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In the Peruvian jungle, could there really be a boiling river

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00:00:05,000 --> 00:00:07,000

that kills on contact?

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00:00:07,000 --> 00:00:12,000

I'm sitting here thinking, holy cow, this thing is a mix.

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00:00:12,000 --> 00:00:15,000

Will the identification of an unknown sailor

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00:00:15,000 --> 00:00:19,000

reveal what happened in Australia's biggest naval disaster?

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00:00:19,000 --> 00:00:23,000

This is the only body to be recovered from the tragedy.

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00:00:25,000 --> 00:00:28,000

And has a dark secret been concealed from the world

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00:00:28,000 --> 00:00:30,000

on this Caribbean wreck.

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00:00:30,000 --> 00:00:33,000

It's highly probable that the owners of this wreck

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00:00:33,000 --> 00:00:35,000

did not want it to be found.

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00:00:39,000 --> 00:00:43,000

The underwater realm is another dimension.

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00:00:43,000 --> 00:00:47,000

It's a physically hostile place

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00:00:47,000 --> 00:00:52,000

where dreams of promise can sink into darkness.

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00:00:52,000 --> 00:00:56,000

I'm Jeremy Wade, and I'm searching the world

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00:00:56,000 --> 00:01:00,000

to bring you the most iconic and baffling underwater mysteries

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00:01:00,000 --> 00:01:02,000

known to science.

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00:01:02,000 --> 00:01:06,000

The vast majority of our ocean is unobserved,

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00:01:06,000 --> 00:01:08,000

unmatched and unexplored.

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00:01:08,000 --> 00:01:14,000

It's a dangerous frontier that swallows evidence.

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00:01:14,000 --> 00:01:16,000

You have nowhere to run.

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00:01:16,000 --> 00:01:19,000

Where unknown is normal.

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00:01:19,000 --> 00:01:23,000

And understanding is rare.

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00:01:35,000 --> 00:01:39,000

In the Gulf of Mexico, an estimated 4,000 shipwrecks

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00:01:39,000 --> 00:01:41,000

litter the sea floor.

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00:01:41,000 --> 00:01:46,000

Intuned inside are countless secrets from America's past.

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00:01:47,000 --> 00:01:51,000

The remains of a 19th century ship found near the Mexican coast

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00:01:51,000 --> 00:01:54,000

are rumoured to have a sinister history.

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00:01:54,000 --> 00:01:57,000

And if true, this will shock the world.

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00:02:00,000 --> 00:02:04,000

2017, in the small coastal town of Citaltepec, Mexico,

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00:02:04,000 --> 00:02:08,000

a local fisherman leads a team of archaeologists

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00:02:08,000 --> 00:02:12,000

to a mysterious wreck two miles offshore.

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00:02:12,000 --> 00:02:14,000

As with much maritime archaeology,

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00:02:14,000 --> 00:02:17,000

we're often guided by local knowledge,

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00:02:17,000 --> 00:02:20,000

and that's absolutely the case here.

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00:02:20,000 --> 00:02:25,000

Some fishermen in Cisal have known about this wreck for generations,

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00:02:25,000 --> 00:02:29,000

and rumours suggest the ship has a shady past.

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00:02:29,000 --> 00:02:33,000

There were rumours that this ship was conducting some sort of illegal activity,

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00:02:33,000 --> 00:02:37,000

perhaps transporting the most heinous of cargoes.

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To uncover the truth, archaeologists from Mexico's Institute of Anthropology and History

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00:02:43,000 --> 00:02:46,000

start looking for clues.

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00:02:46,000 --> 00:02:50,000

When they were first examining it, they didn't know what they were looking at.

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00:02:50,000 --> 00:02:55,000

The remains were scattered over an area of half a mile squared.

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00:02:55,000 --> 00:03:02,000

The team use a portable magnetometer that can detect metal from nearly 1,500 feet away.

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00:03:02,000 --> 00:03:05,000

This ship had a wooden hull.

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00:03:06,000 --> 00:03:10,000

It's got the paddle wheel and a boiler.

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00:03:10,000 --> 00:03:13,000

The archaeologists find elements of the propulsion system,

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00:03:13,000 --> 00:03:16,000

including the rocker arm that helps power the paddle wheel.

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00:03:16,000 --> 00:03:23,000

These specific features reveal that this is a vessel from a narrow slice of maritime history,

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00:03:23,000 --> 00:03:26,000

a side paddle steamer.

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00:03:26,000 --> 00:03:30,000

Steamers transported mail and cargo across the Atlantic to the Caribbean

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00:03:30,000 --> 00:03:33,000

from the 1840s until the 1870s.

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00:03:33,000 --> 00:03:38,000

All the original components were found, but that only tells us the type of ship.

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00:03:38,000 --> 00:03:41,000

That doesn't tell us which ship.

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00:03:41,000 --> 00:03:44,000

Then the divers get a lucky break.

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00:03:44,000 --> 00:03:49,000

Hidden in the sand, they uncover several pieces of cutlery,

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00:03:49,000 --> 00:03:55,000

and they're stamped with a name, Zangranese Brothers and Company.

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00:03:55,000 --> 00:03:59,000

Slowly, the pieces of the story come together.

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00:03:59,000 --> 00:04:07,000

This is a really, really critical find, as it's a really key emblem of who it was owned by.

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00:04:07,000 --> 00:04:13,000

The Zangranese family operated side paddle steamers across the Atlantic from Europe

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00:04:13,000 --> 00:04:19,000

and around the Caribbean, trading in commodities like sugar and natural fibers.

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00:04:19,000 --> 00:04:23,000

They were given literally carte blanche to do a lot of trade.

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00:04:23,000 --> 00:04:27,000

Their reputation was relatively stellar.

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00:04:27,000 --> 00:04:34,000

Searching for more clues about the wreck, the team delved deeper into the history of the Zangranese family.

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00:04:34,000 --> 00:04:38,000

Once you begin looking into the commerce and the company,

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00:04:38,000 --> 00:04:42,000

then the documents literally begin to come out of the woodwork.

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Through detailed analysis, investigators were able to determine that this was the wreck of La Union.

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La Union was one of two side paddle steamers owned by the Zangranese family.

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It sank in 1861.

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But the team's investigation reveals much more about this merchant ship,

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00:05:05,000 --> 00:05:09,000

which has been hidden for more than 150 years.

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00:05:09,000 --> 00:05:15,000

It's highly probable that the owners of this wreck did not want it to be found.

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00:05:15,000 --> 00:05:19,000

The Zangranese family had free reign on the high seas.

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00:05:19,000 --> 00:05:24,000

Their trade unchecked and inhumane.

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00:05:24,000 --> 00:05:32,000

La Union stopped on one of its voyages just a year before it sank in 1860,

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00:05:32,000 --> 00:05:36,000

and it had a slave labor cargo onboard.

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00:05:36,000 --> 00:05:40,000

There were at least 30 slaves on this ship, including children.

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00:05:40,000 --> 00:05:44,000

One was as young as 12 months old.

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00:05:44,000 --> 00:05:50,000

The documentation is clear. The Zangranese brothers were engaged in human trafficking.

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La Union was a slave ship.

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00:05:56,000 --> 00:06:05,000

But slavery had been illegal in Mexico since the 1820s, 32 years before the sinking of La Union.

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00:06:05,000 --> 00:06:09,000

So what was a slave ship doing sailing from Mexico?

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00:06:09,000 --> 00:06:14,000

And we have evidence of shipwrecks which were part of the Atlantic slave trade.

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But this is a different kind of network. We're seeing something new.

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Further investigation of historical records reveals something startling.

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The enslaved people aboard were Maya, indigenous Mexicans.

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00:06:31,000 --> 00:06:36,000

This is the first Mayan slave ship ever discovered.

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00:06:36,000 --> 00:06:43,000

So where was this human cargo being taken when slavery was illegal in their homeland?

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The answer may lie in Mexico's troubled past.

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00:06:48,000 --> 00:06:56,000

The War of the Castas was one that basically persisted from about 1847 till 1901.

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00:06:56,000 --> 00:07:04,000

This caste war pitted the wealthy European Mexicans, the Yucatecos, against the more modest and traditional Maya.

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00:07:04,000 --> 00:07:10,000

Those a Maya in the northern Yucatan found themselves being dispossessed of their land.

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00:07:10,000 --> 00:07:14,000

They were engaged in a rebellion. They were seen as enemy combatants.

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00:07:14,000 --> 00:07:21,000

Did this war provide the Yucatecos with a convenient excuse to banish their Maya enemy?

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00:07:21,000 --> 00:07:30,000

Slavery might have been illegal in Mexico in the 1860s, but elsewhere in the Caribbean it was still thriving.

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00:07:30,000 --> 00:07:33,000

Slavery isn't illegal in Cuba.

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00:07:33,000 --> 00:07:42,000

With their ship La Union, the Sangranese family could take advantage of the demand for slaves on the Cuban sugar plantations.

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00:07:42,000 --> 00:07:47,000

It was a marriage made in hell.

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00:07:47,000 --> 00:07:51,000

The suffering would have begun on board La Union.

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00:07:51,000 --> 00:08:00,000

The Maya were literally being placed in a cargo hold and these were right next to the actual boiler.

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00:08:00,000 --> 00:08:10,000

So they were literally put in harm's way every time they were loaded into these very tight and confined quarters.

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00:08:10,000 --> 00:08:17,000

The discovery of this wreck has, for the first time, revealed a missing chapter from Mexico's past.

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00:08:17,000 --> 00:08:22,000

So why is this immoral trade omitted from the history books?

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We really don't know very much at all about the Mayan slave trade.

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00:08:27,000 --> 00:08:36,000

The Yucatecos who were in charge would have wanted this minimized, so it remained a dirty secret and that went to the bottom of the sea.

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00:08:36,000 --> 00:08:43,000

Archaeologists now know that people were trafficked on board La Union the year before it sank,

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00:08:43,000 --> 00:08:49,000

but they still don't know exactly what happened to the ship on that fated last journey,

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00:08:49,000 --> 00:08:54,000

until the team exploring the wreck uncover new critical pieces of evidence.

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00:08:54,000 --> 00:08:59,000

The firebox has been found in fragments, the chimney's been found in fragments,

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00:08:59,000 --> 00:09:05,000

and there is large chunks of the wreck which have been exposed to intense heat.

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00:09:05,000 --> 00:09:10,000

The charred evidence on the sea floor matches records on land.

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00:09:10,000 --> 00:09:15,000

Just minutes after leaving port, the boiler dramatically explodes.

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00:09:20,000 --> 00:09:24,000

It caused the total destruction of the ship instantaneously.

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00:09:24,000 --> 00:09:31,000

What's still unanswered though is whether human cargo is on board the ship when it explodes.

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00:09:36,000 --> 00:09:44,000

A Mayan slave ship has been identified off the coast of Mexico, the only one ever discovered in the world.

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Evidence on the wreck shows that it exploded, but one question remains,

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00:09:50,000 --> 00:09:57,000

were Maya captives on board when it sank?

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00:09:58,000 --> 00:10:07,000

Records indicate that roughly half of the 80 crew and 60 passengers lost their lives in the explosion.

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00:10:07,000 --> 00:10:11,000

We have no idea what the real death toll was.

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00:10:11,000 --> 00:10:22,000

It was not customary for customs agents and Mexican officials to document this infernal trafficking in human lives.

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00:10:23,000 --> 00:10:32,000

The divers find no human remains, so does this mean this fated journey was without a slave cargo?

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00:10:32,000 --> 00:10:37,000

The ocean may have hidden the true scale of this tragedy.

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00:10:37,000 --> 00:10:43,000

Once you enter the dimension of a very shallow settling of human remains,

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00:10:43,000 --> 00:10:48,000

you're going to see an accelerated decomposition because you'll still have sunlight entering the fray,

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00:10:48,000 --> 00:10:52,000

you'll have oxygen and other factors to contend with.

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00:10:52,000 --> 00:10:59,000

So there's still the possibility that trafficked Maya were on La Union when it sank.

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00:10:59,000 --> 00:11:09,000

And it has since been revealed that up to 20,000 Maya were transported to Cuba on the ships of the Zangronese family.

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00:11:09,000 --> 00:11:13,000

The Maya have always been a proud and noble people.

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00:11:13,000 --> 00:11:20,000

To be enslaved would have been the worst condition for them. This was not the Maya way.

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00:11:20,000 --> 00:11:25,000

The true scale of this industry of terror is yet to be fully uncovered.

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00:11:25,000 --> 00:11:32,000

We're only beginning to understand the extent to which indigenous people from Central America were enslaved.

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00:11:32,000 --> 00:11:40,000

But the secrets that La Union has revealed from its watery grave brings us one step closer to the truth.

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00:11:47,000 --> 00:11:56,000

As I know from my own explorations, the jungle rivers of South America can embody a deadly mix of mystery and danger.

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00:11:56,000 --> 00:12:03,000

And there's one stretch of water that has captured my imagination of mythical boiling river in Peru.

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00:12:03,000 --> 00:12:08,000

Legend has it the water flows so hot it can kill in seconds.

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00:12:08,000 --> 00:12:16,000

Now could one man using the latest science finally separate myth from reality?

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00:12:17,000 --> 00:12:28,000

As an eight year old boy in Peru, Andrés Rousseau is told by his grandfather about the legend of a mysterious boiling river in the heart of the Amazon.

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00:12:28,000 --> 00:12:33,000

My grandfather told me this crazy story about the Spanish conquest of Peru.

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00:12:33,000 --> 00:12:39,000

We're talking about giant anacondas, fierce warriors with poison arrows,

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00:12:39,000 --> 00:12:46,000

maranhas that will strip your flesh of the bone in a lost city of gold.

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00:12:46,000 --> 00:12:51,000

The boiling river was one of the details in this legend.

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00:12:52,000 --> 00:12:58,000

Years later, the little boy is a geoscientist investigating the waters of Peru.

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00:12:58,000 --> 00:13:04,000

When a clue to the existence of the boiling river comes from somewhere close to home.

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00:13:04,000 --> 00:13:08,000

I tell my aunt this thing about a boiling river and that starts to come out and she goes,

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00:13:08,000 --> 00:13:10,000

Oh Andrés, it's real, I've been there.

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00:13:11,000 --> 00:13:16,000

A skeptical Andrés is persuaded to follow his aunt into the depths of the rainforest.

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00:13:16,000 --> 00:13:20,000

The boiling river is a place that sounds like it's straight out of folklore.

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00:13:20,000 --> 00:13:27,000

It was a one hour flight from Lima, a truck on a dirt road for like about two hours.

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00:13:27,000 --> 00:13:36,000

We take a bake it, motorized canoe and then boom, you've entered into another universe.

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00:13:37,000 --> 00:13:40,000

Andrés starts to hear a low rumble.

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00:13:40,000 --> 00:13:44,000

It sounded like an ocean wave that would just crash constantly.

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00:13:44,000 --> 00:13:51,000

And you see these wisps of white cloud of the vapor high up in the canopy of these trees.

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00:13:52,000 --> 00:13:54,000

What greets him is astonishing.

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00:13:54,000 --> 00:13:59,000

A river running boiling hot for four miles.

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00:14:00,000 --> 00:14:01,000

What was your reaction?

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00:14:01,000 --> 00:14:06,000

I'm sitting here thinking, Holy cow, this thing is massive.

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00:14:07,000 --> 00:14:10,000

The boiling river is real.

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00:14:11,000 --> 00:14:17,000

So as you know, Jeremy, the great thing about myths and legends is sometimes they do come true.

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00:14:17,000 --> 00:14:26,000

A river running at more than 200 degrees Fahrenheit, reaching 80 feet at its widest and 20 feet at its deepest.

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00:14:27,000 --> 00:14:30,000

It's hot enough you can boil food in it.

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00:14:30,000 --> 00:14:33,000

It gives humans third degree burns in seconds.

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00:14:34,000 --> 00:14:38,000

Any animals which are unfortunate to fall into the river are boiled alive.

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00:14:39,000 --> 00:14:41,000

Where is the heat coming from?

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00:14:41,000 --> 00:14:45,000

What's causing the water to have an increased temperature?

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00:14:48,000 --> 00:15:03,000

The Peruvian Amazon and a boiling river thought to be no more than a legend is very real.

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00:15:04,000 --> 00:15:09,000

But how this watery inferno came to be remains a mystery.

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00:15:10,000 --> 00:15:17,000

Can an answer to this bizarre phenomenon be hidden in the science of geothermal waters?

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00:15:18,000 --> 00:15:25,000

They exist across the world, water rising up through areas of scorching geology, especially near volcanoes.

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00:15:26,000 --> 00:15:29,000

But they're in particular locations. I mean, we know where to find these things.

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00:15:30,000 --> 00:15:40,000

What is strange in the case of this river is it is A, so hot, and B, so far away from volcanoes.

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00:15:41,000 --> 00:15:45,000

Most of Peru sits in what's known as a geo gap.

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00:15:46,000 --> 00:15:56,000

There has been no volcanic activity near the boiling river for over two million years, and the nearest volcanic area is more than 430 miles away.

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00:15:57,000 --> 00:16:01,000

So what could be powering this scorching hot river?

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00:16:02,000 --> 00:16:05,000

Volcanoes are not the only type of geothermal activity.

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00:16:06,000 --> 00:16:20,000

There's hydrothermal flows, underground geothermal rivers. We have them, but it's really cool and unusual when we see them in places that are not necessarily coupled to geothermal activity.

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00:16:21,000 --> 00:16:25,000

This river seems to go for so long, so hot.

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00:16:26,000 --> 00:16:28,000

But it looks to be something else.

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00:16:29,000 --> 00:16:33,000

Could it be caused by something outside our scientific understanding?

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00:16:34,000 --> 00:16:41,000

Indigenous communities have attached the river tremendous spiritual power. It's become incredibly sacred.

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00:16:42,000 --> 00:16:49,000

The river is known by its ancient name, Shanae Timpishka, meaning boiled with the heat of the sun.

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00:16:50,000 --> 00:16:53,000

But nowhere on earth can the sun do this.

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00:16:56,000 --> 00:17:00,000

Digging deeper, local folklore suggests an alternative explanation.

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00:17:02,000 --> 00:17:12,000

At the head of the river, the water's actually cold, and as it starts flowing down, it reaches the place where there's the first warm water injection.

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00:17:13,000 --> 00:17:16,000

And that's where there's this giant stone.

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00:17:17,000 --> 00:17:21,000

The stone bears a striking resemblance to the head of a constrictor.

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00:17:21,000 --> 00:17:31,000

Traditionally, this is believed to be the home of Yakamama, and in indigenous traditions Yakamama gives birth to the waters of the Amazon.

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00:17:34,000 --> 00:17:38,000

For a decade, Andres and his team have been trying to find out the truth.

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00:17:39,000 --> 00:17:47,000

Boiling water is an inhospitable environment for any kind of technology, and of course, also for scientists.

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00:17:48,000 --> 00:17:53,000

Thermal drone cameras help the team study the boiling water.

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00:17:54,000 --> 00:17:59,000

We'd want to get a good grasp on temperature at various locations.

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00:18:00,000 --> 00:18:05,000

Are there any chemical signatures that might indicate what has happened to this body of water?

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00:18:06,000 --> 00:18:09,000

What clues do those components give us about origins?

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00:18:10,000 --> 00:18:17,000

There are only a few scientific laboratories in the world that can help reveal the river's unseen power.

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00:18:18,000 --> 00:18:21,000

So have you discovered the secret behind the immense heat of this river?

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00:18:22,000 --> 00:18:30,000

I'm in the middle of analyzing more data right now, but in basic terms, what we are seeing thus far is that this is a hot spring on steroids.

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00:18:31,000 --> 00:18:38,000

Waters could be falling to Earth as far away as the Andes, seeping down into the Earth.

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00:18:39,000 --> 00:18:54,000

Rainwater could have traveled underground for 60 miles from the East Andes, and it may not be the only source of the water which is somehow heated underground before being driven to the surface in this one particular place in the Peruvian jungle.

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00:18:54,000 --> 00:19:07,000

In this hot water, in the subsurface, is hitting an area, a fault zone, a unique geologic setting

that allows a mass of hot water to get up to the surface quickly.

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00:19:09,000 --> 00:19:17,000

The boiling river seems to be part of an enormous hydrothermal system, one of the world's largest and most extreme.

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The exact nature of that system, however, is still being worked out.

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00:19:22,000 --> 00:19:31,000

As far as a large tropical, non-volcanic thermal river, we have still not found anything quite like this one.

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While we still can't fully explain the extreme heat of the river, the life that's found within it opens up a whole new area of study.

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00:19:44,000 --> 00:19:53,000

On planet Earth, we have organisms that thrive in extreme environments. We call those organisms extremophiles.

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00:19:54,000 --> 00:20:01,000

They're microbial organisms that have the ability to withstand extremes in temperature, chemistry, and sometimes pressure.

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00:20:02,000 --> 00:20:08,000

Do these microscopic survivors in the boiling river have the potential to transform the future of humanity?

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00:20:09,000 --> 00:20:16,000

Better understanding of these adaptations might give us clues to how life might be adapted elsewhere.

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00:20:17,000 --> 00:20:22,000

So this mysterious stretch of river could be an ecosystem with untold capability.

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00:20:23,000 --> 00:20:28,000

These are the kind of places where we're going to make discoveries about pharmaceuticals.

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00:20:29,000 --> 00:20:37,000

Could the boiling river's jungle specifically hold the keys to solving a humanitarian crisis, or to helping us fix the next pandemic?

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00:20:39,000 --> 00:20:44,000

At this point, we don't know, but we're definitely looking into it, because that is a real possibility.

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00:20:45,000 --> 00:20:53,000

So the discovery of the boiling river was just the beginning of a bigger story, one potentially full of promise.

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00:20:54,000 --> 00:20:59,000

Even after 10 years, I mean, we really have barely begun to scratch the surface of what we can do.

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00:21:09,000 --> 00:21:17,000

Conflicts at sea are usually won by the bigger, more powerful vessel they have the size and weaponry to prevail.

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00:21:18,000 --> 00:21:27,000

So when the grand Australian warship, HMAS Sydney, is destroyed by an inferior Nazi vessel in World War II, it shocks the world.

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00:21:28,000 --> 00:21:33,000

How did the Germans win such an improbable victory against a far superior ship?

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00:21:33,000 --> 00:21:39,000

What compounds the mystery is that there are no Australian survivors to ask.

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00:21:40,000 --> 00:21:47,000

Of the 645 crew on board the Sydney, not one person survived. What happened?

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00:21:49,000 --> 00:21:52,000

November 19th, 1941.

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00:21:53,000 --> 00:21:59,000

State of the art Australian warship, HMAS Sydney, is travelling south off the coast of Western Australia,

219

00:21:59,000 --> 00:22:03,000

when she spots what appears to be a small merchant ship.

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00:22:04,000 --> 00:22:09,000

The Sydney signals it using one of its signal lamps to try and get it to identify itself.

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00:22:10,000 --> 00:22:14,000

The ship responds by hoisting the call sign of a Dutch freighter.

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00:22:16,000 --> 00:22:21,000

The Sydney replies with a secret signal that the apparent merchant ship should know.

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00:22:22,000 --> 00:22:28,000

But when the unidentified ship realised that it can't answer correctly, it opens fire.

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00:22:29,000 --> 00:22:36,000

The merchant ship is in fact the German surface raider HSK Cormoran.

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00:22:42,000 --> 00:22:47,000

After just half an hour of battle, both ships are crippled and sinking.

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00:22:48,000 --> 00:22:54,000

While a fifth of the Cormoran's crew lose their lives, there are no survivors from the Sydney.

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00:22:54,000 --> 00:22:59,000

645 Australian souls are lost.

228

00:23:00,000 --> 00:23:03,000

This is the greatest naval tragedy in Australia's history.

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00:23:05,000 --> 00:23:10,000

How could the Cormoran possibly sink such a superior Australian warship?

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00:23:11,000 --> 00:23:15,000

This is one of the leading warships in the Australian Navy, if not the leading warship.

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00:23:16,000 --> 00:23:23,000

HMAS Sydney has 8 6-inch guns, 8 torpedoes and a plethora of smaller weapons.

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00:23:24,000 --> 00:23:26,000

It weighs over 7000 tons.

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00:23:27,000 --> 00:23:31,000

So she's a very capable ship for taking the Cormoran.

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00:23:32,000 --> 00:23:36,000

So what causes the Sydney to lose every single one of its crew?

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00:23:37,000 --> 00:23:40,000

This is incredibly rare and almost impossible to replicate.

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00:23:40,000 --> 00:23:56,000

Australia is desperate to solve the mystery of what happened in the last moments of its finest warship.

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00:23:57,000 --> 00:24:00,000

However, the only surviving witness is the enemy.

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00:24:01,000 --> 00:24:09,000

318 of the nearly 400 Nazi sailors are picked up by Allied ships and brought to Australia.

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00:24:10,000 --> 00:24:15,000

Will they yield under the pressure and reveal how they pulled off the impossible?

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00:24:16,000 --> 00:24:27,000

The German captain of the Cormoran indicated that his ship was approximately 2,000 yards away from the Sydney when they engaged combat.

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00:24:28,000 --> 00:24:30,000

She's very, very unusual.

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00:24:31,000 --> 00:24:36,000

Why does the Sydney come so close when it has superior long-range guns?

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00:24:36,000 --> 00:24:47,000

One theory suggests that the Cormoran was very close and raised its white flag indicating that it was surrendering when in actual fact it wasn't.

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00:24:48,000 --> 00:24:57,000

By luring in the bigger warship, Hitler's Cormoran can unleash its weapons at the last minute, hidden from view behind the steel plates.

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00:24:57,000 --> 00:25:06,000

These could be retracted to reveal behind it a deck gun and in some cases even a torpedo tube that had been mounted on the main deck.

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00:25:09,000 --> 00:25:15,000

Another theory is that the captain of the nearly 8,000 tonne Sydney moves in close deliberately.

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00:25:16,000 --> 00:25:19,000

The captain of HMA of Sydney knew exactly what he was likely to be facing.

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00:25:20,000 --> 00:25:24,000

Cormoran is a nice sized merchant ship. She's a valuable prize.

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00:25:27,000 --> 00:25:32,000

Finding the Sydney will surely help solve the mystery, but where is it?

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00:25:33,000 --> 00:25:38,000

Seventy of the German prisoners of war give accounts of where the ships went down.

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00:25:39,000 --> 00:25:40,000

They're all different.

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00:25:41,000 --> 00:25:49,000

This was quite typical because they viewed the sinking location of an enemy ship as sensitive strategic military information.

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00:25:50,000 --> 00:26:02,000

The ocean around the battle site is scoured for clues, but it's not until three months later in February 1942 that a potential piece of evidence turns up in the area.

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00:26:05,000 --> 00:26:11,000

Floating off Christmas Island is a decomposing corpse in an Australian Navy life raft.

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00:26:12,000 --> 00:26:15,000

The corpse was very difficult to try and examine.

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00:26:15,000 --> 00:26:18,000

Much of it had been torn off by seabirds.

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00:26:19,000 --> 00:26:25,000

It's found to have no dog tags whatsoever, so there's no means at all of identifying who this person is.

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00:26:26,000 --> 00:26:35,000

The corpse is wearing a boiler suit bleached by the sun and eyewitnesses report the raft is damaged from bullets or shrapnel.

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00:26:36,000 --> 00:26:39,000

The evidence indicates that this body belonged to a sailor.

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00:26:40,000 --> 00:26:45,000

The life raft itself shows signs of damage that could have happened during a battle.

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00:26:46,000 --> 00:26:49,000

This is the only body to be recovered from the tragedy.

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00:26:51,000 --> 00:26:57,000

Could its identification hold a vital clue to what happened in the final moments of the battle?

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00:26:58,000 --> 00:27:03,000

In 1942, because the body's not been identified, it's buried in an unmarked grave.

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00:27:04,000 --> 00:27:10,000

It's not until 2008, 66 years later, that there's finally a breakthrough.

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00:27:11,000 --> 00:27:24,000

100 miles off Australia's most westerly point, 8,000 feet below the surface, is the Cormoran, and

nearby, the Sydney.

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00:27:25,000 --> 00:27:38,000

But it's still another 7 years before advances in technology finally give scientists another shot at solving the mystery of how this bizarre defeat happened.

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00:27:40,000 --> 00:27:47,000

In 2015, an expedition is led by Curtin University, Western Australian Museum and DOF Subsea.

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00:27:48,000 --> 00:27:56,000

This included the most complex lighting and imaging systems ever used underwater in Australian history.

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00:27:58,000 --> 00:28:06,000

One and a half miles down, the powerful lights of the underwater vehicles turn the bowels of the ocean from night to day.

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00:28:08,000 --> 00:28:13,000

ROVs mounted with special cameras record images every five seconds.

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00:28:14,000 --> 00:28:20,000

Photogrammetry is an incredibly important technique in underwater archaeology.

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00:28:21,000 --> 00:28:31,000

And through computer programs, we're able to stitch together these thousands of still images to create a three-dimensional model of the sea floor and what we discover on it.

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00:28:32,000 --> 00:28:37,000

What will they uncover on this wreck that's been hidden from view for more than 80 years?

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00:28:38,000 --> 00:28:43,000

Will the truth of how this rare defeat happened finally be revealed?

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00:28:52,000 --> 00:28:58,000

The wreck of HMAS Sydney has been surveyed using groundbreaking technology.

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00:28:59,000 --> 00:29:04,000

8,000 feet underwater, 100 miles off Australia's most western point.

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00:29:04,000 --> 00:29:12,000

At long last, the ship is about to surrender the secret of how it succumbed to such a crushing defeat.

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00:29:14,000 --> 00:29:18,000

The ROV's powerful lights reveal the answer.

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00:29:19,000 --> 00:29:25,000

The results of the underwater footage shows a hole in the bridge of the ship.

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00:29:25,000 --> 00:29:31,000

The Cormoran had struck a decisive blow at the heart of the Sydney's control systems.

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00:29:32,000 --> 00:29:36,000

A lucky shot or first-class tactics from the Cormoran.

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00:29:36,000 --> 00:29:43,000

The result is the same. Annihilation of not only crucial technology, but key personnel.

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00:29:43,000 --> 00:29:51,000

If you take out the senior officers on the bridge, you literally take out the nervous system, the brain of the ship.

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00:29:53,000 --> 00:30:00,000

We now know what caused the Sydney to sink, but the lack of any survivors is unusual.

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00:30:01,000 --> 00:30:06,000

One suggestion involves a gruesome end for the Australian sailors.

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00:30:06,000 --> 00:30:09,000

One of the theories is that the Germans actually, before the Cormoran sunk,

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00:30:09,000 --> 00:30:12,000

opened fire with machine guns on the Australian sailors in the water.

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00:30:16,000 --> 00:30:19,000

Did the Nazis fire on the surviving sailors?

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00:30:20,000 --> 00:30:29,000

Eyewitness accounts of the Christmas Island body in 1942 report the damage to the raft as being either from bullets or shrapnel.

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00:30:29,000 --> 00:30:38,000

It's inconclusive. 64 years later, does the body of the mysterious sailor show signs of foul play?

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00:30:40,000 --> 00:30:50,000

The body was examined in detail, and in the autopsy they found that the individual had died from a shrapnel fragment to the brain, not a machine gun bullet.

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00:30:51,000 --> 00:30:58,000

We now know this man was not killed by Nazi gunfire. What happened to the rest of the crew we may never know.

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00:30:59,000 --> 00:31:06,000

Yet could breakthroughs in DNA analysis at last reveal the identity of this lone sailor?

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00:31:07,000 --> 00:31:19,000

DNA technology is rapidly developing. We can now take a sample from a deceased individual and determine their ancestry, their eye colour, their hair colour, and a variety of other things.

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00:31:20,000 --> 00:31:27,000

Experts determine he has European ancestry, red hair, blue eyes, and pale skin.

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00:31:28,000 --> 00:31:34,000

Then, strontium isotope testing on the sailor's teeth, pinpoint where he is from.

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00:31:35,000 --> 00:31:39,000

Strontium is an element that exists in mineral deposits all over the world.

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00:31:40,000 --> 00:31:47,000

As groundwater runs over sediment, it picks up tiny amounts of strontium, which is then present in drinking water.

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00:31:47,000 --> 00:31:54,000

When humans or animals drink local water, they put into their bones a local strontium signal.

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00:31:55,000 --> 00:32:04,000

So when these scientists examined the human remains that were found after this tragedy, they established that this individual grew up on the east coast of Australia.

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00:32:05,000 --> 00:32:09,000

And what the sailor was wearing when found holds another vital clue.

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00:32:10,000 --> 00:32:12,000

Samples of the fabric from his uniform were tested.

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00:32:13,000 --> 00:32:17,000

Blue boiler suits were worn by those working in the engine room.

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00:32:18,000 --> 00:32:23,000

And in 2019, investigators finally believe they have found who this one belonged to.

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00:32:25,000 --> 00:32:27,000

A man named Norman Foster.

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00:32:29,000 --> 00:32:33,000

Could the search for the identity of the mysterious sailor at last be over?

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00:32:34,000 --> 00:32:39,000

They tested a relative and it wasn't Norman. So the question is who could it be?

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00:32:40,000 --> 00:32:46,000

Deeply disappointed but determined to uncover the truth, investigators are continuing their quest.

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00:32:47,000 --> 00:32:51,000

And they have narrowed the search down to about 50 sailors.

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00:32:52,000 --> 00:33:02,000

There's hope that the newest developments in DNA testing will allow them to trace the unknown sailor through the male side of the family, improving chances of a match.

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00:33:03,000 --> 00:33:10,000

All they need to find is that vital relative for this piece of the puzzle to finally be solved.

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00:33:19,000 --> 00:33:23,000

Lightning is one of the strongest forces of nature.

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00:33:24,000 --> 00:33:27,000

Little can be done to predict where it will strike.

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00:33:28,000 --> 00:33:30,000

But when it does, it can be catastrophic.

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00:33:30,000 --> 00:33:38,000

In 2014, a day at the beach turns to disaster when an immensely bright bolt of lightning strikes the water.

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00:33:39,000 --> 00:33:41,000

Killing one and injuring thirteen.

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00:33:42,000 --> 00:33:47,000

Did it somehow have a deadly attraction to the ocean? And if so, how?

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00:33:48,000 --> 00:33:54,000

And could an accidental scientific discovery finally explain what happened on that day?

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00:33:55,000 --> 00:34:03,000

July 27th, 2014 and Venice Beach is full of people when something inexplicable happens.

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00:34:04,000 --> 00:34:13,000

There was a tremendous glare as if someone had suddenly turned on all the lights in a very dark room, followed by a tremendous boom.

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00:34:14,000 --> 00:34:23,000

An unusually bright lightning bolt has hit the water, killing a twenty year old man and injuring many more.

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00:34:24,000 --> 00:34:29,000

This giant bolt up in the sky that I've never seen like that. I'm from Midwest so we see lots of lightning.

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00:34:30,000 --> 00:34:34,000

The loudest clap of thunder I've ever heard in my life thought it was like a bomb on us.

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00:34:35,000 --> 00:34:41,000

Then in 2019, another explosive strike in South Boston is caught on camera.

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00:34:43,000 --> 00:34:47,000

The lightning incinerates the boat in a fraction of a second.

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00:34:49,000 --> 00:34:57,000

Is there some deadly connection in these tragedies between the lightning and the waters below to create such mayhem?

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00:34:57,000 --> 00:35:17,000

In 2014, a man dies and thirteen are injured when a giant lightning bolt hits the water off Venice Beach.

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00:35:18,000 --> 00:35:25,000

And five years later on the opposite coast, a single explosive bolt destroys a boat floating in Boston Harbor.

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00:35:27,000 --> 00:35:34,000

Lightning strike at sea is every sailor's worst nightmare and boats offer no protection.

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00:35:35,000 --> 00:35:44,000

You can actually see the clouds light up like Christmas trees. You're stuck on your boat. The waves are hitting you. The rain's coming down.

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00:35:45,000 --> 00:35:50,000

The lightning is cracking. You have nowhere to run.

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00:35:50,000 --> 00:36:02,000

I've witnessed firsthand lightning over water. In Suriname, north of Brazil, it releases its might in the middle of filming.

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00:36:08,000 --> 00:36:11,000

A member of my crew taking a strike.

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00:36:12,000 --> 00:36:15,000

What's on record has been hit was actually struck on the head by that bolt of lightning.

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00:36:15,000 --> 00:36:22,000

Luckily, he survives. Elsewhere, when lightning and water mix, it can be a different story.

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00:36:23,000 --> 00:36:31,000

To try and understand what can make lightning strikes on the US coast so devastating, we turn to clues from the past.

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00:36:32,000 --> 00:36:40,000

The 1970s and American Vella satellites are patrolling the planet from space, looking for signs of rogue nuclear tests.

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00:36:41,000 --> 00:36:52,000

They had X-ray sensors. The later ones had optical sensors. Although they were designed to detect nuclear tests, they were able to see things as well.

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00:36:53,000 --> 00:36:57,000

And in 1977, they start picking up unusual blazes of light.

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00:36:58,000 --> 00:37:02,000

These are so powerful, they're releasing as much energy as a small nuclear weapon.

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00:37:04,000 --> 00:37:08,000

What could these explosions be? Could they be unregulated nuclear tests?

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00:37:09,000 --> 00:37:16,000

Further investigation shows that these flashes are releasing a completely different signature to that of a nuclear explosion.

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00:37:17,000 --> 00:37:19,000

Something never seen before.

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00:37:21,000 --> 00:37:30,000

Lightning reaches temperatures of 30,000 degrees, five times hotter than the surface of the sun, but these are even more powerful.

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00:37:32,000 --> 00:37:35,000

The flashes are named super bolts.

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00:37:38,000 --> 00:37:42,000

They named the super bolts because they were much, much more intense.

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00:37:43,000 --> 00:37:50,000

Something which is 10 times the power of an ordinary bolt, sometimes 100, potentially even a thousand times.

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00:37:53,000 --> 00:37:56,000

The satellite data then gives another revelation.

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00:37:57,000 --> 00:38:07,000

You can draw a map just by plotting the lightning on the planet. It basically sticks very nicely to the continents and as soon as you move over the oceans, you have a dramatic decrease in the amount of lightning.

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00:38:08,000 --> 00:38:13,000

But when it comes to super bolts, it's the ocean they hit most often.

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00:38:17,000 --> 00:38:24,000

Is it because out at sea the thunderstorms can develop more energy? It's a mystery to me.

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00:38:26,000 --> 00:38:34,000

Finding out what's going on when lightning strikes over water is crucial for the safety of those out at sea and in the shallows.

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00:38:35,000 --> 00:38:41,000

Since the 1970s, thousands more super bolts have been recorded across the planet's oceans.

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00:38:42,000 --> 00:38:50,000

The better the data gets, the more we see that this is really a clear signal, that there's more intense lightning, whether you're looking optically or whether you're looking with radio waves.

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00:38:51,000 --> 00:38:59,000

So what causes these massively powerful oceanic super bolts, up to a thousand times brighter than anything seen on land?

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00:39:00,000 --> 00:39:05,000

Can the answer help our understanding of those shocking incidents on the US coast?

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00:39:09,000 --> 00:39:17,000

In 2020 at Tel Aviv University in Israel, a scientific breakthrough finally sheds new light on this mysterious phenomenon.

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00:39:18,000 --> 00:39:23,000

Initially we were interested in how lightning may impact the chemistry of seawater.

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00:39:23,000 --> 00:39:30,000

During the experiment when they changed from tap water to seawater, they noticed the flash becomes dramatically brighter.

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00:39:31,000 --> 00:39:33,000

Everything is the same, the only difference was the type of water.

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00:39:34,000 --> 00:39:42,000

That something about the water was actually impacting the lightning above the water. Why should the water actually impact how bright it was?

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00:39:43,000 --> 00:39:54,000

They then take samples from a freshwater lake, Lake Tiberius, and from the Dead Sea, whose water is ten times saltier than normal seawater.

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00:39:55,000 --> 00:40:02,000

Amazingly they discover that discharges over Dead Sea water are nearly 40 times brighter than over Lake water.

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00:40:03,000 --> 00:40:10,000

When you have salts in water, the salt breaks up into its ions and this results in a change in the conductivity of the water.

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00:40:11,000 --> 00:40:18,000

As the water becomes more conductive, the electricity from the lightning can drain off much quicker into the water.

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00:40:19,000 --> 00:40:22,000

And this is what heats up the air faster and will give us the brighter the lightning.

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00:40:23,000 --> 00:40:29,000

Colin and his team have proved for the first time the importance of salinity in the brightness of super bolts.

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00:40:29,000 --> 00:40:31,000

Science has been looking in the wrong direction.

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00:40:32,000 --> 00:40:37,000

So it's not what's in the clouds that may hold the answer, it's what lies in the water.

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00:40:40,000 --> 00:40:46,000

But there's a big difference between a lab and the vast watery expanses of our planet.

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00:40:47,000 --> 00:40:53,000

It is a very interesting step to add an extra layer of complexity into the problem.

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00:40:54,000 --> 00:40:57,000

But that by itself can't explain everything in the patterns we see.

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00:40:59,000 --> 00:41:03,000

The scientists at Tel Aviv are continuing their investigations.

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00:41:06,000 --> 00:41:10,000

So were the lightning strikes at Venice Beach and Boston Harbor?

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00:41:11,000 --> 00:41:12,000

Super Bolts.

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00:41:13,000 --> 00:41:19,000

The more recent distribution of super bolts show that they're not uniformly distributed over the oceans.

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00:41:20,000 --> 00:41:30,000

The latest research has discovered that where super bolts tend to hit the most is not along the US coastline, but in the northeast Atlantic and Mediterranean.

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00:41:31,000 --> 00:41:40,000

We may never know for certain whether the lightning strikes in Venice Beach and Boston Harbor, although deadly and destructive, were super bolts.

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00:41:41,000 --> 00:41:46,000

And why they hit certain ocean areas more than others is another enigma to crack.

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00:41:46,000 --> 00:41:51,000

As soon as you discover something, then again gives you another 10-15 questions to answer.

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00:41:54,000 --> 00:42:01,000

Science has revealed an intense connection between the salty oceans and the immense power of the skies.

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00:42:02,000 --> 00:42:07,000

But there is still a lot left to understand about this highly complex relationship.