The Washington Post

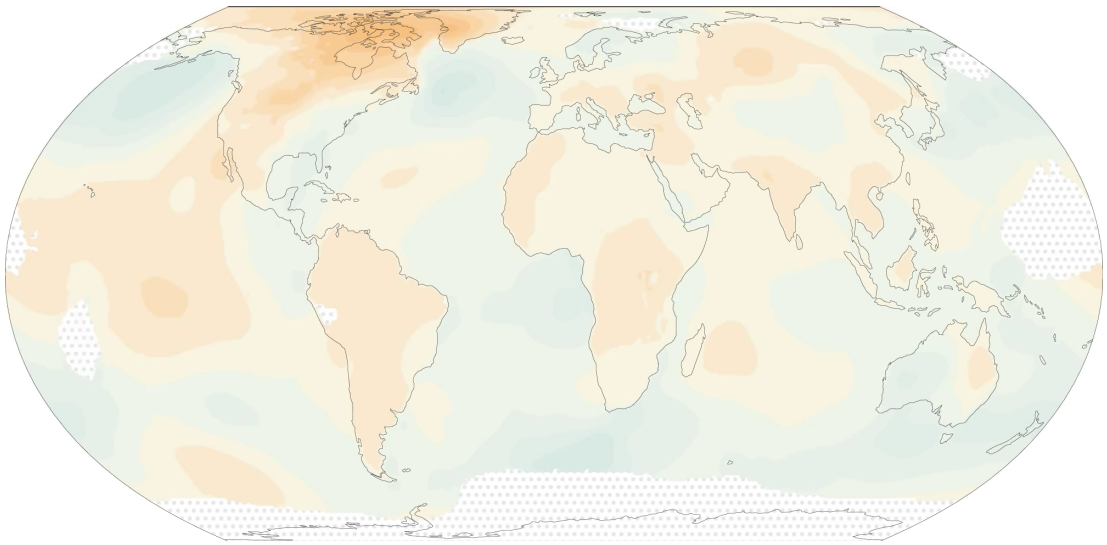
2°C: Beyond the limit

Extreme climate change has arrived in America

Dangerous new hot zones are spreading around the world

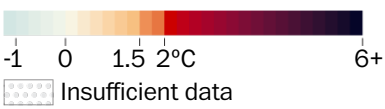
2°C: BEYOND THE LIMIT

Dangerous new hot zones are spreading around the world



2018

Five-year average of temperature change compared with late 1800s Replay



By Chris Mooney and John Muyskens | Photos and videos by Carolyn Van Houten

SEPT. 11, 2019

LA CORONILLA, Uruguay — The day the yellow clams turned black is seared in Ramón Agüero's memory.

It was the summer of 1994. A few days earlier, he had collected a generous haul, 20 buckets of the thin-shelled, cold-water clams, which burrow a foot deep into the sand along a 13-mile stretch of beach near Barra del Chuy, just south of the Brazilian border. Agüero had been digging up these clams since childhood, a livelihood passed on for generations along these shores.

But on this day, Agüero returned to find a disastrous sight: the beach covered in dead clams.

An empty yellow clamshell rests on the beach in Barra del Chuy, Uruguay. Clam harvests have plunged 95 percent from the peak of 220 tons in 1985 as ocean temperatures have warmed.

"Kilometer after kilometer, as far as our eyes could see. All of them dead, rotten, opened up," remembered Agüero, now 70. "They were all black, and had a fetid odor."

He wept at the sight.

The clam die-off was an alarming marker of a new climate era, an early sign of this coastline's transformation. Scientists now suspect the event was linked to a gigantic blob of warm water extending from the Uruguayan coast far into the South Atlantic, a blob that has only gotten warmer in the years since.

Click any temperature underlined in the story to convert between Celsius and Fahrenheit

The mysterious blob covers 130,000 square miles of ocean, an area nearly twice as big as this small country. And it has been heating up extremely rapidly — by over 2 degrees Celsius — or 2C — over the past century, double the global average. At its center, it's grown even hotter, warming by as much as 3 degrees Celsius, according to one analysis.

The entire global ocean is warming, but some parts are changing much faster than others — and the hot spot off Uruguay is one of the fastest. It was first identified by scientists in 2012, but it is still poorly understood and has received virtually no public attention.

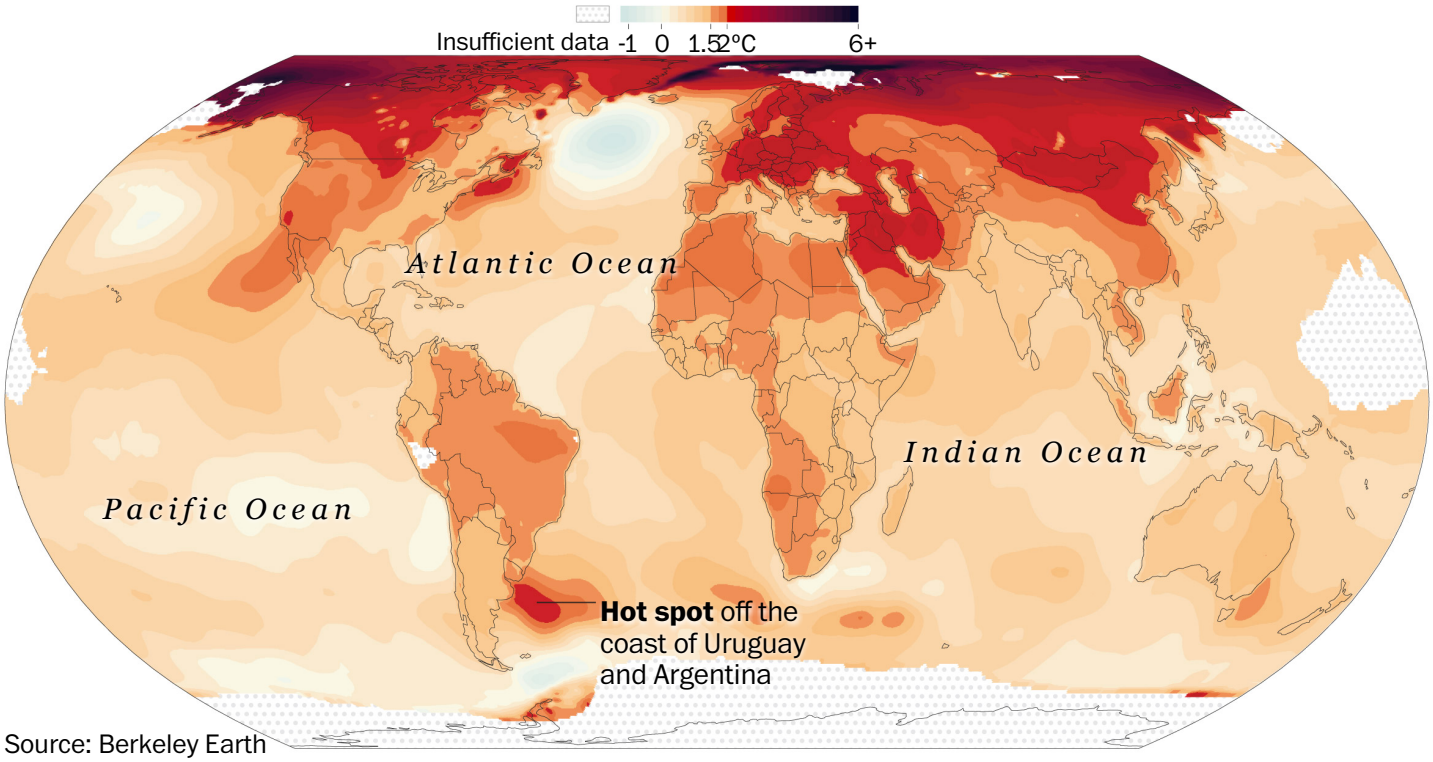
What researchers do know is that the hot zone here has driven mass die-offs of clams, dangerous ocean heat waves and algal blooms, and wide-ranging shifts in Uruguay's fish catch.

The South Atlantic blob is part of a global trend: Around the planet, enormous ocean currents are traveling to new locations. As these currents relocate, waters are growing warmer. Scientists have found similar hot spots along the western stretches of four other oceans — the North Atlantic, the North Pacific, the South Pacific, and the Indian.

A Washington Post analysis of multiple temperature data sets found

numerous locations around the globe that have warmed by at least 2 degrees Celsius over the past century. That's a number that scientists and policymakers have identified as a red line if the planet is to avoid catastrophic and irreversible consequences. But in regions large and small, that point has already been reached.

Temperature change, 2014-2018 compared with 1880-1899



Source: Berkeley Earth

This map, using data from Berkeley Earth, shows how the temperature average of the last five years compares with 1880-1899.

The Post analyzed four data sets, and found: Roughly one-tenth of the globe has already warmed by more than 2 degrees Celsius, when the last five years are compared with the mid- to late 1800s. That's more than five times the size of the United States.

warmed by 1.5 degrees Celsius, a point at which scientists say the impacts of climate change grow significantly more intense.

The fastest-warming zones include the

Arctic, much of the Middle East, Europe and northern Asia, and key expanses of ocean. A large part of Canada is at 2C or higher.

Read the full methodology

Some entire countries, including Switzerland and Kazakhstan, have warmed by 2C. Austria has said the same about its famed Alps.

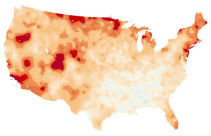
The percentage of the globe that has exceeded 2C varies depending on the time periods considered. Over the past five years, 8 to 11 percent of the globe crossed the threshold, The Post found, while over the past 10 years, the figures drop slightly to between 5 and 9 percent. Considering just the past five years increases the area by roughly 40 percent.

These hot spots are the scenes of a critical acceleration, places where geophysical processes are amplifying the general warming trend. They unveil which parts of the Earth will suffer the largest changes.

Extreme warming is helping to fuel wildfires in Alaska, shrink glaciers in the Alps and melt permafrost across Canada's Northwest Territories. It is altering marine ecosystems and upending the lives of fishermen who depend on them, from Africa to South America to Asia.

It is making already hot places in the Middle East unbearable for outdoor workers and altering forests, lakes and rivers in the United States. It has thawed the winters of New England and transformed the summers of Siberia.

MORE FROM 2° C: BEYOND THE LIMIT



Extreme climate change has arrived in America →

For Uruguay, a small and politically liberal country of fewer than 4 million, the key vulnerability is in the oceans.

Uruguay is famous for its laid-back former president, who lived on a humble flower farm rather than at the mansion occupied by his predecessors, as well as its cattle and sheep, which outnumber Uruguayans by a factor of six. But it's also known for its tourism and beaches.

A yellow clam on the beach in Barra del Chuy, Uruguay.

Nearly half of Uruguayans live in the coastal megacity of Montevideo. Meanwhile, international tourists flock to the beaches of Punta del Este, a stylish resort where a major Trump Organization property, the Trump Tower Punta del Este, is under construction.

But waters have warmed by 1 degree Celsius in just 20 years in the estuary of the Rio de la Plata, where the vast river spills into the ocean, and in the common offshore fishing area shared by Uruguay and Argentina. That is a very fast change in a very short time.

In 2017, a record-setting ocean heat wave caused mass fish die-offs and a dangerous algal bloom, forcing beach closures in Montevideo. Such events are becoming more common and more severe. What the clammers along the coast near Brazil experienced decades ago is spreading and becoming harder to ignore.

The peak of the 2017 ocean heat wave: Feb. 25

Source: Robert Schlegel, Ocean Frontier Institute

Uruguay is trying to help them, but that effort underscores the possibilities — and the limits — of adapting to extreme climate change.

‘The new normal’

Over the past five years, Earth has passed a significant threshold. The planet is now more than 1 degree Celsius warmer than it was in the mid- to late 1800s, before industrialization spread across the world.

The Post’s analysis relied upon four separate temperature records from the U.S. government and scientific researchers. Variations in the data sets themselves, and how they were analyzed, produce somewhat different assessments of the extent of the planet that has warmed by 2C.

Because the Earth goes through a number of natural cycles, climate scientists consider long periods, of multiple years, to analyze temperature change. The Post’s analysis considered two “preindustrial” periods — the 50 years from 1850 to 1899 and the 20 years from 1880 to 1899.

[Six takeaways from The Post’s analysis of the globe’s fastest-warming areas]

It also considered two end periods, the past five years and the past 10, which were compared with the two preindustrial periods to determine the amount of warming that has taken place.

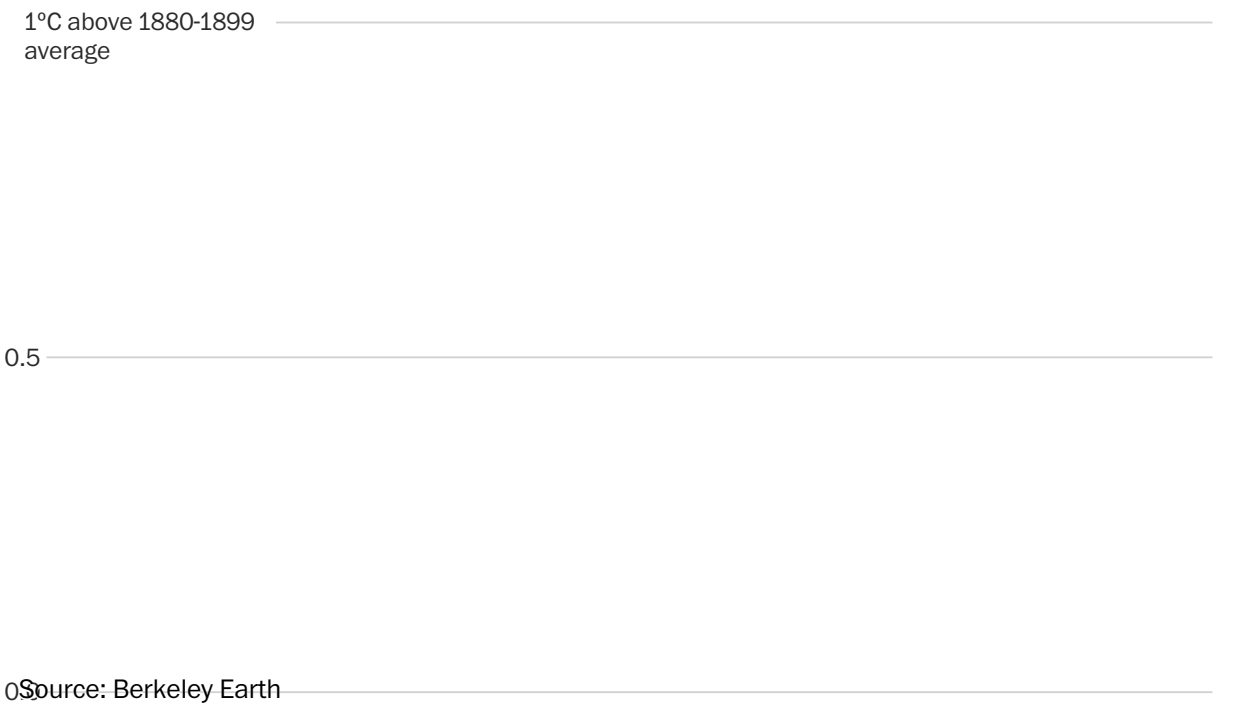
The past five years are by far the hottest — and display the most numerous and expansive 2C hot spots. And while five years may be a brief period in climatic terms, 2019 is already following the same ultrawarm pathway.

Barring some dramatic event like a major volcanic eruption — which can cause temporary global cooling by spewing ash that blocks the sun — scientists expect this to continue and steadily worsen.

“We’re not going to really cool down much in the future, so the last five years are indicative of the new normal,” said Zeke Hausfather, a researcher with Berkeley Earth, which produces one of the data sets The Post

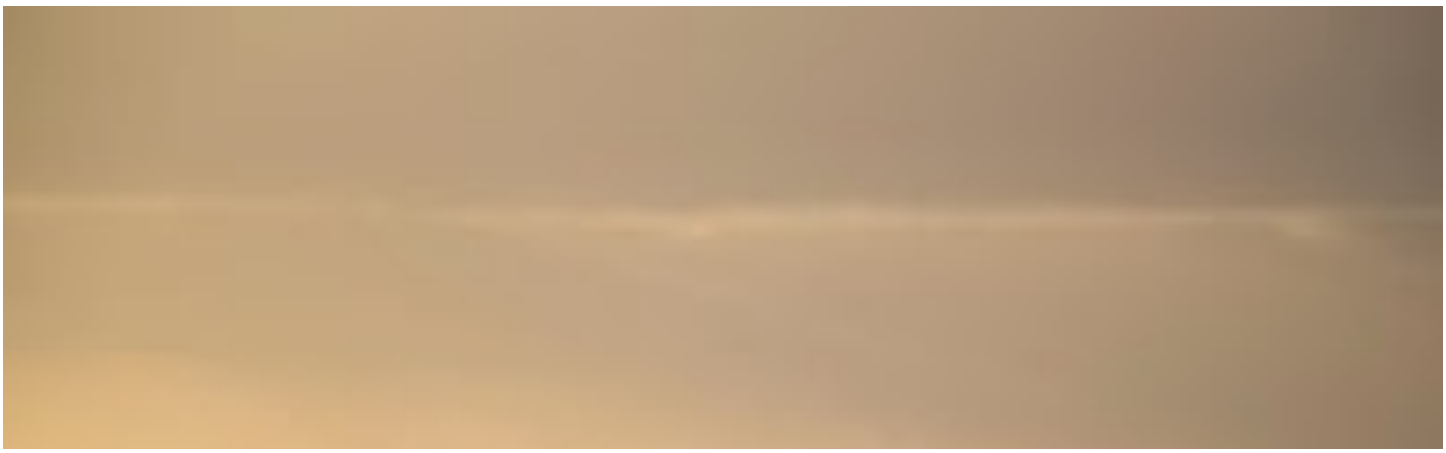
analyzed.

The rise in average global temperatures



While the global data sets do not agree about what is happening to every stretch of the Earth, they show unmistakable patterns.

For instance, an intriguing group of ocean hot spots appears again and again. One cause? The tropics are expanding.



A giant hot zone miles offshore from the beach in Barra del Chuy is transforming fisheries and a way of life for Uruguayan clammers.

Jose Rocha at his home in La Coronilla, Uruguay. He and his family dig for yellow clams in Barra del Chuy.

The quiet beach town of Barra del Chuy, just south of the Brazilian border, supplies clams to restaurants in Uruguay's tourist meccas.

Straddling the equator, the tropics are already hot because they receive the most sunlight. As the sun hits the tropics, enormous columns of air rise skyward and then outward. But as greenhouse gases trap more heat, those columns of air are pushed farther toward the north and south poles.

Air that rises in the tropics falls back down over the middle latitudes. With a warming planet, though, the air is falling in different places.

One region where that air sinks is the South Atlantic Ocean, where the tropical expansion has led to a southward shift in the location of a gigantic counterclockwise circulation of winds. These winds, in turn, drive key ocean currents, including a warm, salty, 60-mile-wide stream called the Brazil Current, which is being pushed even farther south.

Near Uruguay, the Brazil Current collides with the cold and nutrient-rich Malvinas Current that flows north from waters off Argentina. Where the two currents meet — what is known as the “confluence” — features sudden

temperature contrasts and fosters rich fisheries.

But that zone, too, is on the move. Research suggests it is shifting southward at a rate of more than 40 miles per decade.

The result has been a stunning temperature change off the Uruguayan coast.

“The southward displacement of warm waters creates a very strong signal,” explains oceanographer Alberto Piola, a professor at the University of Buenos Aires.

The hot spot emerges most dramatically in The Post’s analysis when the most recent five years are compared with the last two decades of the 19th century. By this standard, it has only recently crossed the 2C threshold.

In 2012, scientists first flagged it as one of the ocean’s fastest-warming stretches. And they’ve attributed the changes to a broad global pattern that can’t be explained just by natural climate variability.

Some other analyses suggest that a tremendous amount of change has occurred here since the late 19th or early 20th century.

Gerrit Lohmann and Hu Yang, climate scientists with the Alfred Wegener Institute in Germany, examined the Brazil Current region following an inquiry from The Post.

They found a warming of between 2 and 3 degrees Celsius between 1900 and 2018, with the warmest regions located farther offshore, according to a high-resolution data set of sea surface temperatures from the Hadley Center in Britain.

‘It wasn’t that way before’

Ramón Agüero was about 6 years old when his parents taught him and his younger brother Arturo how to dig for clams. The brothers learned to read the weather and the tides to find the richest lodes, which they collected with shovels and buckets.

Later, as the brothers grew up, it became their work as well — work that disappeared when the government banned clamming after the 1994 die-off.

Scientists Omar Defeo, left, and Diego Lercari, second from right, listen as brothers Ramón, center, and Arturo Agüero talk about learning to gather clams, at their home near Barra del Chuy.

Arturo Agüero had five children to feed, and had to move to Montevideo to find work.

“When they shut down the clams, I wanted to die,” he said. “Because that is what I knew how to do. I knew how to work the clams. I knew it all.”

Similar upheaval struck some 100 other clammers, many of whose families had worked these beaches for generations.

Forty years ago, marine biologist Omar Defeo, a professor at the University of the Republic in Uruguay, began studying this fishery. He thought it was a good dissertation topic, so he began making the 200-mile trip from Montevideo out to a region called the Rocha department.

It's a place of endless cattle fields, horseback riders along the highways, and beaches that, unlike in the tourist havens far to the south, are quiet and almost empty.

But then came the huge die-offs, first along the coast of Brazil, then Uruguay and finally Argentina, wiping out clams along each coastline. Defeo's research became much more urgent.

Yellow clams pile up in Monte Hermoso, Argentina, in November 1995, when huge numbers of them died. (Sandra Fiori)

"In a process of more or less 10 years, the mass mortalities destroyed the populations of yellow clam," said Defeo, who has made about 200 trips to the beaches at Barra del Chuy.

In 2008, the fishery finally reopened after a 14-year hiatus, but for an extremely small catch — just three tons. The most recent year's allowed catch was only 10 tons — a decline of 95 percent from the peak of 220 tons in 1985.

Over decades of research, Defeo and his colleagues have chronicled the species' downfall amid warming waters: The clams are now much smaller, rarer and increasingly contaminated by toxic red tides — making them unsafe to eat for weeks at a time. The red tides, in turn, are worsened by climate change, scientists say.

What's more, the Rocha beaches are crawling with more tropical species, including crabs and smaller kinds of clams attracted to the warmer waters.

Jose Rocha, center, and his family hunt for clams in Barra del Chuy.

Eduardo Rocha, 5, plays near Jose Rocha's home in La Coronilla.

Jose Rocha, 68, naps after gathering yellow clams in the Uruguayan heat. After the decline of the clam population, he started a home bakery, and he wakes at 3 a.m.

The upheaval matches a key prediction of climate science.

When temperatures rise 1.5 to 2 degrees Celsius for the globe, according to a recent report by the United Nations Intergovernmental Panel on Climate Change, one of the most severely affected ocean animals will be bivalve species — clams, oysters, mussels and their relatives. Above 1.8 degrees Celsius or so, they face "very high risks" of population decline if not extinction, the report said.

That's the sort of biological wreckage that has shown up along the beaches at Barra del Chuy.

For the fishers who remain, even gathering the small numbers of clams that they're allowed to take has gotten tougher.

On an early April day — fall in the Southern Hemisphere — driving winds from the south pushed the waves more than a football field's length inland over the gently sloping beach. For Maria Celia Pereyra Ambrossi, there was no way to pursue her catch. The clams, which are hard to find even on a good day, were all underwater.

"The wind in this area of the beach is always strong, and each passing year, it is stronger," said Pereyra Ambrossi, her silver hair whipped in all directions. "It wasn't that way before."

The sun sets on the beach in Barra del Chuy, Uruguay.

Two days later, the weather had finally calmed, and the ocean had given

back much of the beach.

Jose Rocha, 68, and four other family members packed into an old red Volkswagen Golf and drove straight out onto the sand. Barefoot, Rocha walked along the shoreline, dragging his rusty shovel behind him until he found a promising spot to dig.

But the clams were sparse, and only about four pounds were gathered. After about an hour, Rocha stopped and rolled a cigarette as he leaned against the hood of his car.

“We are in a time — I do not know what’s happening — where the climate is not the same,” Rocha said. “The climate is not the same anymore.”

To Maria Celia Pereyra Ambrossi, changing winds and tides are to blame for declining clam populations in Barra del Chuy.

Jose Rocha and his daughter Silvia Marlene Rocha take a shovel to the beach in search of clams.

Rocha examines a clam he dug from the beach. The clams burrow as deep as a foot into the sand.

‘A delicate situation’

Government regulators, academics like Defeo and the fishers themselves have hatched a plan to leverage the shrinking supply of the yellow clam.

“The strategy is to catch low numbers of clams, because the stock is very reduced, to sell with a good price to restaurants and just to have this low number of fishers,” Defeo said.

The clams are commanding prices nearly double what they were just six years ago, thanks to increasing restaurant demand.

In recent years, the clam has been marketed at high-end restaurants in the tourist meccas of Punta del Este and José Ignacio, about 100 miles down the coast from Barra del Chuy. It’s become part of a trend to alter the Uruguayan diet, heavy on beef, toward healthier and locally gathered food.

The first to serve the yellow clam was Lo de Tere in Punta del Este, one of Uruguay’s most popular tourist spots. Just steps from the harbor, it serves only Uruguayan food gathered within about 100 kilometers (62 miles).

On a recent visit, chef Nicolas Larrosa pulled several live clams out of a tub of seawater to display them before cooking. As he lifted one up, it sprayed water on the kitchen floor from both of its siphons, the tubelike structures used to filter seawater and gather nutrients.

Larrosa filled a frying pan with oil and garlic before adding the clams, still

in their shells. After the frying, he sprinkled a bit of parsley. It's simple — and that's the point.

Once used mostly for bait, yellow clams are now served at high-end restaurants.

"People have discovered this. And they are addicted," said Eduardo Marfetán, who owns the restaurant with his wife and daughter. "I have one client, from Buenos Aires, he calls me, before he comes to Punta Del Este, he says, 'You have clams?' "

Most of the time, the answer is no. The clams are never on the menu, Marfetán said. They are a special sold only when the restaurant has them in stock.

The deliveries arrive from Nancy Schuch and her husband, Gabriel Rocha, who buy them from the clammers off the beach. She moves the clams through a small beachside processing plant — the first of its kind in this industry. It is this innovation, paired with a marketing campaign aimed at restaurants, that has led to a new commercial life for the clam.

Plans are afoot for an even larger plant. Schuch and Javier Vitancourt, the plant's veterinary technician, hope to create a more state-of-the-art facility that will also be open to the public, who would be able to try the clams at any time.

That is, if the climate allows it.

Schuch said the clams — and the business — will be okay in the long term. "I'm positive," she said.

Defeo, though, takes a cautious tone about the future.

"The resource is in a delicate situation," he said. "The stock has not been recovered, and we need to monitor the fishery constantly just to provide early warnings."

At the beachside processing plant she owns with her husband, Nancy Schuch buys clams and cleans them before selling them to restaurants.

Yellow clams await processing at the plant.

Nicolas Larrosa plates an order of yellow clams at Lo de Tere restaurant. The chef fries them in oil and garlic, and sprinkles them with parsley.

‘A no-analog world’

When it comes to the effects of climate change in the South Atlantic, the clams are only the beginning.

Ocean life is exquisitely sensitive to temperature. In July, Defeo and his student Ignacio Gianelli published a study demonstrating for the first time that the entire Uruguayan fish catch is shifting toward more tropical, warm-water species.

Andrés Domingo, the director of Uruguay’s national oceans and fisheries agency, is worried about the changing currents.

“These conditions probably have a lot of impact on ecosystem ecology,” he said.

Harvests of the Argentine hake, traditionally the largest fish catch in Uruguay, have plummeted. The hake is a cold-water species, so it may be fleeing the warming waters. Yet given that the species has also been overfished, it's hard for scientists to attribute the changes exclusively to warming.

Patagonia has experienced an utterly opposite trend — a dramatic explosion in the catch of Argentine red shrimp. The catch has grown from a little over 40,000 tons in 2006 to a record of 230,000 tons in 2017.

Bárbara Franco, who studies fisheries and climate change at the University of Buenos Aires, said the temperature measurements in the deeper ocean waters along Patagonia are too spotty to attribute the shrimp boom to climate change.

Signs of erosion are evident on the beach near the Brazilian border.

Climate change can make for winners and losers, especially when it comes to fisheries. Along the U.S. coast, fast-warming waters drove lobsters away from southern New England and into the Gulf of Maine, leading to crashing fisheries in one spot and a boom in another. That could be happening here, too.

Still, the overall consequences of these oceanic changes are likely to be negative, Franco said. Fisheries in Uruguay and Brazil are projected to decline by more than a quarter by the end of the century.

That could mean major harm to any number of small-scale fisheries, far beyond the community that gathers the yellow clam. According to the United Nations' Food and Agriculture Organization, workers in these smaller, often local and subsistence-driven fisheries account for 90 percent of all fishery workers around the globe, largely in developing countries. In many cases, they are earning the equivalent of less than $1 per day.

Scientists say they are struggling to keep up with the impacts of a warming world, whether measuring changes in the Arctic or disappearing kelp forests in the southern Pacific.

"We're really playing catch-up," said marine scientist Boris Worm of Dalhousie University in Canada. "Everything we base our civilization on is based on the accumulated experience from the last 7,000 years, about how the world works, and how we can survive in this world that had an exceptionally stable climate.

"And we're shifting away from that equilibrium at breakneck speed now. We're living in a no-analog world that none of us has any experience with."

Brady Dennis contributed to this report.

Methodology

The Post analyzed four global temperature data sets to determine how much of the globe has already warmed above 2 degrees Celsius.

The data sets considered were from NASA, NOAA, Berkeley Earth and the scholars Kevin Cowtan and Robert Way (because their data set includes more extensive coverage of the Arctic than the U.K. Hadley Center's data set). In addition, Karsten

Haustein of Oxford University created an additional data set at our request that averages together Berkeley Earth, NASA, and Cowtan and Way from 1850 to the present. We used this data set as well. Data from Berkeley Earth was downloaded on April 16; Karsten Haustein on April 25; NASA on June 14; NOAA on Aug. 1 and Cowtan & Way on Aug. 26.

Each data set divides the globe into a grid of cells and provides a series of monthly temperature observations for each, going back to the 19th century.

Period-based approach

Our first task was to identify a baseline period representing the time before fossil fuel burning led to the major alteration of the atmosphere — the so-called "preindustrial period." For the NASA and NOAA data sets, which date back to 1880, we used the 20-year period from 1880 to 1899. The Berkeley Earth and Cowtan and Way data sets go back to 1850, so we used the 1850-1899 period as a second baseline.

We then calculated how much the annual temperature average for each subsequent year differed from the two preindustrial baseline averages. These departures from the average are referred to as "temperature anomalies" by climate scientists.

Next, we sought to capture the current climate. To do so, we averaged several years of recent temperature anomalies together to account for weather and natural climate variability, using both five-year and 10-year periods. The maps show averages of the most recent five years (2014 to 2018) using data from Berkeley Earth. We then calculated the percentage of the globe's area that exceeded a rise of 2 degrees Celsius (3.6 degrees Fahrenheit). For mapping purposes, the resolution of the data was increased using bilinear interpolation.

Here are the results:

When the most recent 10 and five years are compared with the 1880-1899 average

	% of globe above 2°C			Above 1.5°C	
	10-year	Five-year		10-year	Five-year
Cowtan & Way	8.5%	10.8%	Cowtan & Way	17.9%	20.5%
Berkeley Earth	7.1%	9.6%	Berkeley Earth	18.0%	22.5%
NASA GISTEMP	7.2%	10.0%	NASA GISTEMP	15.3%	17.4%
Karsten Haustein	7.3%	10.4%	Karsten Haustein	17.6%	20.5%
NOAA GlobalTemp	4.8%	6.5%	NOAA GlobalTemp	10.6%	12.5%

When the most recent 10 and five years are compared with the 1850-1899 average

	% of globe above 2°C			Above 1.5°C	
	10-year	Five-year		10-year	Five-year
Cowtan & Way	7.3%	10.2%	Cowtan & Way	15.9%	19.3%

	% of globe above 2ºC			Above 1.5ºC	
	10-year	Five-year		10-year	Five-year
Berkeley Earth	5.3%	7.7%	Berkeley Earth	16.1%	20.4%
Karsten Haustein	6.4%	9.2%	Karsten Haustein	16.7%	20.5%

The data sets from Berkeley Earth, NASA and NOAA do not have data for the whole globe for the entire time period, particularly the very earliest years. To account for that, we discounted cells that were missing data for more than half of the years in a given period.

While the table includes numbers based on NOAA GlobalTemp, that data set does not cover much of the Arctic, where the fastest warming is occurring. For that reason, The Post did not include NOAA in calculating the percentage of the Earth above 2C.

Linear regression approach

In our previous story, which examined 2C regions within the United States, we used linear regression to calculate annual mean temperature trends from 1895 to 2018.

That story used a separate, higher-resolution and exclusively U.S.-focused data set, which is why it found hot spots that do not necessarily appear in the global data sets. That U.S. data only went back to 1895, whereas the global data covers many more years in the pre-industrial era. For this reason, The Post's global analysis used the period-based approach, which several experts said they preferred over the linear regression analysis. Here are the results from the linear regression analysis:

	% of globe above 2ºC			Above 1.5ºC	
	1880-2018	1895-2018		1880-2018	1895-2018
Cowtan & Way	6.9%	5.7%	Cowtan & Way	15.4%	13.9%
Berkeley Earth	6.4%	4.3%	Berkeley Earth	16.5%	14.1%
NASA GISTEMP	8.4%	6.1%	NASA GISTEMP	18.4%	16.2%
Karsten Haustein	6.6%	4.6%	Karsten Haustein	15.3%	13.6%
NOAA GlobalTemp	6.8%	5.6%	NOAA GlobalTemp	15.6%	13.1%

Uruguay hot spot

Our method also allowed us to analyze how the hot spot off the coasts of Uruguay and Argentina varies in its level of warming depending on the different scenarios considered. In all the data sets, at least part of the hot spot exceeds 2C when 2014-2018 is compared with 1880-1899. Linear trends beginning in 1880 and 1895 also often detect 2C of warming in the region.

However, analyses that start with the 1850-1899 period or end with the 2009-2018 period often do not. The region is still very warm and usually shows higher than 1.75C of warming.

Credits

Project and story editing by Trish Wilson. Graphics editing by Monica Ulmanu. Design and development by Madison Walls. Copy editing by Wayne Lockwood. Photo editing and research by Karly Domb Sadof. Project management by Julie Vitkovskaya. Digital Operations by Sarah Dunton and María Sánchez Díez. Additional work by Chris Alcantara.

Chris Mooney

Chris Mooney covers climate change, energy, and the environment. He has reported from the 2015 Paris climate negotiations, the Northwest Passage, and the Greenland ice sheet, among other locations, and has written four books about science, politics and climate change.

John Muyskens

John Muyskens is a graphics editor at the Washington Post specializing in data reporting.

Carolyn Van Houten

Carolyn Van Houten is a staff photojournalist at the Washington Post. Previously, she worked at the San Antonio Express-News and held internships at National Geographic, The Tampa Bay Times, and The Chicago Tribune, among others. She studied journalism at the University of North Carolina at Chapel Hill.

2.1k Comments

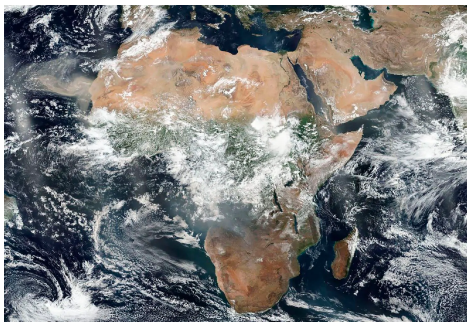
More stories

Here's how the hottest month in recorded history unfolded around the world

The record warm July left its mark on people and the ecosystems they depend on. "This is not your grandfather's summer," said U.N. Secretary General António Guterres.

We're at the peak of the global fire season

According to an analysis of NASA data, the global fire season peaks every year in July and August.



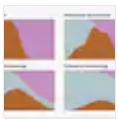
Gone in a generation: Across America, climate change is already disrupting lives.

The continental United States is 1.8 degrees Fahrenheit warmer than it was a century ago. Seas around the coasts are nine inches higher. Damage is mounting because of these fundamental changes, and Americans are living it.

Most Read

1 Everything you need for the return of travel 

2 What you need to know about the coronavirus variants 

3 Why outbreaks like coronavirus spread exponentially, and how to 'flatten the curve' 

4 Things that matter, in the words of Charles Krauthammer 

5 How epidemics like covid-19 end (and how to end them faster) 

Follow Post Graphics

Twitter | Facebook | Tumblr

Terms of use