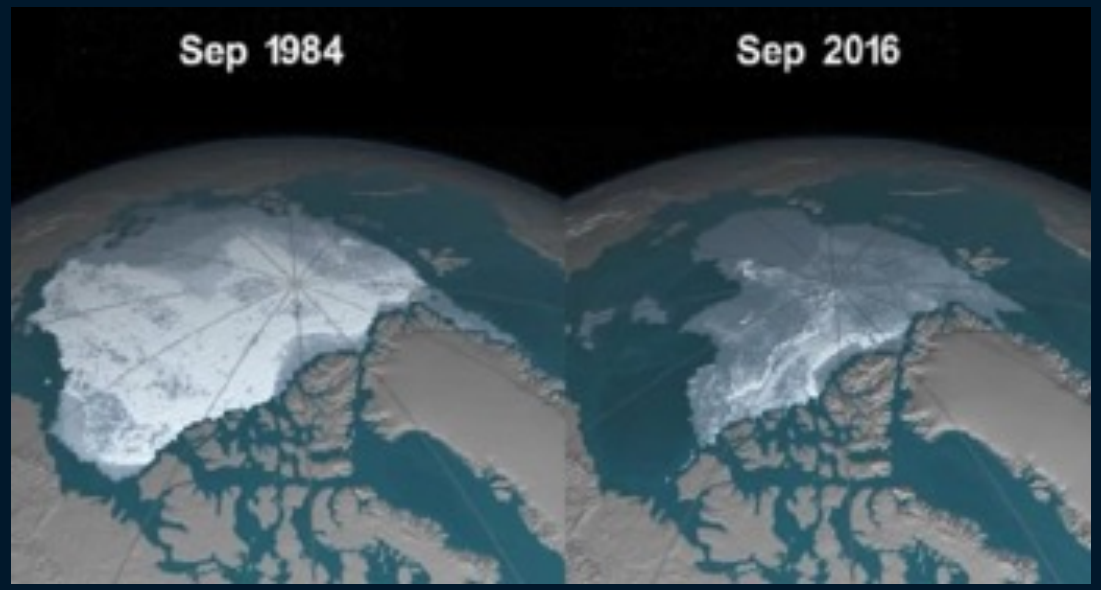
Impact :

42%

of sea level rise

Sources : IPCC

Absorbed by surface ice, this excess of energy causes melting of glaciers and ice caps



- 9 k billion

tons of ice since 1961 from glaciers

-12,8 %

Ice every ten years for ice caps

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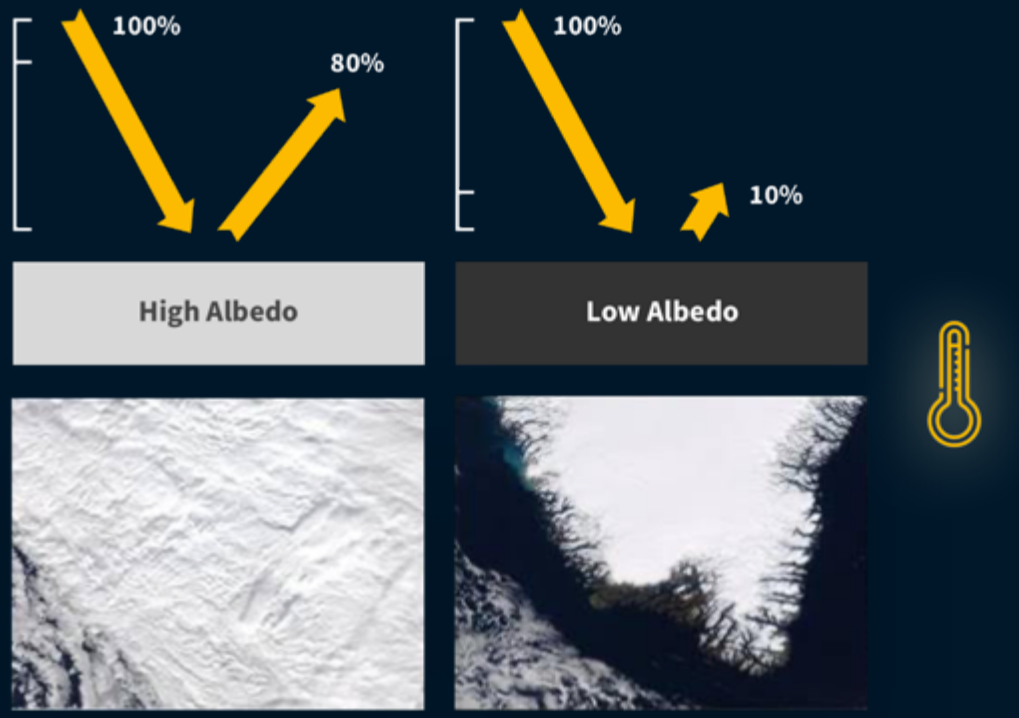
Sources : IPCC, LGGE

CLIMATE CHANGE ACADEMY

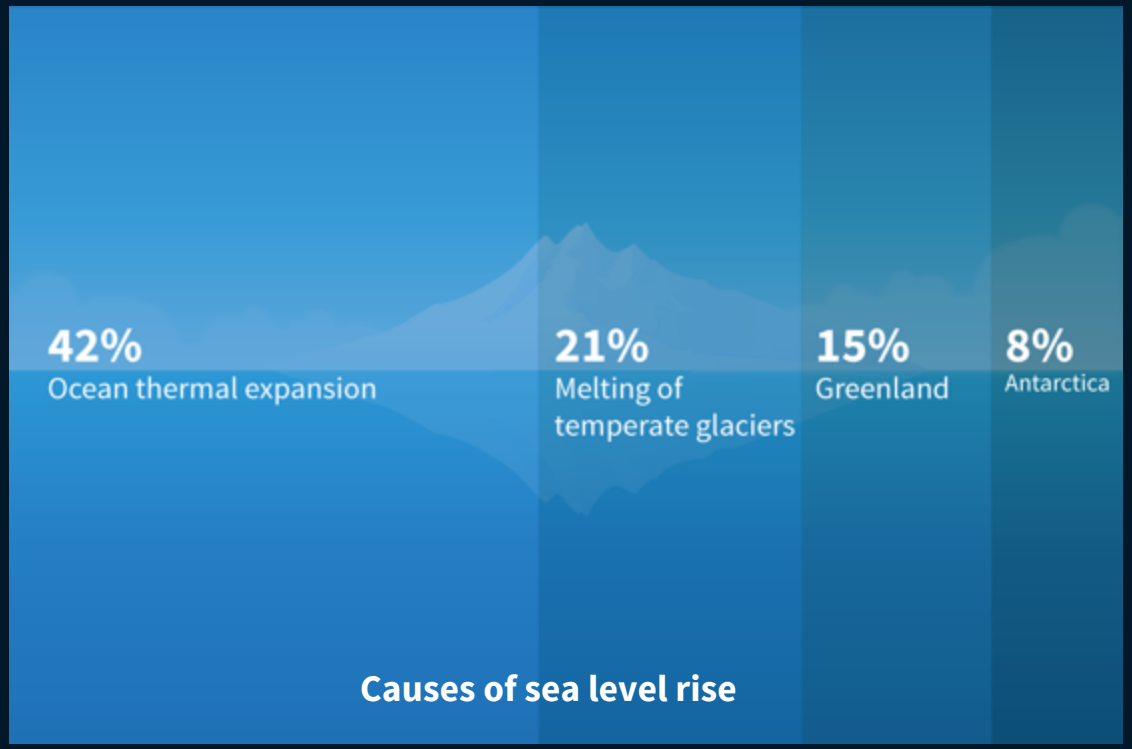
Melting glaciers and ice caps reduces surface reflectivity.
This increases the absorption of solar radiation by oceans and soils...
reinforcing the melting in a "positive" feedback loop



"Albedo" effect

Source : North Carolina Climate Office

Melting of the glaciers and the ice caps (but not sea ice), together with ocean thermal expansion, cause sea level rise



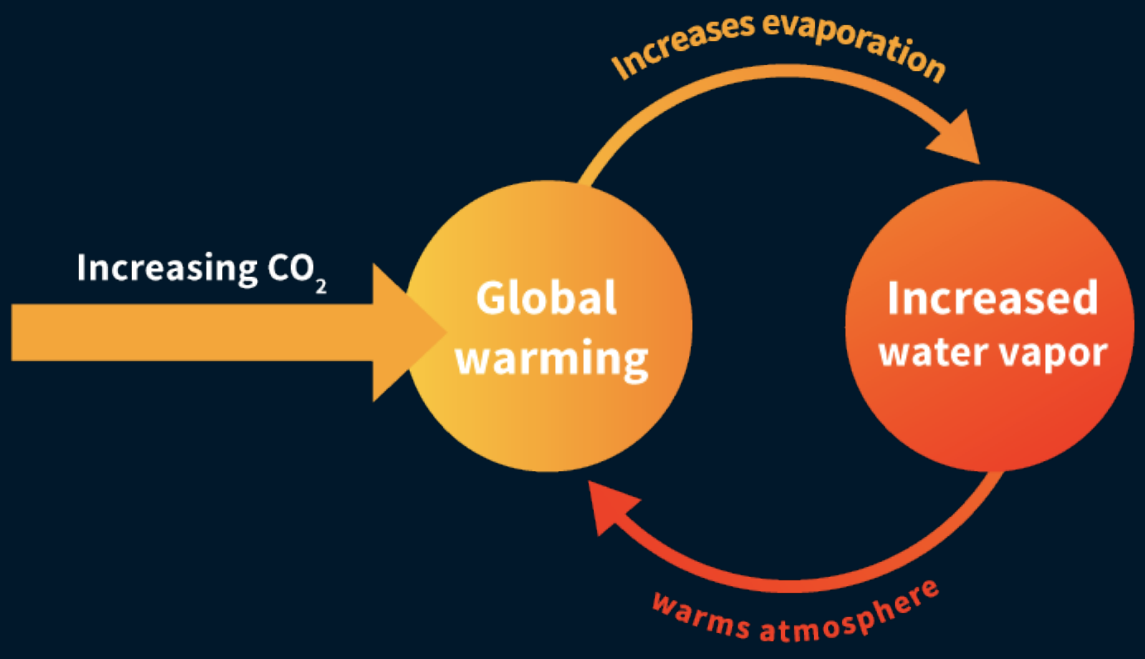
Sea level rise

9cm in 20 years

20cm since 1900

Source : IPCC

Evaporation from the ocean surface increases if the water and air heat up. The additional water vapour generated will accelerate the greenhouse effect, provoking another "positive" feedback loop

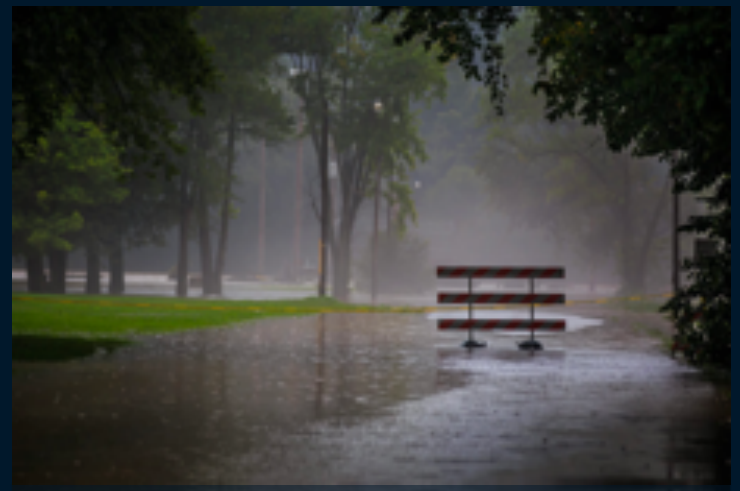


+ 1 ^{0}C temperature

+ 7 % in water vapour

Source : IPCC

Disruption in the water cycle results in more intense but less frequent rainfall. Together with the gradual drying of the soil, the frequency of flooding increases



+ 22%

intensity of extreme rainfalls in the Cévennes

/ 10

divided surface of the Tchad lake since 1960

8%

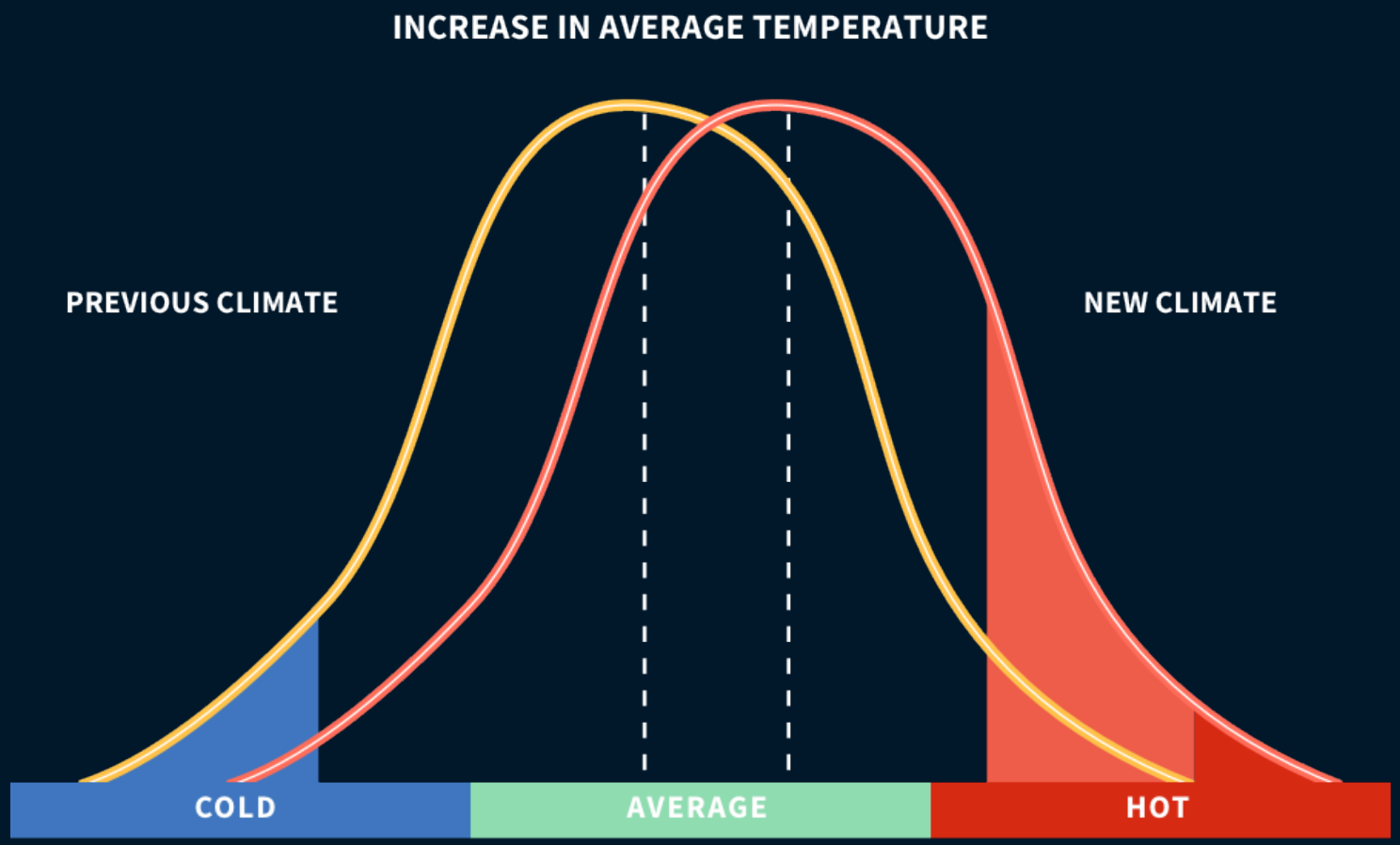
of the European territory affected by desertification

Climate

Sources : JRC, IRD

CLIMATE CHANGE ACADEMY

A relatively small change in average temperatures results in large increases in the risk of extreme heat waves



Sources : IPCC

Overall, there is a modification of climatic hazards, with very different level of scientific certainty

Heat Waves	Higher frequency, longer duration
Extreme rainfall	More intense and more frequent over most mid-latitude land masses and over wet tropical regions
Drought	In presently dry regions, higher frequency by the end of the 21st century
Wildfire	Fire-inducing weather conditions are only one part of the equation, land management is another main driver
Tropical cyclones	Uncertainty on frequency. Increase in intensity, decrease in translation speed, poleward shift in maximum intensity
Winter storms	No consensus
Hail	Difficult to model due to hail being a localized event

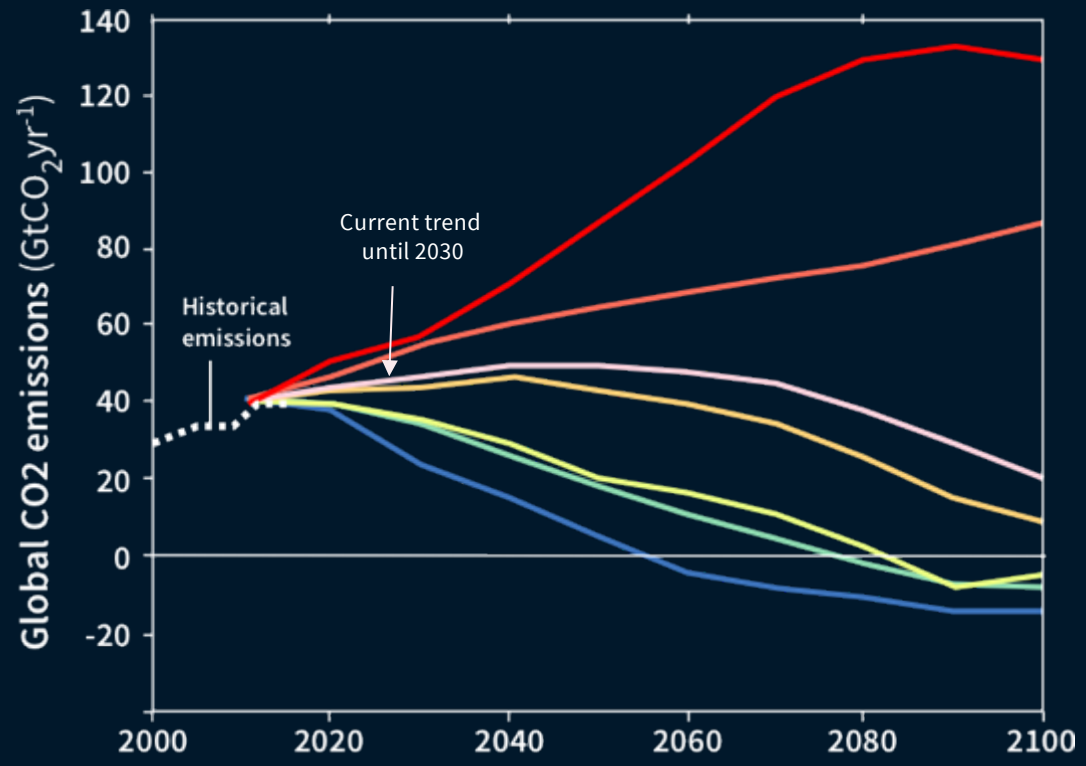
Scientific consensus No consensus

Sources : IPCC AR5 Synthesis Report, IPCC Ocean and Cryosphere Report

What to expect for tomorrow?

Because of the duration of CO_2 in the atmosphere, all our actions will only have an impact after 2040

Since the last ice age, it has taken 10 000 years to warm up by 5°C. Following the more pessimistic scenarios, it could take only 80 years to increase by another 5°C or more



Most pessimistic scenario
+ 6,5°C to + 7°C in 2100

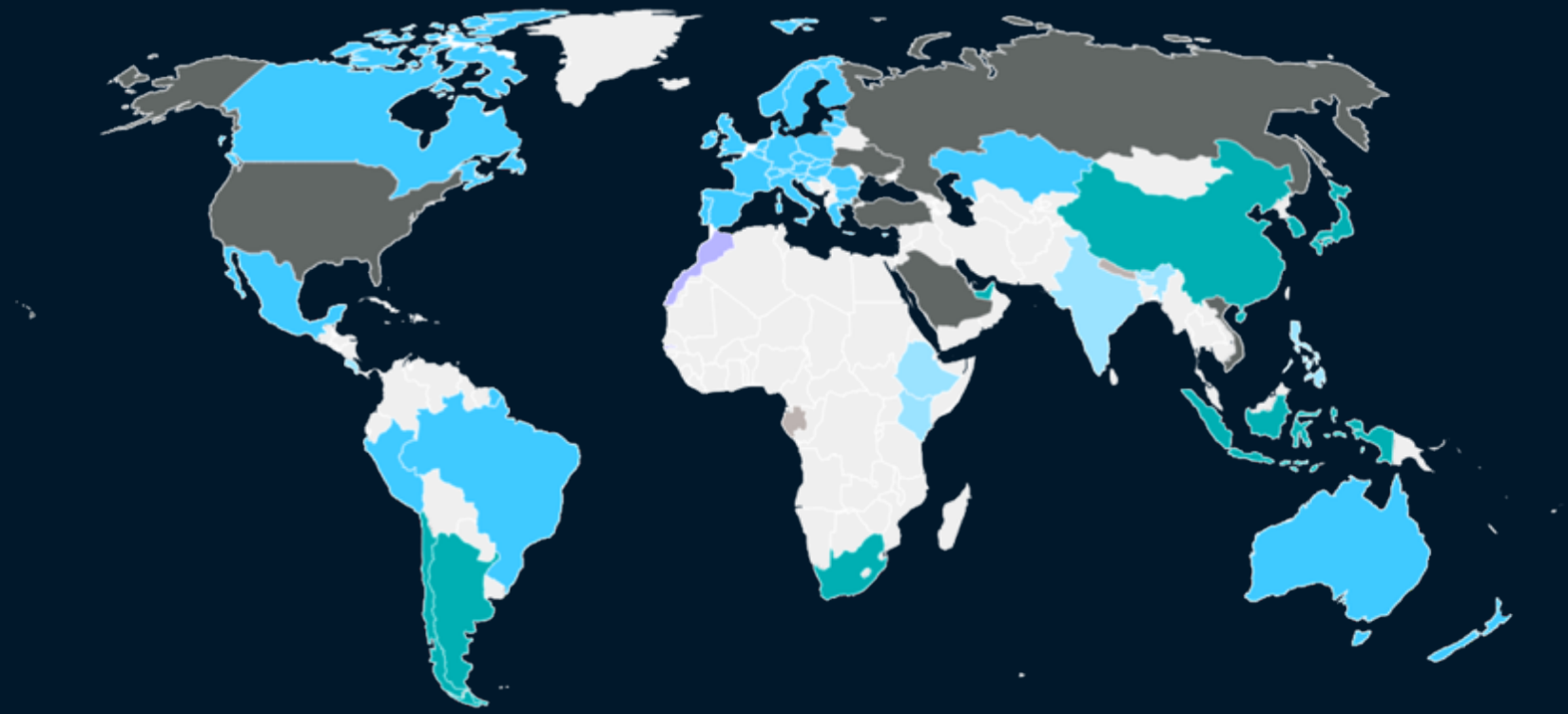
Most optimistic scenario
consistent with **the Paris Agreement below 2°C**

This means an immediate reduction of CO2 emissions to reach carbon neutrality at the global level by 2060

Sources : CNRS, IPSL

What commitments under the Paris Agreement?

Current policies are insufficient to achieve the Paris Agreement objective



CRITICALLY INSUFFICIENT | HIGHLY INSUFFICIENT | INSUFFICIENT | 2°C COMPATIBLE | 1.5°C PARIS AGREEMENT COMPATIBLE | ROLE MODEL

Sources : The Climate Action Tracker

What about biodiversity ?

Climate change is only the third factor behind biodiversity extinction

#1	#2	#3	#4	#5
				
Land-use change	**Direct exploitation**	**Climate Change**	**Pollution**	**Invasive species**

$125 000 000 000 000 "free" services coming from biodiversity each year

Climate

CLIMATE CHANGE ACADEMY

Sources : WRI; Royal Botanic Gardens, Kew (2017)

Quick Test!

What would be the Earth's average temperature without the greenhouse effect?

A. - 50°C **B. - 5°C** **C. - 18°C**

What is the most common greenhouse gas?

A. Water vapour **B.** CO_2 **C.** Methane

Which is the main cause of sea level rise?

A. Ocean thermal expansion

B. Melting of glaciers

C. Melting of ice caps

For each 1°C increase in the Earth's average temperature...

A. + 7% of water vapour

B. - 7% of water vapour

Global warming increases...

A. Frequency of tropical cyclones

B. Intensity of rainfall

C. Frequency of rainfall

For the last 20 years, the sea level rise has risen...

A. + 3cm

B. + 9cm

C. + 15cm

Air pollution particles generated by human activities...

A. Accelerates global warming

B. Slows down global warming

Want to know more?

Other training offers available in our Climate Change Academy

CLIMATE CHANGE ACADEMY

SOCIO-ECONOMY

CLIMATE FINANCE

MITIGATION

ADAPTATION

BIODIVERSITY

WANT TO ACT NOW?

Some books for your evenings...

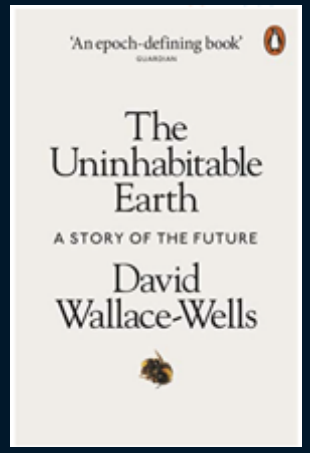
"Foundation"

Limits to growth
D. Meadows, J. Randersand W.W. Behrens III, et al.

"Action-driven"

Global warming of 1.5°
IPCC summary for policymakers

"Prospective"



The Uninhabitable Earth
David Wallace-Wells

"Historical"

The Wizard and the Prophet
Charles C. Mann

"Scientific"

What we know about climate change
Kerry Emanuel

AXA Climate

CLIMATE CHANGE ACADEMY

Our mission is to help communities and businesses tackle climate risks

BUILD RESILIENCE

Adaptation services

PROTECT IN REAL TIME

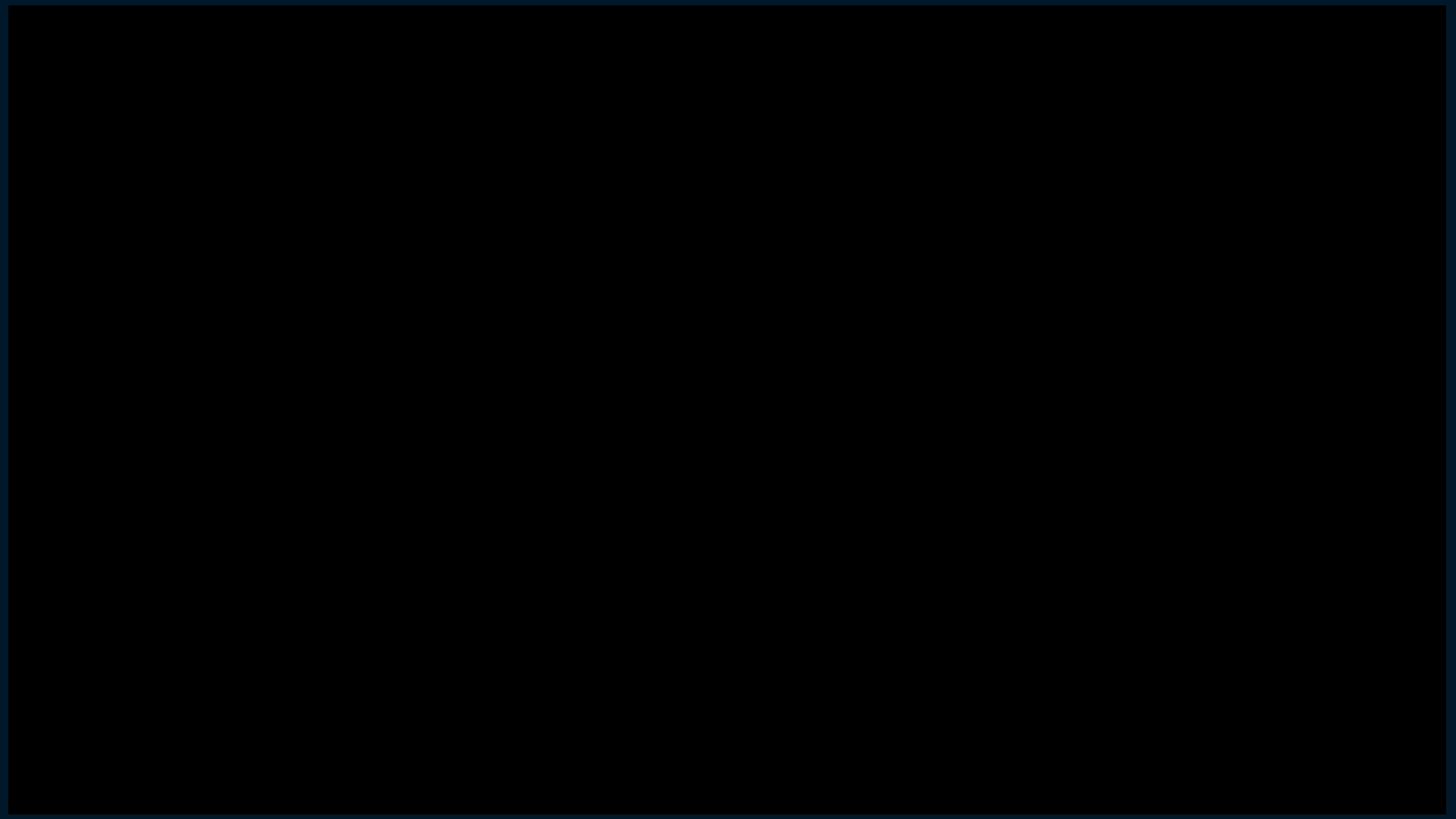
CYMO

RECOVER FASTER

Parametric insurance

AXA Climate

AXA Climate : A global offer to tackle climate risks



24/7 Natural Hazards Protection Platform

CYMO

ALERT

- 24/7 Real time Natural Hazard monitoring
- Monitoring interface access
- Early graduated alerting for up to 10 contacts
- Briefing by call for the key point of contact

ANTICIPATE

- Validated geocoding
- Natural Hazard risks analysis
- Adaptation of your Contingency Plans (Prevention + Business Continuity) to Natural Hazard

RESPONSE

- Action Plan applied according to each alert severity
- Analysis of the damage caused by the Natural Hazard a few hours after the impact (satellites, aircrafts, drones, social networks…)

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Case study |Renesas Electronics, Kumamoto, Japan| July, 4th to 8th 2020

CYMO

ANTICIPATE ALERT RESPOND

Case Study: Beirut explosion visual assessment

4/08/2020 Beirut Explosion

- **190** deaths
- **6,500** injuries
- **US$10–15 billion** in property damage

- **2 CYMO clients are in zone**

AXA Climate : Thank you for your attention

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