How Changing Ocean Temperatures Could Upend Life on Earth

0:01

from The New York Times I'm Katherine

0:02

benold this is the

0:06

[Music]

0:09

da many of the effects of climate change

0:12

are already with us heat waves droughts

0:15

wildfires flooding but some of the most

0:17

alarming consequences are hiding beneath

0:20

the surface of the ocean today my

0:23

colleagues David gallis and raymon Jong

0:25

on just how close we might be to a

0:27

Tipping Point

0:28

[Applause]

0:34

[Applause]

0:35

[Music]

0:38

it's Tuesday May

0:42

7th David you've been writing about

0:45

different aspects of climate change for

0:46

years and I'm definitely no stranger to

0:48

distressing news about a warming Planet

0:51

but something about ocean temperatures

0:53

seems particularly distressing what's

0:55

going on starting last year scientists

0:58

started noting something alarming

1:00

happening in oceans all around the world

1:03

it was warm in the oceans but it started

1:06

to get really hot in ways that they had

1:09

never seen before and for the last year

1:12

plus I've been checking in with

1:14

scientists and they are increasingly

1:18

concerned perplexed even with what

1:20

they're seeing and when you say oceans

1:23

are getting hotter can you just give me

1:25

a sense of how much the oceans are

1:27

warming and how fast well if you look at

1:30

a chart that shows say the last two or

1:33

three decades of average sea surface

1:35

temperatures you'll see a gradual

1:38

warming Trend but starting last March we

1:41

didn't see another gradual increase we

1:44

saw this big jump and from March of 2023

1:48

on it stayed hot and it's just getting

1:51

hotter and we began 2024 at this much

1:55

higher level than we've ever seen before

1:58

and we're still there and in parts of

2:00

the world the temperatures are still

2:02

going up as we head into summer and that

2:05

has scientists really concerned and you

2:07

said earlier that none of the scientists

2:09

that you've been checking in with and

2:10

none of these very sophisticated climate

2:13

models that they're operating with can

2:15

explain this big jump and I guess I have

2:18

to ask at this point why are these

2:20

scientists so surprised I mean we've

2:23

seen record breaking heat waves for the

2:25

past several years it seems like every

2:27

single year is hotter than the last why

2:29

is it any Sur surpris that the ocean is

2:31

no different well they're not surprised

2:34

that the ocean's warming they have

2:36

understood for many years now that the

2:38

overall man-made global warming that

2:40

we're experiencing all over the world in

2:43

all these different ways is going to

2:45

affect the oceans water is very

2:47

absorbent for heat and a lot of the

2:50

extra heat that we're producing from the

2:52

burning of fossil fuels a lot of the

2:54

extra heat that's being caused in the

2:56

atmosphere as a result of that is just

2:58

getting sucked in to the ocean and bit

3:01

by bit over the last many decades the

3:03

oceans have gotten warmer so even after

3:06

the air cools say in Winter or something

3:09

the ocean holds on to a portion of that

3:11

heat that's right even when it's cold

3:14

outside the oceans year after year have

3:18

been getting a little warmer as a result

3:20

of climate change but that on its own

3:22

does not account for the kind of warming

3:23

that we're seeing right now not even

3:26

close so what else do they think could

3:28

be going on well for the last year or so

3:31

the Pacific Ocean has been going through

3:33

an elino cycle which is when a lot of

3:35

excess heat is released from the ocean

3:38

and in addition to making the Pacific

3:40

Ocean hotter it has sort of an overall

3:43

warming nudge a little boost for warmth

3:46

in Ocean heat around the world but even

3:49

that doesn't explain the big jumps we've

3:51

seen and there's another

3:53

counterintuitive factor that scientists

3:55

believe is playing a role here as well

3:58

and that has everything to do with the

3:59

pollution

4:00

being emitted by big ocean liners by Big

4:03

Ships traveling across the

4:06

Atlantic so in 2020 some shipping

4:10

regulations changed and they required

4:12

that the emissions from the fuel being

4:16

used in big ocean

4:19

tankers become much cleaner and as a

4:23

result of that there was less sulfur

4:25

dioxide in the shipping

4:28

emissions that's a good thing for many

4:30

reasons sulfur dioxide is a pollutant it

4:33

can have really adverse health effects

4:35

on humans but one of the things that was

4:37

also doing was refracting sunlight away

4:41

from the

4:43

oceans and so what we've seen over the

4:45

last recent Years is as there was less

4:49

sulfur dioxide in the North Atlantic as

4:52

less and less of that parate matter was

4:54

in the atmosphere and able to bounce the

4:57

sun's energy back into space

5:00

more and more of the sun's energy more

5:02

and more of the sun's heat was making

5:04

its way into the

5:06

oceans and that scientists are now

5:09

understanding likely played a warming

5:11

role as

5:12

[Music]

5:16

well so basically lower emissions in

5:18

these shipping lanes means less kind of

5:21

smoggy cloud cover and therefore more

5:24

direct sunlight hitting the ocean

5:25

surface and heating it up which actually

5:27

kind of rings the bell because we talked

5:29

about this in the show recently in

5:31

relation to scientists wanting to

5:32

artificially create more potent clown

5:34

cover to cool down the planet it's a

5:36

little ironic that scientists are now

5:39

trying to engineer the very thing we

5:40

were trying to stop doing it talk about

5:42

unintended consequences that's right and

5:45

this is one of those instances where

5:46

there are these very tough tradeoffs

5:48

right it's great yes that we have less

5:50

pollution that's going to be good for

5:52

Public Health on the other hand it may

5:55

have allowed yet more warming in the

5:57

oceans that's having Cascade cing

6:00

effects across all sorts of ecosystems

6:02

that we're only just beginning to

6:04

understand yeah let's let's talk about

6:06

that for a moment what are the effects

6:08

of this mysterious warming you mentioned

6:11

ecosystems well there are a lot of

6:13

effects when the oceans get this hot

6:16

this fast but perhaps the most immediate

6:20

concern among people all over the world

6:23

is the fact that in dozens and dozens of

6:25

countries all over the world we're

6:28

experiencing a wreck wave of coral

6:31

bleaching which is to say that coral

6:33

reefs these vitally important parts of

6:35

the ocean ecosystems are just dying at a

6:39

rate we've never really seen before and

6:41

that's going to have all sorts of

6:42

negative effects for Fisheries all over

6:45

the globe why are coral reefs so

6:47

important well they matter for a lot

6:50

more than just snorkeling yes they're

6:52

beautiful and yes they are the center of

6:55

a lot of tourist activity but they're

6:57

also sort of this fun fundamental

7:00

foundational part of the marine food

7:03

chain and so when we think about all of

7:06

the life that coral reefs sustain that

7:09

all allows for smaller fish to flourish

7:14

and go out into the ocean and those

7:15

smaller fish contribute to the lives and

7:18

the ecosystems of bigger fish and when

7:21

we think back to you know the food chain

7:23

that we learned about when we were in

7:24

elementary school coral reefs are right

7:27

at the bottom of that and if we lose

7:30

that it's going to have devastating

7:33

effects for marine ecosystems all over

7:35

the world is there any hope to save the

7:38

Coral at this point or are they doomed

7:41

my colleague Ka Einhorn has been doing a

7:44

lot of great reporting on the situation

7:46

with corals and she's highlighted some

7:49

of the efforts underway to try to save

7:52

them to grow more resilient corals but

7:55

the truth is the scale we're seeing with

7:58

bleaching events happening All Around

8:00

the World in something like 56 countries

8:03

it's just not possible to stop it

8:05

entirely at this point so it's one of

8:08

these dominoes in our ecosystem that can

8:11

set up a whole range of problems and

8:13

actually result in major losses to

8:16

biodiversity and just to come back to

8:18

the mystery of it all we just don't know

8:20

what happens when those dominoes start

8:22

to fall and it's not just corals that

8:25

are being impacted here the weather

8:27

could well change as a result of these

8:29

warmer oceans as well and I'm

8:31

particularly thinking about the upcoming

8:34

Atlantic hurricane season warm water is

8:37

a key ingredient to hurricanes when you

8:40

think about hurricanes and how strong

8:43

they get and how fast they intensify one

8:46

of the most important factors in both of

8:49

those Dynamics is how hot the water is

8:53

and when we see all this warm water

8:56

hanging out in the Atlantic ocean that

8:59

is leading forecasters to predict a

9:01

potentially record-breaking hurricane

9:04

season that is right around the corner

9:06

in the North Atlantic and that could

9:08

affect the Caribbean North America and

9:12

Beyond what's striking to me is that you

9:14

know we know that the oceans are getting

9:17

much hotter we don't fully know why and

9:20

we can't fully explain what the impact

9:22

will be which really doesn't sound great

9:25

but if we don't fully understand what's

9:27

going on then how can we even hope to do

9:31

something about

9:32

it well I've been asking scientists this

9:35

very question right like what is there

9:37

to be done and the tough answer is

9:41

there's no easy way to turn down the

9:43

thermostat of the oceans this warming is

9:47

happening and our job now is to live

9:50

with it as best we

9:54

can and we haven't even talked about

9:56

what some people regard as the biggest

9:58

threat of all

10:00

as the oceans warm they're contributing

10:03

to The Melting of glaciers and the loss

10:06

of Arctic sea ice and as that happens

10:10

many people are worried not just about

10:12

rising sea levels but also about the

10:15

disruption to a vitally important ocean

10:19

current and if that happens it could

10:21

have massive ramifications for the

10:24

entire planet it could change just about

10:28

everything we know about life on

10:35

[Music]

10:38

Earth after the break my colleague

10:41

Raymond Jong talks about the possibility

10:43

of that ocean current

10:46

[Music]

10:50

collapsing we'll be right

10:55

back Raymond before the break our

10:58

colleague David gallis told us all about

11:00

this alarming trend of the ocean heating

11:02

up and some of the very worrying

11:03

consequences of of that but you are here

11:06

to tell us about something else that may

11:08

be happening in the ocean something to

11:10

do with ocean currents and if I'm honest

11:13

it sounds like something straight out of

11:15

a science fiction movie can you explain

11:18

sure Katherine and and actually you're

11:20

right it is something from a science

11:21

fiction

11:23

movie I'm here at the global warming

11:25

conference in New Delhi where if you can

11:27

believe your eyes it's snowing

11:30

about 20 years ago a movie called The

11:32

Day After Tomorrow came out the only

11:34

Force strong enough to affect global

11:36

weather is the Sun what about the North

11:38

Atlantic current I got a call last night

11:41

from Professor rapson at the Headland

11:42

Center he thinks the current is

11:46

changed come on Jack how could that be

11:50

and the plot of that movie is that

11:52

there's this major ocean current in the

11:54

Atlantic that suddenly stops moving it

11:57

collapses and it sets off this Cascade

12:00

of natural disasters in Nova Scotia

12:02

earlier today the Ocean Rose by 25 ft in

12:05

a matter of seconds what you're seeing

12:07

are two actual tornadoes striking Los

12:10

Angeles International Airport it's a mob

12:12

scene here at Grand Central Station over

12:15

half the platforms are flooded and

12:17

service has been suspended on all trains

12:20

that ultimately plunged the planet into

12:22

a new Ice Age what can we do

12:26

[Music]

12:29

save as many as you

12:34

can I guess my question to you Raymond

12:37

given what we're talking about here is

12:39

which part of that movie is science

12:41

fiction and which part is actual science

12:44

I'd say most of the movie is pretty

12:46

purely fiction but there is a kernel of

12:49

Truth in the science which is that this

12:51

vital ocean current in the Atlantic is

12:54

very real and just like in the movie

12:57

scientists are worried about what

12:59

happens if it shuts down okay so tell me

13:02

about this current scientists have given

13:05

it a very very unwieldy

13:10

name they call it the Atlantic

13:12

meridianal overturning circulation but

13:15

most people just use the acronym amoc

13:18

amok amok okay think of it as a giant

13:22

conveyor belt of water that loops around

13:25

the Atlantic Ocean and it starts near

13:27

the equator goes up through the

13:29

Caribbean around the east coast of the

13:32

US up toward northern Europe and then

13:34

back

13:37

again scientists have come to realize

13:41

how important amok is for a lot of the

13:44

climate that we enjoy today a lot of

13:47

Northern Europe Britain Iceland

13:51

Scandinavia is habitable today really

13:53

because of amok it's because this system

13:57

transports Heat from the equator and

14:01

very generously drops it off uh in

14:03

northern Europe that even though it's so

14:06

far from the equator it it's not as

14:08

uninhabitable as say far Northern Canada

14:11

or

14:15

Siberia and let me just ask you is this

14:18

amoc current the same thing as the Gulf

14:20

Stream which people write about in a

14:22

worried about a lot these days yeah the

14:24

Gulf Stream is a similar system of

14:27

currents but amok sort of the full loop

14:31

the Gulf Stream is just one part of it

14:33

but amok is really what's important for

14:34

the climate Okay so before we talk about

14:37

amok shutting down or collapsing can you

14:40

actually kind of give me a a quick

14:42

science 101 explanation of how this

14:44

thing works like there's this massive

14:46

Loop of water like a sort of I guess an

14:49

underwater river that you described

14:51

which kind of

14:52

transports warm water up towards the

14:55

North and then comes back as cold water

14:57

what keeps this thing running how does a

14:59

current just stay in constant motion and

15:02

loop around like that it has to do

15:05

primarily with differences in

15:07

temperature and salinity basically

15:10

fluids want to keep moving in a

15:12

particular direction and it's driven by

15:15

this balance between warm water cold

15:18

water salty water fresh water heavier

15:21

water wants to sink lighter water wants

15:23

to rise and so the temperature and

15:26

salinity of the water is sort of what

15:28

determines how densities and this

15:30

density and differences in density keeps

15:32

this giant Loop moving it's something

15:34

that explorers noted in the Atlantic

15:38

hundreds of years ago they noticed that

15:40

deep water was was very cold it was

15:42

unexpected and so I think as people have

15:45

started studying the oceans more and and

15:48

science has advanced they've realized

15:49

there's a very delicate system of

15:52

differences and temperature and salinity

15:54

that keeps this conveyor belt moving

15:56

that's really fascinating I mean I've

15:59

always known we had these currents and

16:01

that they were really important but I

16:03

never really appreciated and understood

16:05

what it takes to keep them going so okay

16:09

tell me why scientists are so worried

16:11

about amok shutting

16:13

down as the planet warms there's

16:16

something that might be significantly

16:18

affecting this delicate balance and

16:21

that's the melting of the Greenland ice

16:22

sheet with the melting of the ice

16:26

there's this big infusion of fresh water

16:28

into the North Northern Atlantic and

16:30

because that affects the salinity of the

16:32

northern Atlantic it sort of changes the

16:34

balance of salinity and temperature

16:36

potentially enough to knock this Loop

16:39

off course and there's signs already

16:42

that this is happening that at least the

16:44

current is slowing down and one major

16:47

piece of evidence is this cold blob

16:50

that's appeared in the northern Atlantic

16:52

a cold blob a cold blob that's right

16:56

with most almost everywhere on the

16:58

planet getting warmer because of the

17:00

greenhouse gases that we're putting into

17:02

the atmosphere there's a conspicuous

17:04

blob in the North Atlantic near

17:07

Greenland that is getting cooler and

17:10

it's exactly the place that scientists

17:13

would expect to be getting cooler if

17:15

amok were slowing down okay so the

17:18

Greenland ice sheet is melting due to

17:21

climate change and that seems to be

17:23

disrupting this current so as a result

17:26

less warm water is being transported nor

17:28

North and that's why we have this cold

17:31

blop that scientists have noticed in the

17:33

North Atlantic that's right and do we

17:35

know what would happen if the current

17:37

collapsed today so the best source of

17:40

information we have about what happens

17:42

when amok collapses comes from about

17:45

12,800 years

17:47

[Music]

17:48

ago which is as far as scientists know

17:51

the last major time this happened

17:53

basically the climate changed really

17:55

really quickly at least by geological

17:58

time it was it was sort of less than 100

18:00

years as far as scientists know much of

18:03

the northern hemisphere got cold

18:05

again the temperature in parts of

18:08

Greenland probably fell by about 18° fah

18:13

forests were replaced by Tundra ice

18:16

sheets grew

18:18

again as far away as California and the

18:21

southwestern us you had evidence of

18:24

cooler drier conditions and as far as

18:27

scientists can tell this may even have

18:29

contributed to The Disappearance of some

18:32

of our early hunter gatherer

18:33

civilizations some of our ancestors were

18:36

probably pushing into new territory as

18:39

the aits retreated and were suddenly

18:41

confronted with another blast of

18:49

cold wow okay so the last time this

18:52

happened this current shutdown the world

18:55

was basically plunged into an ice age

18:57

and wiped out part of humanity

18:59

is that the scenario we're looking at

19:01

today I think scientists are careful

19:04

about not being too precise about what

19:06

it would look like if it happened again

19:08

the world after all is still warming and

19:10

so in a lot of ways the climate is

19:12

already quite different from the one

19:15

that was around at the time but

19:17

certainly I think scientists expect

19:19

northern Europe the UK Iceland

19:23

Scandinavia to become a much colder

19:25

place even than it was 200 years ago

19:27

before Industrial Revolution before

19:30

humans started adding greenhouse gases

19:32

to the atmosphere How cold are we

19:34

talking you mentioned the UK I'm in the

19:36

UK right now I mean would Britain

19:39

suddenly look like the frozen tundra it

19:42

would be significantly colder it's far

19:45

north enough to really be almost Arctic

19:48

and I think an amok collapse could bring

19:51

much stronger winter storms deep cold in

19:54

the winter that would be extremely

19:56

dangerous but at the same time that cold

19:59

around the North Atlantic doesn't just

20:01

translate straightforwardly into cold

20:04

everywhere basically if you don't have

20:06

amok you have more heat that stays

20:09

around the tropics and the equator a

20:11

warm ocean around the equator gives the

20:14

fuel to storms around the equator and

20:16

rainfall around the Equator so it's not

20:18

just about getting that warm water from

20:21

the tropics to Europe it's also getting

20:24

that warm water away from the tropics to

20:26

avoid things like extreme weather events

20:29

that's right and it's not just about the

20:30

temperatures people would experience

20:32

it's also about agriculture and

20:35

especially in vulnerable places like

20:37

Africa big shifts in rainfall big shifts

20:39

in temperature could really affect food

20:42

chains Food Supplies our ability to feed

20:45

ourselves and what does that mean for

20:46

humans living in these places like you

20:49

were saying that 13,000 years ago

20:51

northern Europe basically wasn't

20:52

inhabitable

20:53

anymore would humans still be able to

20:55

live in these places we as a

20:58

civilization ation as a species

21:00

obviously have some ability to withstand

21:03

a range of temperatures a range of

21:05

weather conditions but we really haven't

21:08

seen in our recent history at least

21:10

changes as fast as the ones scientists

21:12

imagine anoch collapse would bring it's

21:16

really hard to say is Northern Europe

21:18

ready for a much colder climate than it

21:20

is right now if for instance sea level

21:23

rise accelerates on the east coast of

21:25

the US are cities there prepared that's

21:28

another consequence of amok that

21:30

scientists are worried about and it's

21:32

obviously already happening and you can

21:34

see the effects of seil rise in places

21:36

like the Gulf Coast North Carolina

21:38

Florida even New York but certainly it

21:41

would be a test for countries societies

21:45

around the northern Atlantic that they

21:46

haven't seen before okay that that's a

21:49

very scary Prospect with everything that

21:52

goes with it you know Mass floods and

21:54

displacement of people climate migration

21:56

everything that you can sort of Imagine

22:00

when do scientists predict that this

22:02

could actually happen based on the data

22:05

they have and and assuming of course

22:07

current human behavior and Emissions

22:09

don't change as best of scientists can

22:12

tell right now they know amok is

22:14

weakening they expect it to continue

22:16

weakening whether a collapse is imminent

22:19

whether it's far away is still really

22:22

really hard to say but it couldn't

22:24

quickly be reversed once you sort of

22:26

started on this process the the system

22:29

just keeps moving in that direction like

22:31

a point of no return that's right so if

22:34

we're already seeing signs that this

22:36

current is weakening does that mean

22:39

we're possibly already past that point

22:41

of no return is it no longer a matter of

22:44

if but when the really short answer is

22:47

we just don't know the best guess is

22:50

that it's not going to shut down this

22:52

Century but plenty of scientists are

22:55

worried it's something that a lot of

22:57

them are focused very intensely just

23:00

because we do think the consequences if

23:03

amok did shut down could be so

23:05

catastrophic if that current collapsed

23:08

though like is there anything we could

23:11

do to bring it back like it did come

23:13

back 13,000 years ago after that last

23:16

ice age what happened short answer again

23:20

nobody is quite sure it seems to have

23:23

abruptly grown warm again over 40 50

23:26

years but it's pretty clear why and I

23:30

think as far as what would happen today

23:33

to bring it

23:34

back scientists would still say cutting

23:37

greenhouse gas emissions and preventing

23:40

the planet from overheating is probably

23:42

the only thing we have in our control

23:45

that could influence the climate on that

23:46

scale I mean it's sort of where we land

23:49

at the end of every episode about

23:52

climate change and it's sort of

23:54

interesting I mean probably like a lot

23:55

of people listening to you I find all

23:58

this pretty scary and dystopian and

24:00

worrying it's kind of crazy to think

24:03

actually that scientists have warned

24:05

about this for decades that there was

24:08

even a science fiction movie made 20

24:10

years ago which you know in some ways

24:12

predicted what might be the real

24:14

consequences of this current shutting

24:16

down it's not like we humans lack the

24:18

imagination of like all the terrible

24:20

things we're we're risking here but when

24:22

it comes to protecting ourselves and the

24:25

planet against this existential threat

24:28

we are clearly unwilling to do what it

24:30

takes yeah scientists have been thinking

24:33

about amok and had a pretty good grasp

24:36

of what amok looked like decades ago as

24:38

early as the 80s and 90s scientists made

24:42

this connection between the warming that

24:44

humans were bringing about and

24:47

consequences like an amok collapse and

24:49

other things as

24:51

well it was one of the scientists who

24:54

wrote about amok in the 880s who said

24:56

the climate system is an angry beast and

24:59

we are poking it with sticks and that's

25:02

still true

25:06

today well raymon thank you very much

25:10

thank you

25:13

[Music]

25:23

Katherine we'll be right back

25:29

here's what else you need to know today

25:31

on Monday the judge in Donald Trump's

25:33

hush money trial held the former

25:35

president in contempt for repeatedly

25:37

violating a gag order and threatened to

25:40

jail him the judge told Trump that the

25:42

last thing he wanted to do is to put him

25:44

in jail but at the end of the day he had

25:46

a job to do and would seriously consider

25:48

it and Israel stepped up its attack on

25:52

the southern city of Rafa in Gaza hours

25:56

after Hamas said it was ready to accept

25:57

a cease by a proposal The Proposal was

26:00

put forward by Egyptian and Qatari

26:02

mediators but Israel responded by saying

26:05

that it failed to meet its demands the

26:07

prime minister's office said it would

26:09

still send a delegation to talk about

26:11

how to reach an acceptable

26:16

deal today's episode was produced by

26:18

Carlos prto Michael Simon Johnson Alex

26:21

Stern and Diana win it was edited by

26:24

Devon Taylor contains original music by

26:26

Rowan neimo and Mar Lozano our theme

26:29

music is by Jim brunberg and Ben

26:31

lansberg of

26:35

wanderly that's it for the daily I'm

26:38

Katherine benold see you tomorrow

26:42

[Music]