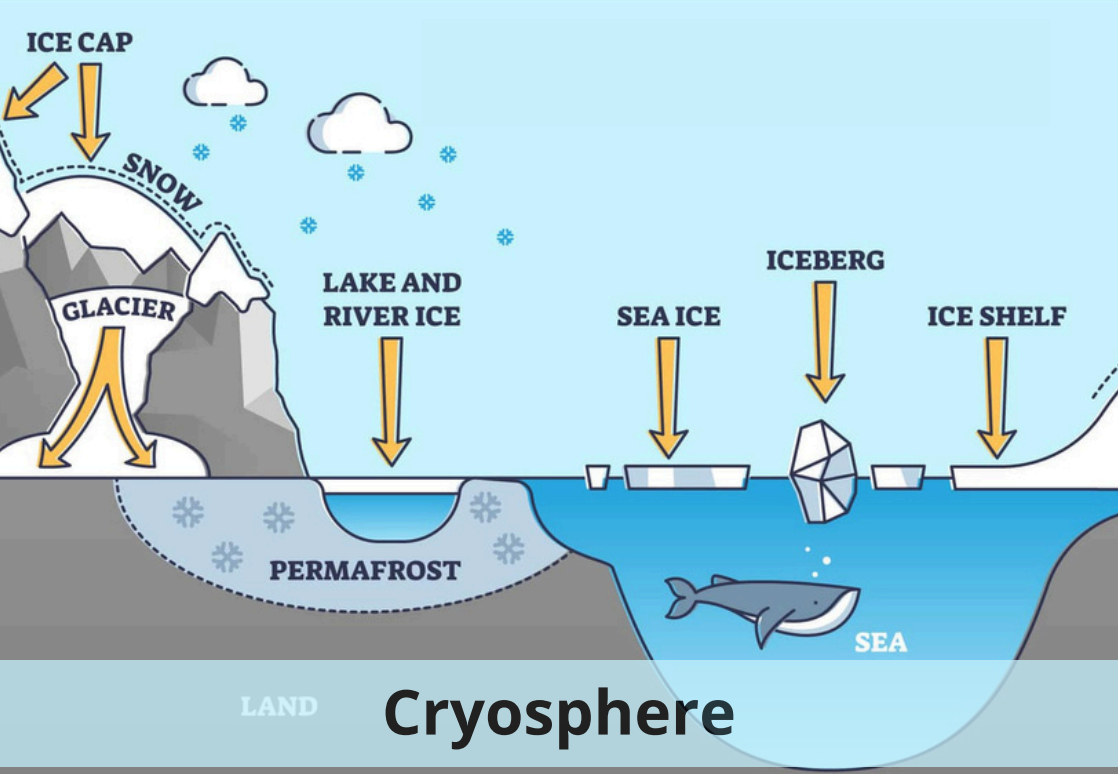

ICE CAP
SNOW
GLACIER
LAKE AND
RIVER ICE
SEA ICE
ICEBERG
ICE SHELF
PERMAFROST
SEA
LAND

Cryosphere

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Cryoshère

Define all surface compose by solid water permanently or temporaly.

This regroup sea ice, snow, glaciers, ice caps, ice sheets, ice on lakes or rivers and frozen ground.
With this definition, it's important to notice than a part of water belongs to cryosphere and also hydrosphere.

Desalination

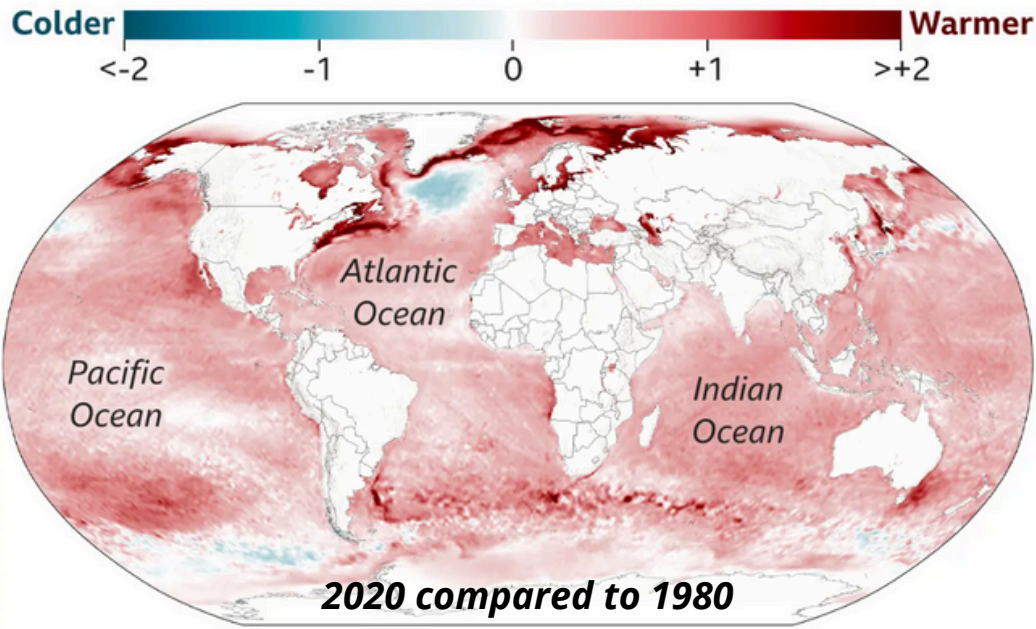
CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Desalination

Ocean salinity is changing as a result of global warming. Since the 1950s, we have seen a softening of the oceans in the Arctic and Pacific, due to the influx of fresh water from melting ice and precipitation.
This desalination changes the density of the water, disrupting ocean currents and circulation.

Ocean surface warming

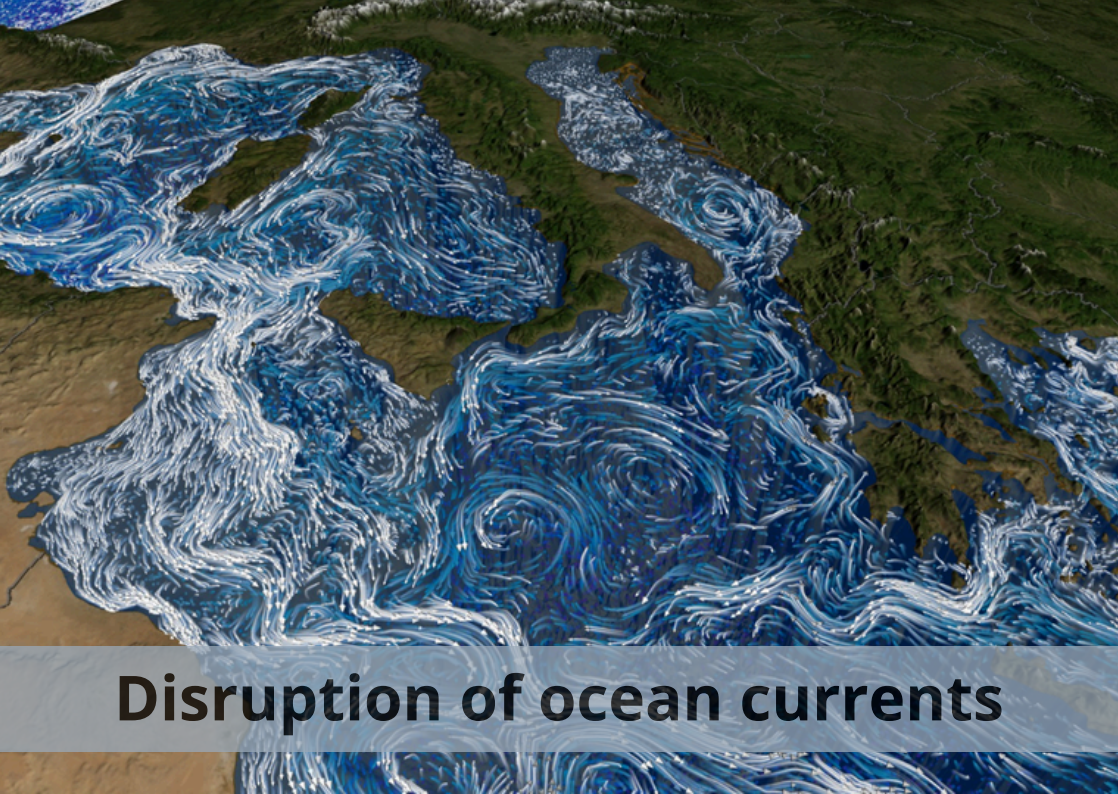


CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Ocean surface warming

Since the end of the 19th century, the surface temperature of the oceans has risen by +0.88°C. This warming, caused by the accumulation of greenhouse gases, affects more than 83% of the oceans, particularly the tropical ocean and the Arctic. It is leading to an increase in the frequency and intensity of marine heat waves.



Disruption of ocean currents

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Disruption of ocean currents

Global warming is disrupting the major ocean currents that regulate the world's climate.
Some are weakening, like the AMOC, while others are moving towards the poles.
These changes are altering the transport of heat, salt and carbon, affecting regional climates and marine ecosystems.

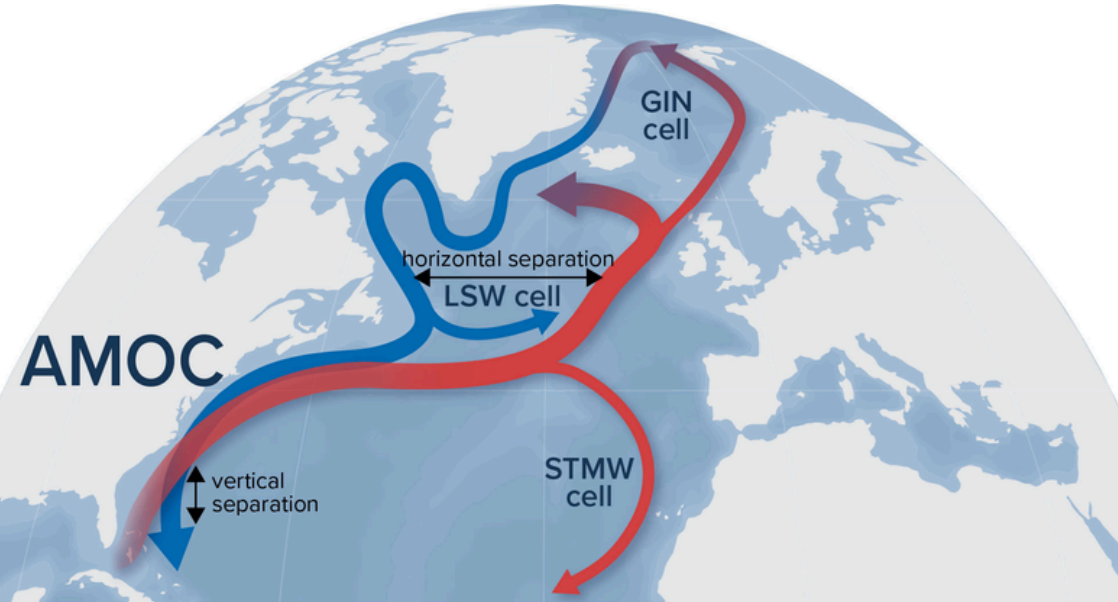

Changing weather patterns

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Changing weather patterns

Global warming alters weather patterns through changes in ocean currents and atmospheric circulation.
Weaker trade winds, shifting subtropical gyres:
these variations influence sea temperature, salinity and weather conditions..



AMOC Regulations

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

AMOC Regulations

The AMOC is an essential ocean current that redistributes heat between the equator and the poles. It has been weakening for several decades as a result of global warming and the influx of fresh water, particularly from the melting of Greenland.

Warming of the atmosphere

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Warming of the atmosphere

Since 1850, the average temperature of the atmosphere has been rising rapidly due to man-made greenhouse gases.

The Arctic is particularly affected, with a significant loss of summer sea ice.

Sea level rise

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Sea level rise

The global average sea level rose by 0.20 m between 1901 and 2018, at a rate unprecedented in the last 3,000 years.
Since 2006, the rise has been 3.7 mm/year.
This rise is mainly due to the thermal expansion of the oceans (38%) and the melting of glaciers (41%).
If emissions remain high, the sea level could rise by between 0.38 and 0.77 m by 2100.

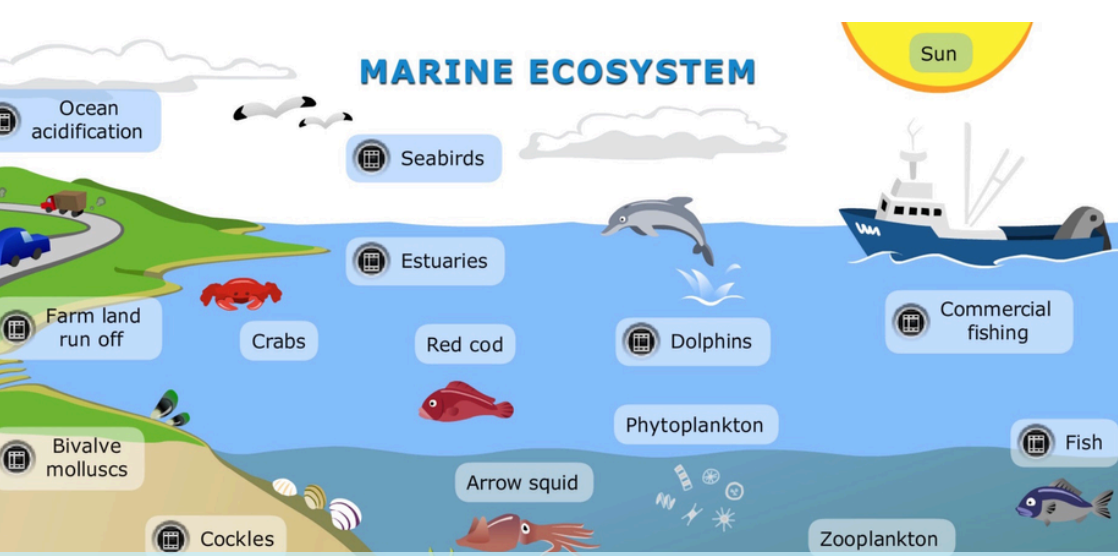
Albedo reduction

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Albedo reduction

Global warming causes ice to melt, reducing the albedo of the Earth's surface.
Less radiation is reflected and more is absorbed by darker surfaces, such as water or vegetation.
This accelerates the melting of the ice and intensifies global warming, creating a positive feedback.



Disturbance of marine and terrestrial ecosystems

CL!MATE FRESK
All the cards are in your hands!

TOULOUSE INP N7

Disturbance of marine and terrestrial ecosystems

Global warming, by melting ice and acidifying the oceans, is changing natural ecosystems.
This is disrupting habitats and food chains, threatening biodiversity and affecting resources vital to human populations.