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The vast pool of warm Pacific water called El Niño, coming on top of an underlying global warming trend, lifted the earth's average surface temperature in 1997 to the highest levels ever recorded, Government scientists reported yesterday.

The rise in temperature, measured in minute fractions of a degree to about 62 degrees Fahrenheit, was not great and did not exceed the previous record by much, and several experts cautioned against making too much of it, given the role of El Niño.

But they said that even if El Niño had not been a factor, the 1997 readings would have extended a broad, general trend that has made the 1990's the world's warmest decade since people began measuring temperatures with thermometers in the mid-19th century.

The earth's average surface temperature has increased by about 1 degree Fahrenheit in the 20th century. Mainstream scientists say emissions of heat-trapping gases like carbon dioxide, which is produced by the burning of coal and oil, are responsible for at least part of the warming trend. The Government experts restated that judgment yesterday.

"We believe this tendency for increased global temperatures is related to human activity," specifically the gas emissions, Thomas R. Karl, senior scientist at the National Climatic Data Center in Asheville, N.C., said in announcing the latest temperature data at a briefing in Washington.

Other scientists pointed out that the warming trend was heightened last year by El Niño, the expanse of warm water that heated the surface

of the tropical Pacific in the latter half of 1997 and continues to do so. David Parker, a climate analyst at the British Meteorological Office, credited El Niño for most of the global temperature rise from 1996, which was not a year of record warmth.

But despite that, Mr. Parker said, "the underlying warming trend is still there."

According to the data presented by Mr. Karl, combined land and ocean temperatures last year averaged three-quarters of a degree Fahrenheit above normal, the mean temperature for the years from 1961 to

1990. The temperatures exceeded the record, set in 1990, by fifteen-hundredths of a degree. The actual average surface temperature last year was a little more than 62 degrees Fahrenheit, said the report by the National Climatic Data Center.

Even while the globe as a whole warmed, analysts at the center said, in the United States, the East and South were generally cool and the West generally warm. On balance, said William Brown, an analyst at the center, "it was a rather ho-hum year nationally."

A second report on the worldwide picture, issued by the British Meteorological Office, also showed that the average global temperature last year surpassed the record. In the British data set, the record year was 1995. The British figures did not include December readings, but because December was a warm month, experts at the meteorological office said they expected the new record to hold once the information was complete.

Because the two sets of figures contain slightly different data and were analyzed differently, they produce slightly different results and different record years. But they both document an overall warming trend in both the 1990's and 1980's, the two warmest decades on record.

"You can take the temperature in the mouth or the armpit," said Robert Quayle, chief of the global climate laboratory at the Asheville center. However it is taken, Mr. Quayle said, "the trend seems to be holding, and I think that's the chief conclusion."

A third report, issued by the NASA Goddard Institute for Space Studies in New York, showed that the average global temperature in 1997 essentially equaled the record set in 1995. The Goddard report was based on what is called the meteorological year, which runs from December through November. The results for calendar 1997 are expected to be about the same as for the meteorological year, said Dr. James E. Hansen, the director of the Goddard institute.

As has often happened, temperature measurements taken from earth satellites diverged from the surface readings. In fact, the satellites showed 1997 to be the eighth-coolest year in the 19 years since readings have been taken from orbit.

In general, however, the ups and downs of the satellite record have paralleled those of the surface readings.

And once the cooling influence of volcanic eruptions and the warming influence of El Niño are filtered out, the satellites show a warming trend of 0.13 of a degree per decade, said Dr. John R. Christy of the University of Alabama at Huntsville, one of the keepers of the satellite data. The 0.13-of-a-degree warming trend compares with 0.10 of a degree revealed by the surface temperature record described yesterday by Mr. Karl.

The surface thermometers and the satellites measure temperature in different parts of the climate system, and the surface data are considered important because the effects of climate change on people and natural ecosystems are felt at the surface.

The slight hundredths-of-a-degree rise last year in surface temperatures is "not really that significant" in helping to gauge whether human activity is warming the atmosphere, Dr. Hansen said.

A significant rise globally, like a tenth of a degree Celsius, which is nearly two-tenths of a degree Fahrenheit, "would make it clearer," he said, adding, "I suspect we will see that in the next couple of years, but we didn't do it this year."

Dr. Hansen was an early adherent of the view that human activity is warming the earth, and he has consistently predicted a new record by 2000.

As is always the case, the global temperature last year was not uniform from region to region. While many parts of the globe were warmer than average, some — including the eastern and southern United States — were cooler.

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