Global Climate Report - January 2016

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Maps and Time Series

Temperature and Precipitation Maps

January 2016

Temperature Anomalies Time Series

January

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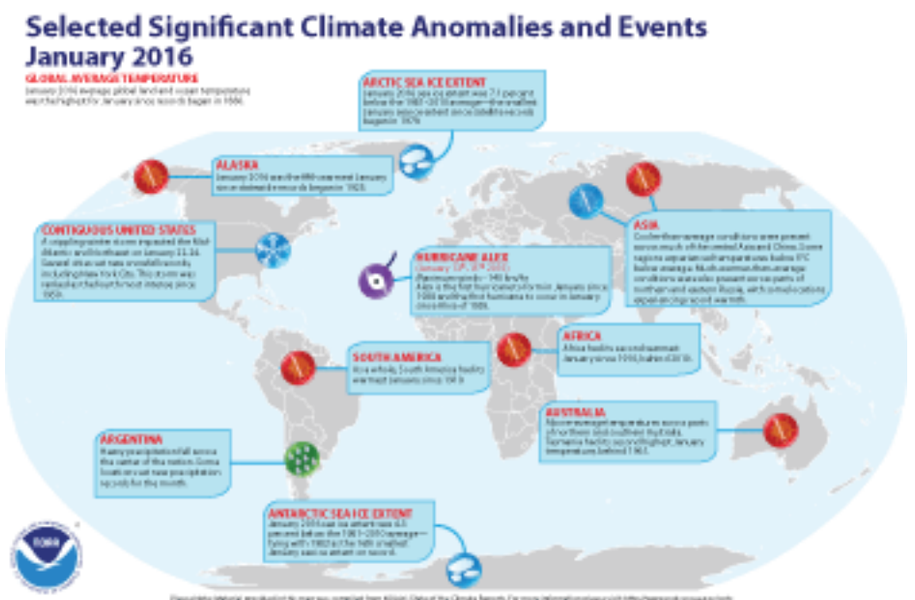


January 2016 Selected Climate Anomalies and Events Map

Introduction

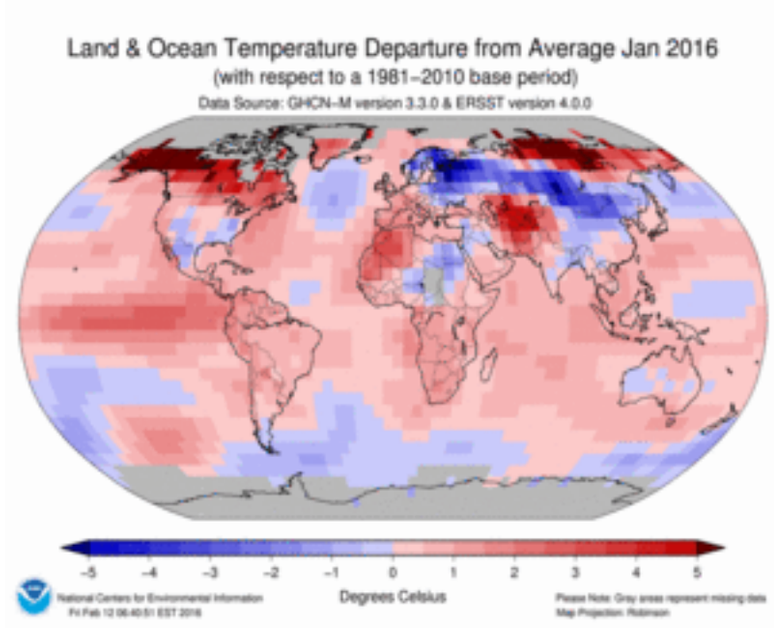
Temperature anomalies and percentiles are shown on the gridded maps below. The anomaly map on the left is a product of a merged land surface temperature (Global Historical Climatology Network, GHCN) and sea surface temperature (ERSST.v4) anomaly analysis as described in Huang et al. (2016). Temperature anomalies for land and ocean are analyzed separately and then merged to form the global analysis. For more information, please visit NCDC's Global Surface Temperature Anomalies page. The percentile map on the right provides additional information by placing the temperature anomaly observed for a specific place and time period into historical perspective, showing how the most current month, season or year compares with the past.

The most current data can be accessed via the Global Surface Temperature Anomalies page.

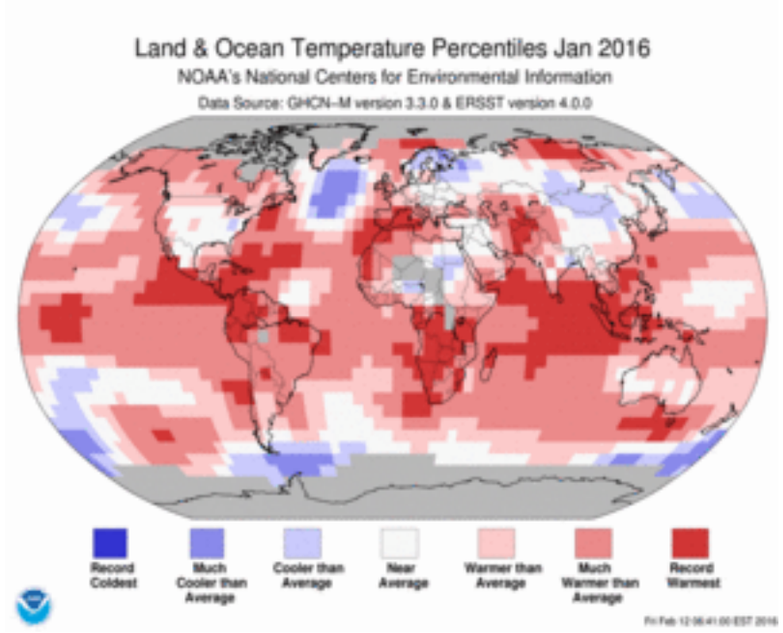
Temperatures

In the atmosphere, 500-millibar height pressure anomalies correlate well with temperatures at the Earth's surface. The average position of the upper-level ridges of high pressure and troughs of low pressure—depicted by positive and negative 500-millibar height anomalies on the January 2016 map—is generally reflected by areas of positive and negative temperature anomalies at the surface, respectively.

January



January 2016 Blended Land and Sea Surface Temperature Anomalies in degrees Celsius



January 2016 Blended Land and Sea Surface Temperature Percentiles

A strong El Niño that evolved in 2015 continued to impact global weather and temperatures at the beginning of 2016. The January 2016 globally-averaged temperature across land and ocean surfaces was 1.04°C (1.87°F) above the 20th century average of 12.0°C (53.6°F), the highest for January in the 137-year period of record, breaking the previous record of 2007 by 0.16°C (0.29°F). This departure from average is the second highest among all months in the historical record, second only to December 2015, which was 1.11°C (2.00°F) above average. These two months are the only two to-date to surpass a monthly temperature departure of 1°C. January 2016 also marks the ninth consecutive month that the monthly temperature record has been broken and the 14th consecutive month (since December 2014) that the monthly global temperature ranked among the three warmest for its respective month.

Separately, the global land surface temperature was 1.56°C (2.81°F) above average, the second highest on record for January, behind only 2007. Record warmth was observed across a swath of northern Siberia where temperatures rose at least 5°C (9°F) above the 1981–2010 monthly average, as well as across parts of southeastern Asia, southwestern Asia and the Middle East, most of southern Africa, and areas of Central and South America. Nearly all of the South American continent was much warmer than average. Northern Mexico, Scandinavia, and Central Asia around Mongolia were cooler than average, with a couple of areas that experienced much cooler-than-average temperatures. Parts of far western Russia and central Asia observed temperatures at least 5°C below average for the month.

Select national information is highlighted below:

- Northeasterly flows brought warmer-than-average weather to much of New Zealand in January. All of the North Island and the northern and western regions of the South Island were above to well-above average for the month. Overall, the nation-wide temperature was 0.6°C (1.1°F) higher than the 1981–2010 average.
- Though not as extreme as the past few months, temperatures remained above the 1961–1990 average across Australia during January. The average mean temperature for the month was +0.52°C (+0.94°F). Tasmania was the warm spot, with an average mean temperature that was 1.79°C (3.22°F) above average, its second highest for January, behind only 1961. National records begin in 1910.
- In Germany, the January temperature was 0.8°C (1.4°F) higher than the 1981–2010 average.
- The year also started out warmer than normal in Austria. The average January temperature was 1.3°C (2.3°F) above the 1981–2010 average.
- Sweden was colder than average across most of the country for January, with a mix of mild, cold, and mild again weather patterns through the month. On January 7th, the temperature dropped to -42.9°C (-45.2°F) in Naimakka, the lowest temperature recorded in Sweden during any month since 2001
- It was also a colder-than-average January in Finland, particularly in the southern and central regions, with temperatures 4°–7°C (7°–11°F) below the 1981–2010 average.
- The January national temperature for Iceland was 0.2°C (0.4°F) higher than the 1961–1990 average, but 1.0°C (1.8°F) lower than the average over the past 10 years. Not all locations in

Iceland were warmer than average, however; Akureyri had its coldest January since 1995.

- In Canada, Ontario was warmer than normal at the start of 2016. Temperatures in northern Ontario and the Far North were 2°–5°C (4°–9°F) higher than the 1961–1990 average.
- According to CIIFEN, much of South America had January temperatures around 2.0°C (3.6°F) above the 1981–2010 average; however, Argentina, Uruguay, and southern Brazil observed temperatures about 0.5°C (0.9°F) below average.

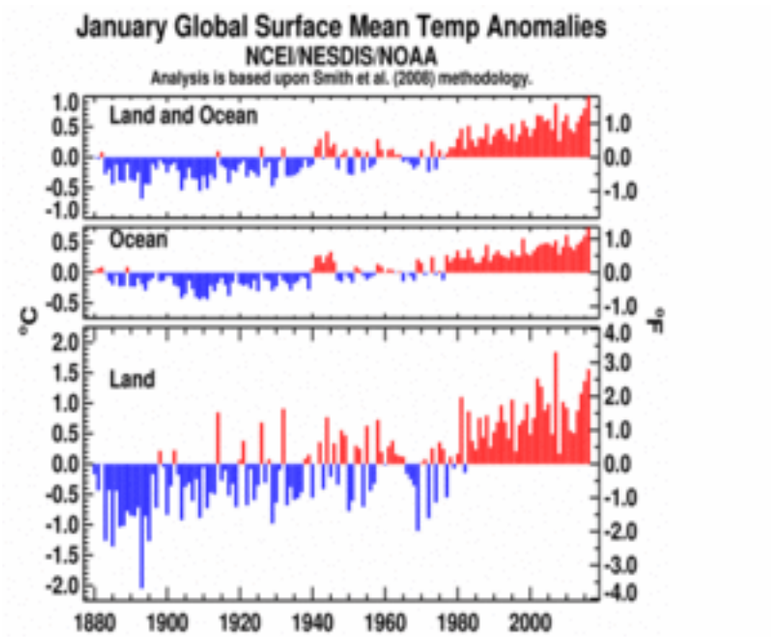
For the oceans, the globally-averaged temperature departure of +0.86°C (+1.55°F) from the 20th century average was the highest on record for January, surpassing the previous record of 2010 by 0.25°C (0.45°F). Record warmth was observed in all major ocean basins: various regions of the eastern and western Atlantic, particularly near coasts, part of the Barents Sea in the Arctic; the Southeast Indian Ocean to the south of Australia; most of the North Indian Ocean; parts of the eastern and central equatorial Pacific; and the western Mediterranean Sea. Near-record strong El Niño conditions prevailed in the central and eastern equatorial Pacific Ocean during the month, where the Oceanic Niño Index tied as the highest on record with the same general period in 1998. However, the January 2016 global ocean temperature is 0.29°C (0.52°F) higher than the monthly temperature for January 1998.

According to NOAA's Climate Prediction Center, as of early February 2016, the strong El Niño is expected to weaken and likely transition to ENSO-neutral during late Northern Hemisphere spring or early summer 2016, with a possible transition to La Niña conditions during the fall.

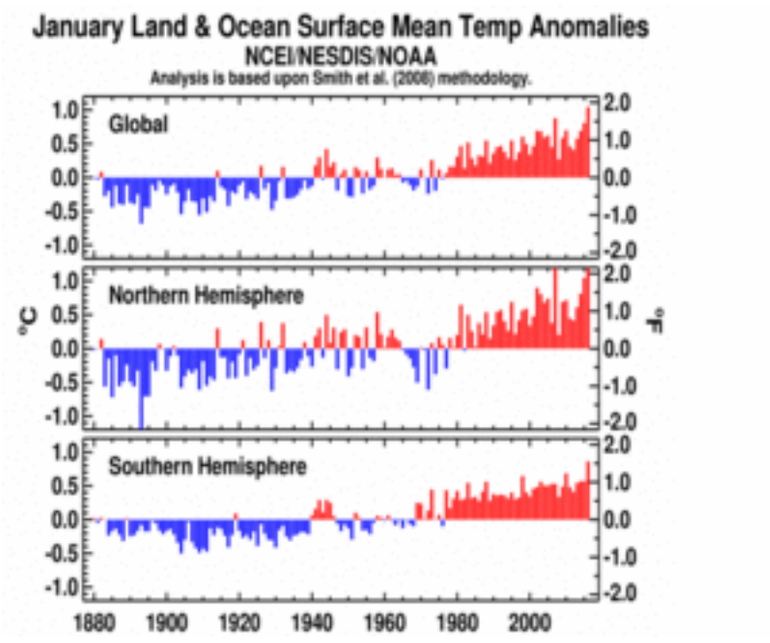
Elsewhere, much cooler-than-average conditions remained in the North Atlantic waters south of Greenland and were seen in parts of the Southern Ocean.

JANUARY	ANOMALY		RANK (OUT OF 137 YEARS)		RECORDS		
	°C	°F			YEAR(S)	°C	°F
Global							
Land	+1.56 ± 0.24	+2.81 ± 0.43	Warmest	2nd	2007	+1.84	+3.31
			Coolest	136th	1893	-2.05	-3.69
Ocean	+0.86 ± 0.15	+1.55 ± 0.27	Warmest	1st	2016	+0.86	+1.55
			Coolest	137th	1909, 1911	-0.44	-0.79
Land and Ocean	+1.04 ± 0.17	+1.87 ± 0.31	Warmest	1st	2016	+1.04	+1.87
			Coolest	137th	1893	-0.68	-1.22
Northern Hemisphere							
Land	+1.67 ± 0.34	+3.01 ± 0.61	Warmest	3rd	2007	+2.27	+4.09
			Coolest	135th	1893	-2.58	-4.64
Ocean	+0.96 ± 0.14	+1.73 ± 0.25	Warmest	1st	2016	+0.96	+1.73
			Coolest	137th	1894	-0.47	-0.85
Land and Ocean	+1.23 ± 0.22	+2.21 ± 0.40	Warmest	1st	2007, 2016	+1.23	+2.21
			Coolest	137th	1893	-1.28	-2.30
	Ties: 2007						
Southern Hemisphere							
Land	+1.27 ± 0.12	+2.29 ± 0.22	Warmest	1st	2016	+1.27	+2.29
			Coolest	137th	1904	-0.90	-1.62
Ocean	+0.79 ± 0.15	+1.42 ± 0.27	Warmest	1st	2016	+0.79	+1.42

			Coolest	137th	1909	-0.47	-0.85
Land and Ocean	+0.86 ± 0.15	+1.55 ± 0.27	Warmest	1st	2016	+0.86	+1.55
			Coolest	137th	1904	-0.50	-0.90



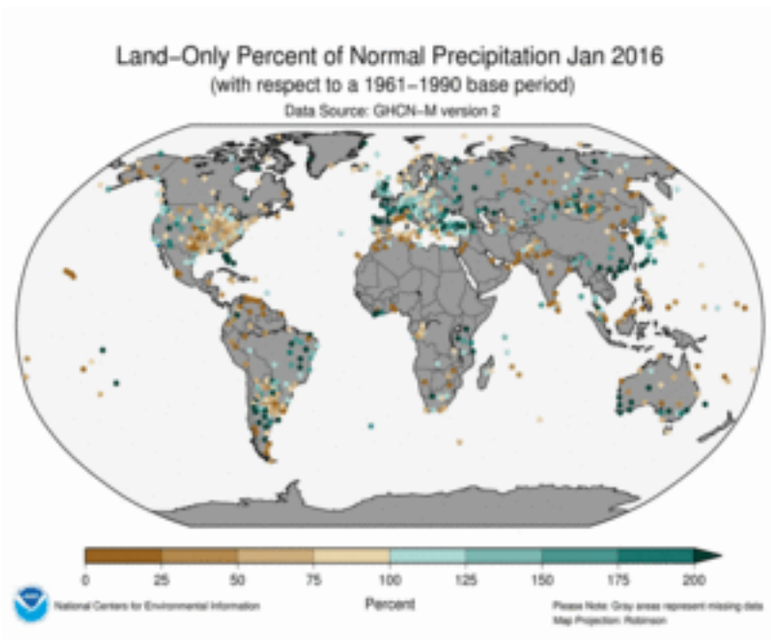
January Global Land and Ocean plot



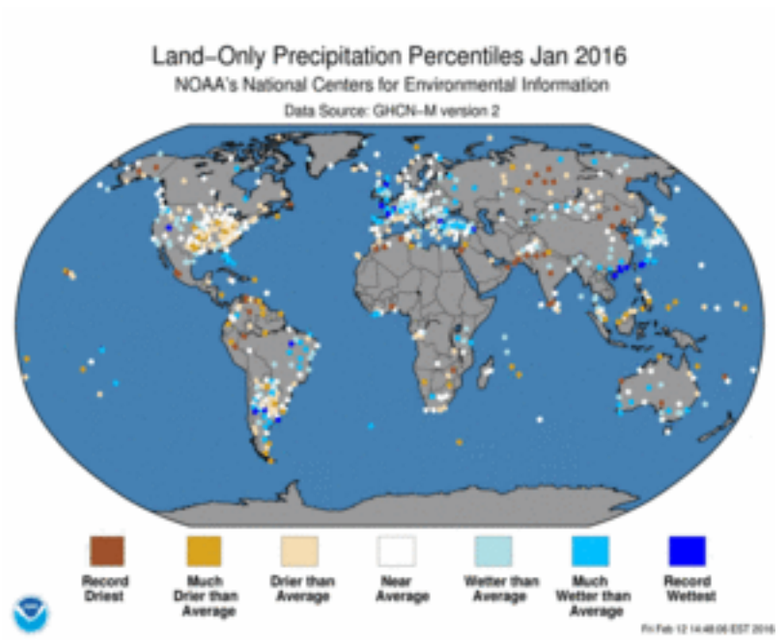
January Global Hemisphere plot

Precipitation

The maps below represent precipitation percent of normal (left) and precipitation percentiles (right) based on the GHCN dataset of land surface stations using a base period of 1961–1990. As is typical, precipitation anomalies during January 2016 varied significantly around the world. Precipitation was especially high across parts of eastern Brazil and areas of southern South America, much of western Europe, western Mongolia, some coastal regions in southeastern China, and much of the coastline along southern and southwestern Australia. It was notably dry across part of western Mexico, parts of both northern and southern South America, sections of southern, north central, and eastern Asia, far northwestern Africa, and small areas of western and southern Australia.



January 2016 Land-Only Precipitation Percent of Normal



January 2016 Land-Only Precipitation Percentiles

- The tropical air that flowed over New Zealand during January brought not only warmth but wetness, extreme in some areas. Precipitation totals were more than 149 percent of normal across the northern and eastern portions of both islands. On the South Island the port city of Timaru received almost three times its typical January rainfall. More than half of that total (81 mm) was received in one day, marking the highest single day rainfall total since records began there in 1881.
- It was also wet in Ireland. Dublin airport reported its wettest January since 1948, with 118.4 mm (4.7 inches) of rainfall, close to twice its monthly average.
- Following its wettest December on record, the United Kingdom received 152 percent of its average rainfall during January, marking its fourth wettest January since records began in 1910. Eastern Scotland observed its second wettest month among all months in its record.
- In January, Colombia, Venezuela, and the southern highlands of Peru were experiencing severe dryness, which impacted agriculture, water supplies, and power generation. Paraguay, Uruguay, and Argentina experienced flooding, which impacted thousands of residents, as reported by CIIFEN.

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- Peterson, T.C. and R.S. Vose, 1997: An Overview of the Global Historical Climatology Network Database. *Bull. Amer. Meteorol. Soc.*, **78**, 2837-2849.

- Huang, B., V.F. Banzon, E. Freeman, J. Lawrimore, W. Liu, T.C. Peterson, T.M. Smith, P.W. Thorne, S.D. Woodruff, and H-M. Zhang, 2016: Extended Reconstructed Sea Surface Temperature Version 4 (ERSST.v4). Part I: Upgrades and Intercomparisons. *J. Climate*, **28**, 911-930.

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