

18.9 The “El Niño” Effect

Background: According to the United States National Oceanic and Atmospheric Administration (NOAA), “El Niño and La Niña are the warm and cool phases of a recurring climate pattern across the tropical Pacific — the El Niño-Southern Oscillation, or “ENSO” for short. The pattern can shift back and forth irregularly every two to seven years, and each phase triggers predictable disruptions of temperature, precipitation, and winds. These changes disrupt the large-scale air movements in the tropics, triggering a cascade of global side effects.” While U.S. weather is affected by an El Niño, Pacific nations that depend on agriculture and fishing are especially vulnerable. The 1997–98 El Niño was one of the most powerful climate events in recorded history. It resulted in droughts, flooding and other natural disasters including a severe outbreak of Rift Valley fever after extreme rainfall in northeastern Kenya and southern Somalia; record rainfalls in California; and one of Indonesia’s worst droughts on record.

Instructions: Carefully read the article below and answer questions 1-7 based solely on information from the text.

El Niño May Bring Record Heat, and Rain for California

by John Schwartz, NYT, Aug. 14, 2015, a14

http://www.nytimes.com/2015/08/14/science/signs-of-a-historic-el-nino-but-forecasters-remain-wary.html?hp&action=click&pgtype=Homepage&module=mini-moth®ion=top-stories-below&WT.nav=top-stories-below&_r=0

A. This year’s El Niño weather pattern could be the most powerful on record, federal forecasters said, while warning that the effects of the weather system are never certain. “We’re predicting this El Niño could be among the strongest El Niños in the historical record,” said Mike Halpert, the deputy director of the Climate Prediction Center for the National Oceanic and Atmospheric Administration, in a teleconference with reporters. This year’s El Niño is already the second strongest for this time of year in more than 60 years of record-keeping, he said.

B. El Niño, which begins with warmer-than-usual water temperatures in the Eastern Pacific, can affect weather around the world — in the United States, it can bring heavy winter precipitation in California and across the South. El Niño events have also been linked to droughts in Australia and India, more numerous hurricanes in the Pacific Ocean (but fewer in the Atlantic), and a warmer planet over all. The current El Niño, along with unusual warming in the Northern Pacific, will produce what is “very likely to be the warmest year on record,” Daniel Swain, a Ph.D. candidate at Stanford who runs the respected California Weather Blog, said in an interview.

C. The federal forecasters announced a greater than 90 percent chance that El Niño would continue all winter for the Northern Hemisphere. The likelihood that the effects will last into early spring is 85 percent, up from last month’s prediction of 80 percent. Conditions in the Pacific Ocean suggest that what has formed there is as big as anything seen since 1997-98, a system that brought the term “El Niño” into popular culture and which is remembered for the catastrophic amounts of water it dumped on California, leading to flooding and mudslides.

D. The main missing piece of the current patterns that would ensure an event like 1997, he said, is a relaxation of trade winds in the central and western Pacific, which allows the weather patterns to move eastward. “I’m a little cautious: This could happen, it could not happen,” he said. In other words, Dr. Patzert said, “Bob Dylan says it all: The answer is blowin’ in the wind.” Without the relaxation of the trade winds, he said, “this will turn out to be a modest El Niño, with a huge sigh of disappointment here in the West.”

E. Even if El Niño could bring enormous amounts of rain to California, it will almost certainly not wipe out the state’s four years of drought, experts said. Central and Northern California, which supply much of the state’s water, do not typically receive as much precipitation from an El Niño as Southern California, said Kevin Werner, the director of western regional climate services for the N.O.A.A. More important, he said, meeting the current water deficit for the state would require more than twice the average amount of precipitation for a year — “something in excess of the wettest year on record,” he said. It has to be the right kind of precipitation, too. While a great deal of rain could recharge many of the state’s reservoirs, much of the state’s water supply depends on the amount of snow on the Sierras. “El Niño does have the potential to bring a whole lot of water to California.” Mr. Swain said, “but it doesn’t necessarily bring a lot of snow.”

F. The federal forecasters also warned that the complexities of the El Niño phenomenon mean that the typical patterns of rain and other effects might not emerge at all. “There are still probably more unknowns regarding temperature and precipitation in the winter than there are knowns,” Mr. Halpert said.

G. Experts in the El Niño phenomenon note that they have had relatively few events to compare over the past 60 years, and that each El Niño has proved unique. “You’re working with a very small sample set,” Michael L. Anderson, California’s state climatologist, said in an interview. Even an El Niño that appears to hold promise of extensive precipitation based on similarities to past events may not come through, he said. “The one important element is that El Niño events are associated with large variability of outcome,” he said. And while people tend to remember years with powerful El Niño effects, he said, “People don’t associate as strongly the years when an El Niño event didn’t lead to a big outcome.”

1. The following sentence appears in paragraph A. “This year’s El Niño weather pattern could be the most powerful on record, federal forecasters said, while warning that the effects of the weather system are never certain.”

Based on this sentence, which statement is most accurate?

- A. Scientists have established that this year’s El Niño weather pattern will affect climate conditions for decades.
- B. While weather forecasting can be unpredictable, there is strong evidence about the effect of this year’s El Niño.
- C. Weather forecasters are certain about the impact of this year’s El Niño weather pattern and are issuing warnings.
- D. Scientists are still uncertain whether this year’s El Niño will be especially disruptive.

2. Paragraph B describes an El Niño. Which statement comes closest to the meaning in this paragraph?

- A. Warmer-than-usual water temperatures in the world’s oceans causing worldwide climate catastrophes.
- B. Warmer-than-usual water temperatures in the Eastern Pacific affect weather around the world.
- C. Warmer-than-usual water temperatures in the Eastern Pacific have affects largely limited to the South Pacific.
- D. Warmer-than-usual water temperatures lead to the melting of Artic and Antarctic icecaps.

3. Which weather pattern is most closely associated with an El Niño?

- A. Heavy rainfall followed by good crop yields in India and Australia.
- B. Temporary global warming that may produce the hottest year on record.
- C. Droughts in California and the United States South.
- D. Higher than usual hurricane activity in the Caribbean basin and along the East Coast of the United States.

4. According to paragraph C, there is a greater than 90 percent chance that El Niño effects will continue all winter in the Northern Hemisphere. Why are these predictions expressed with less than 100% certainty?

- A. The reality is that science continues to be largely guesswork and the forecasters want to ability to be wrong.
- B. Unpredictable wind patterns could still lead to minor changes in weather conditions.
- C. Scientists really are certain but want to avoid global panic especially in communities located at sea level.
- D. The El Niño effect is limited to the Pacific region and the Northern Hemisphere is primarily affected by the Atlantic Ocean.

5. According to Paragraph E, what is the predicted impact of the El Niño on the four-drought in California?

- A. Record rainfall in Southern California will do much to alleviate the four-year drought.
- B. The drought will probably continue as record rain falls in the wrong areas of the state.
- C. Northern California lakes and reservoirs will fill with water permitting the piping of water to the south.
- D. Record snow in California mountain regions will at least temporarily end the four-year drought.

6. The statement in Paragraph F that “There are still probably more unknowns regarding temperature and precipitation in the winter than there are knowns” supports the idea that

- A. Scientists predicting weather disasters have close ties to and funding from business interests.
- B. Much more research needs to be conducted to fully understand weather patterns.
- C. Weather scientists should work for government agencies rather than private foundations.
- D. It is unlikely that researchers will ever understand forces affecting temperature and precipitation.

7. Which statement best explains why scientists remain uncertain about the impact of this year’s El Niño?

- A. This year’s El Niño is the first weather event of its kind in hundreds of years and the last El Niño happened before the invention of modern scientific equipment.
- B. There are relatively few events to compare this year’s weather patterns with from the past and so far each El Niño has proven to be unique.
- C. Conflict between Pacific Rim nations prevents adequate examination of ocean currents that cause El Niños.
- D. Because El Niños largely impact Australia, India, and South America, United States scientists have not received adequate federal dollars to conduct research.