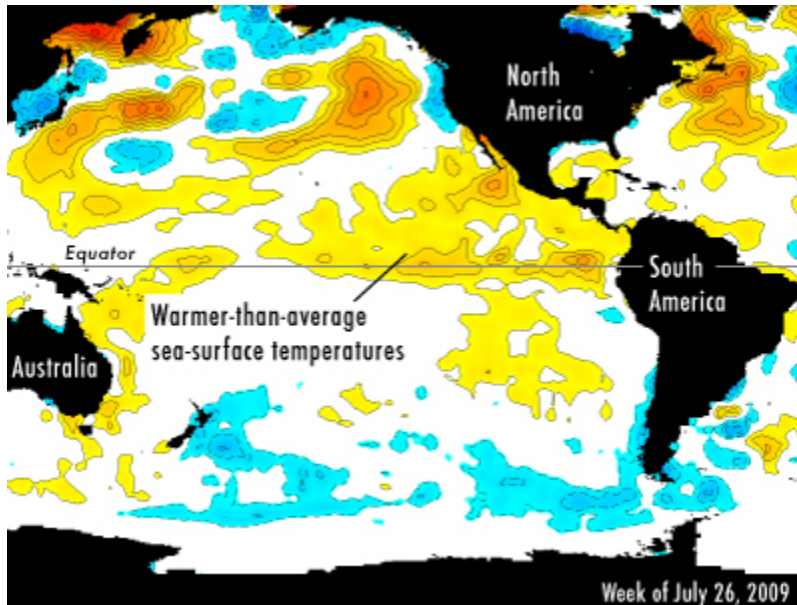


Spotlight: Top misconceptions about El Niño



This recent map of sea-surface temperature anomalies shows that weak El Niño conditions have developed in the tropical Pacific.

Forecasts by the International Research Institute for Climate and Society and other institutions show that a weak El Niño has developed in the equatorial Pacific, and is likely to continue evolving with warmer-than-normal conditions persisting there until early 2010. What exactly is this important climate phenomenon and why should society care about it? Who will be most affected? We address these questions as well as clear up some common misconceptions about El Niño, La Niña, and everything in between!

First, the basics.

El Niño refers to the occasional warming of the eastern and central Pacific Ocean around the equator (the yellow and orange areas in the image). The warmer water tends to get only 1 to 3 degrees Celsius above average sea-surface temperatures for that area, although in the very strong El Niño of 1997-98, it reached 5 degrees or more above average in some locations. La Niña is the climatological counterpart to El Niño-- a *yin* to its *yang*, so to speak. A La Niña is defined by *cooler*-than-normal sea-surface temperatures across much of the equatorial eastern and central Pacific. El Niño and La Niña episodes each tend to last roughly a year, although occasionally they may last 18 months or longer.

The Pacific is the largest ocean on the planet, so a significant change from its average conditions can have consequences for temperature, rainfall and vegetation in faraway

places. In normal years, trade winds push warm water-and its associated heavier rainfall-westward toward Indonesia. But during an El Niño, which occurs on average once every three-to-five years, the winds peter out and can even reverse direction, pushing the rains toward South America instead. This is why we typically associate El Niño with drought in Indonesia and Australia and flooding in Peru. These changing climate conditions, combined with other factors, can have serious impacts on society, such as reduced crop harvests, wildfires, or loss of life and property in floods. There is also evidence that El Niño conditions increase the risk of certain vector-borne diseases, such as malaria, in places where they don't occur every year and where disease control is limited.

During either an El Niño or a La Niña, we also observe changes in atmospheric pressure, wind and rainfall patterns in different parts of the Pacific, and beyond. An El Niño is associated with high pressure in the western Pacific, whereas a La Niña is associated with high pressure in the eastern Pacific. The 'seesawing' of high pressure that occurs as conditions move from El Niño to La Niña is known as the *Southern Oscillation*. The oft-used term *El Niño-Southern Oscillation*, or ENSO, reminds us that El Niño and La Niña episodes reflect changes not just to the ocean, but to the atmosphere as well.

ENSO is one of the main sources of year-to-year variability in weather and climate on Earth and has significant socioeconomic implications for many regions around the world. The development of a new El Niño episode in recent months offers an opportunity to clear up some common misconceptions about the climate phenomenon:

Niño periods cause more disasters than normal periods

On a worldwide basis, this isn't necessarily the case. But ENSO conditions do allow climate scientists to produce more accurate seasonal forecasts and help them better predict extreme drought or rainfall in several regions around the globe. (Read a 2005 paper on the topic [here](#).)

On a regional level, however, we've seen that El Niño and La Niña exert fairly consistent influences on the climate of some regions. For example, El Niño conditions typically cause more rain to fall in Peru, and less rain to fall in Indonesia and Southern Africa. These conditions, combined with socioeconomic factors, can make a country or region more vulnerable to impacts.

"On the other hand, because El Niño enhances our ability to predict the climate conditions expected in these same regions, one can take advantage of that improved predictability to help societies improve preparedness, issue early warnings and reduce possible negative impacts," says Walter Baethgen who runs IRI's Latin America and the Caribbean regional program.

El Niño and La Niña significantly affect the climate in most regions of the globe

Actually, they significantly affect only about 25% of the world's land surface during any particular season, and less than 50% of land surface during the entire time that ENSO conditions persist.

Regions that are affected by El Niño and La Niña see impacts during the entire 8 to 12 months that the climate conditions last

No. Most regions will only see impacts during one specific season, which may start months after the ENSO event first develops. For example, the current El Niño may cause the southern U.S. to get wetter-than-normal conditions in the December to March season, but Kenyans may see wetter-than-normal conditions between October and December.

El Niño episodes lead to adverse impacts only

Fires in Southeast Asia, droughts in eastern Australia, flooding in Peru often accompany El Niño events. Much of the media coverage on El Niño has focused on the more extreme and negative consequences typically associated with the phenomenon. To be sure, the impacts can wreak havoc in developing and developed countries alike, but El Niño events are also associated with reduced frequency of Atlantic hurricanes, warmer winter temperatures in northern half of U.S., which reduce heating costs, and plentiful spring/summer rainfall in southeastern Brazil, central Argentina and Uruguay, which leads to above-average summer crop yields.

We should worry more during El Niño episodes than La Niña episodes

Not necessarily. They each come with their own set of features and risks. In general, El Niño is associated with increased likelihood of drought throughout much of the tropical land areas, whereas La Niña is associated with increased risk of drought throughout much of the mid-latitudes (see maps [here](#) and [here](#).) El Niño may have gained more attention in the scientific community, and thus the public, because it substantially alters the temperature and circulation patterns in the tropical Pacific. La Niña, on the other hand, tends to amplify normal conditions in that part of the world: the relatively cold temperatures in the eastern equatorial Pacific become colder, the relatively warm temperatures become even warmer, and the low-level winds blowing from east to west along the equatorial Pacific strengthen.

The stronger the El Niño/La Niña, the stronger the impacts, and vice versa

Current forecasts show a weak-to-moderate El Niño has formed and will remain through the rest of the year. Does this mean we should expect weak-to-moderate impacts? Not necessarily. The important point to remember is that ENSO shifts the odds of some regions receiving less or more rainfall than they usually do, but it doesn't guarantee this will happen. For example, scientists expected the very strong El Niño of 1997/98--which triggered wildfires in Indonesia and flooding and crop loss in Kenya - to also increase the chances of below-normal summer rainfall in India and South Africa, but this didn't happen. On the other hand, India did experience strong rainfall deficiencies in 2002, during a much weaker El Niño.

El Niño and La Niña events are directly responsible for specific storms or other weather events

We usually can't pin a single event on an El Niño or La Niña, just like we can't blame global climate changes for any single hurricane. ENSO events typically affect the frequency or strength of weather events. When looked at over the course of a season, regions experience increased or decreased rainfall, for example.

El Niño and La Niña are closely related to global warming

El Niño and La Niña are a normal part of the earth's climate and have likely been occurring for millions of years. Global climate change may affect ENSO cycles, but the research is still ongoing.

About the IRI

The IRI works on the development and implementation of strategies to manage climate related risks and opportunities. Building on a multidisciplinary core of expertise, IRI partners with research institutions and local stakeholders to best understand needs, risks and possibilities. The IRI supports sustainable development by bringing the best science to bear on managing climate risks in sectors such as agriculture, food security, water resources, and health. By providing practical advancements that enable better management of climate related risks and opportunities in the present, we are creating solutions that will increase adaptability to long term climate change. The IRI was established as a cooperative agreement between NOAA's Climate Program Office and Columbia University. It is part of The Earth Institute at Columbia University, and is located at the Lamont Campus

Media contact: Francesco Fiondella

Telephone: 845.680.4476 or 845.680.4468