Headline: Explainer: How El Niño is helping drive heatwaves and extreme weather

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Rescue workers take part in a search and rescue operation near an underpass that has been submerged by a flooded river caused by torrential rain in Cheongju, South Korea, July 16, 2023. REUTERS FILE PHOTO

Rescue workers take part in a search and rescue operation near an underpass that has been submerged by a flooded river caused by torrential rain in Cheongju, South Korea, July 16, 2023. REUTERS FILE PHOTO

LONDON — Countries around the world from China to the United States are battling heatwaves, with the onset of the climate phenomenon El Niño helping push temperatures higher.

Scientists told Reuters that climate change and El Niño are the major drivers of extreme heat that have seen temperature records broken in Beijing and Rome, while leaving some 80 million Americans under excessive heat warnings.

El Niño is a natural phenomenon that in addition to contributing to higher temperatures in many parts of the world, also drives tropical cyclones in the Pacific and boosts rainfall and flood risk in parts of the Americas, Asia and elsewhere.

In June, the U.S. National Oceanic and Atmospheric Administration (NOAA) declared that an El Niño is now under way. The past three years have been dominated by the cooler La Niña pattern.

Scientists have warned that this year looks particularly worrying. The last time a strong El Niño was in full swing, in 2016, the world saw its hottest year on record. Meteorologists expect that this El Niño, coupled with excess warming from climate change, will see the world grapple with record-high temperatures.

Experts are also concerned about what is going on in the ocean. An El Niño means that waters in the Eastern Pacific are warmer than usual. Globally, sea temperatures hit new records for the months of May and June, according to the European Union’s Copernicus Climate Change Service. That could supercharge extreme weather.

“We’re in unprecedented territory,” said Michelle L’Heureux, a meteorologist with NOAA’s Climate Prediction Center.

This year’s El Niño could lead to global economic losses of $3 trillion, according to a study published last month in the journal Science, shrinking GDP as extreme weather decimates agricultural production, manufacturing, and helps spread disease.

Governments in vulnerable countries are taking note. Peru has set aside $1.06 billion to deal with El Niño’s impacts and climate change, while the Philippines — at risk from cyclones — has formed a special government team to handle the predicted fallout.

Here is how El Niño will unfold and some of the weather we might expect:

El Niño is a natural climate pattern borne out of unusually warm waters in the eastern Pacific.

It forms when the trade winds blowing east-to-west along the equatorial Pacific slow down or reverse as air pressure changes, although scientists are not entirely sure what kicks off the cycle.

Because the trade winds affect the sun-warmed surface waters, a weakening causes these warm western Pacific waters to slosh back into the colder central and eastern Pacific basins.

During the 2015-16 El Niño — the strongest such event on record — anchovy stocks off the coast of Peru crashed amid this warm water incursion. And nearly a third of the corals on Australia's Great Barrier Reef died. In too-warm waters corals will expel living algae, causing them to calcify and turn white.

This build-up of warm water in the eastern Pacific also transfers heat high into the atmosphere through convection, generating thunderstorms.

"When El Niño moves that warm water, it moves where thunderstorms happen," said NOAA meteorologist Tom DiLiberto. "That's the first atmospheric domino to fall."

This shift in storm activity affects the current of fast-flowing air that moves weather around the world — called the subtropical jet stream — pushing its path southward and straightening it out into a flatter stream that delivers similar weather along the same latitudes.

"If you're changing where the storm highway goes … you're changing what kind of weather we would expect to see," DiLiberto said.

During an El Niño, the southern United States experiences cooler and wetter weather, while parts of the U.S. West and Canada are warmer and drier.

Hurricane activity falters as the storms fail to form in the Atlantic due to changes in the wind, sparing the United States. But tropical cyclones in the Pacific get a boost, with storms often spinning toward vulnerable islands.

Some parts of Central and South America experience heavy rainfall, although the Amazon rainforest tends to suffer from drier conditions.

And Australia endures extreme heat, drought and bushfires.

El Niño could offer a reprieve to the Horn of Africa, which recently suffered five consecutive failed rainy seasons. El Niño brings more rain to the Horn, unlike the triple-dip La Niña, which desiccated the region.

Historically, both El Niño and La Niña have occurred about every two to seven years on average, with El Niño lasting 9 to 12 months. La Niña, which takes hold when waters are cooler in the Eastern Pacific, can last one to three years.

How climate change might be affecting El Niño is "a very big research question," said DiLiberto. While climate change is doubling down on the impacts from El Niño — layering heat on top of heat, or excess rainfall on top of excess rainfall — it's less clear if climate change is influencing the phenomenon itself.

Scientists are not sure whether climate change will shift the balance between El Niño and La Niña, making one pattern more or less frequent. If ocean temperatures are rising across the board, it is unlikely the cycle would change, scientists said, as the basic mechanics behind the phenomenon

stay the same.

However, if some parts of the ocean are warming faster than others, that could influence how El Niño plays out by amplifying temperature differences.

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