

Extremely hot conditions in Japan in midsummer 2013

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<http://ds.data.jma.go.jp/tcc/tcc/index.html>

In summer 2013, many parts in Japan, especially in western Japan, experience very high temperatures, while precipitation amounts are below normal on the Pacific side in eastern and western Japan as well as in Okinawa/Amami. Four stations recorded temperatures reaching or exceeding 40°C, among which Ekawasaki (Kochi Prefecture) hit 41.0°C, a new country record high temperature, on 12 August.

1. Surface climate conditions

In summer 2013, temperatures continue to remain above normal in many parts of Japan, especially in western Japan (Fig. 1). Ten-day mean temperatures averaged over western Japan were the third highest on record for three consecutive ten-day periods from the middle of July (11 – 20 July, 21 – 31 July and 1 – 10 August) in the JMA records since 1961 (Table 1). Since around 8 August, temperatures have been well above normal almost all over Japan and more than 3°C above normal at a large number of observation stations mainly on the Pacific side in eastern and western Japan (Fig. 2). In particular, from 10 to 12 August, the Pacific side in eastern and western Japan experienced extremely high temperatures and Ekawasaki (Shimanto-city, Kochi Prefecture) marked the highest temperature on record in the country at 41.0°C on the afternoon of 12 August, exceeding the previous record of 40.9°C logged at Kumagaya (Saitama Prefecture) and Tajimi (Gifu Prefecture) on 16 August 2007. As of 12 August, a total of 106 observation stations recorded the highest temperatures. Daily minimum temperatures were also quite high at many places and 68 stations recorded the highest daily minimum temperatures, as of 12 August. On 11 August, the daily minimum temperature at Tokyo was as high as 30.4°C. It was the first time for the temperature in Tokyo to remain over 30°C for all day long since the daily observation started in 1875.

Since July, precipitation amounts continue to be below normal on the Pacific side in eastern and western Japan and in Okinawa/Amami. The precipitation amount from 1 July through 12 August was as little as 0.0 mm in Naze (Kagoshima Prefecture).

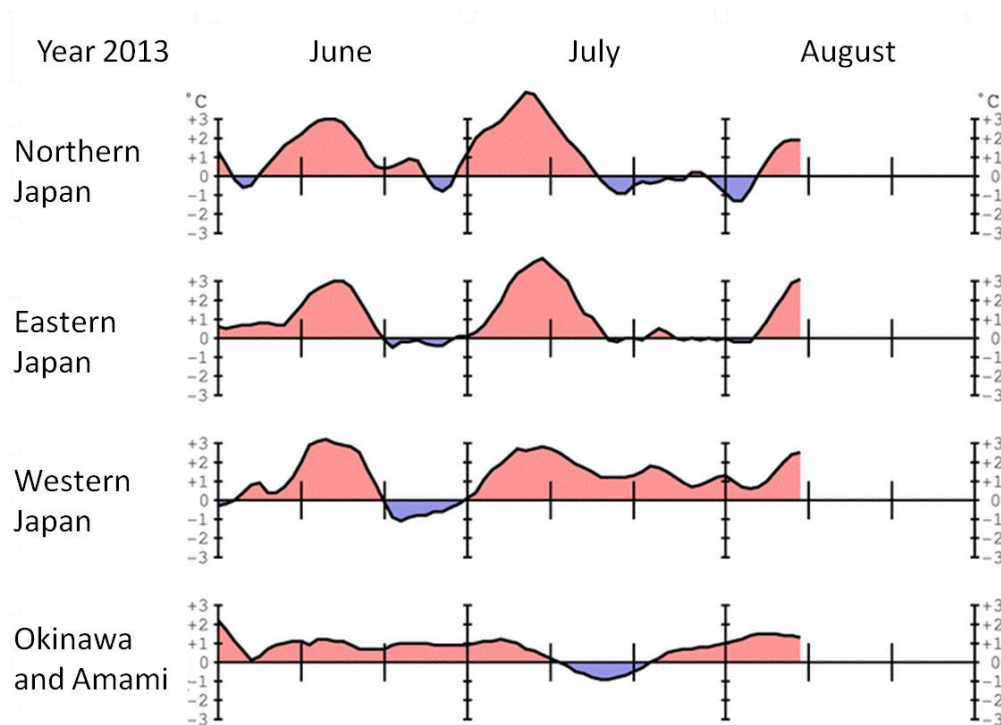


Fig. 1 Time series of five-day running mean temperature anomalies (unit: °C) for four divisions of Japan from 1 June to 12 August, 2013

Anomalies are deviations from the 1981 – 2010 average, based on daily observations made at 154 surface meteorological stations.

Table 1 10-day mean temperature anomalies (unit: °C) averaged over four divisions of Japan from early July to early August, 2013 and rankings since 1961 (shown only within top five)

Anomalies are deviations from the 1981 – 2010 average, based on daily observations made at 154 surface meteorological stations.

	Jul.			Aug.
	1 – 10	11 – 20	21 – 31	1 – 10
Northern Japan	+3.4°C 1st	+0.7°C	-0.2°C	+0.2°C
Eastern Japan	+2.2°C	+1.5°C	+0.1°C	+1.0°C
Western Japan	+1.8°C	+1.7°C 3rd	+1.2°C Tie for 3rd	+1.3°C Tie for 3rd
Okinawa and Amami	+0.9°C Tie for 3rd	-0.6°C	+0.4°C	+1.4°C 1st

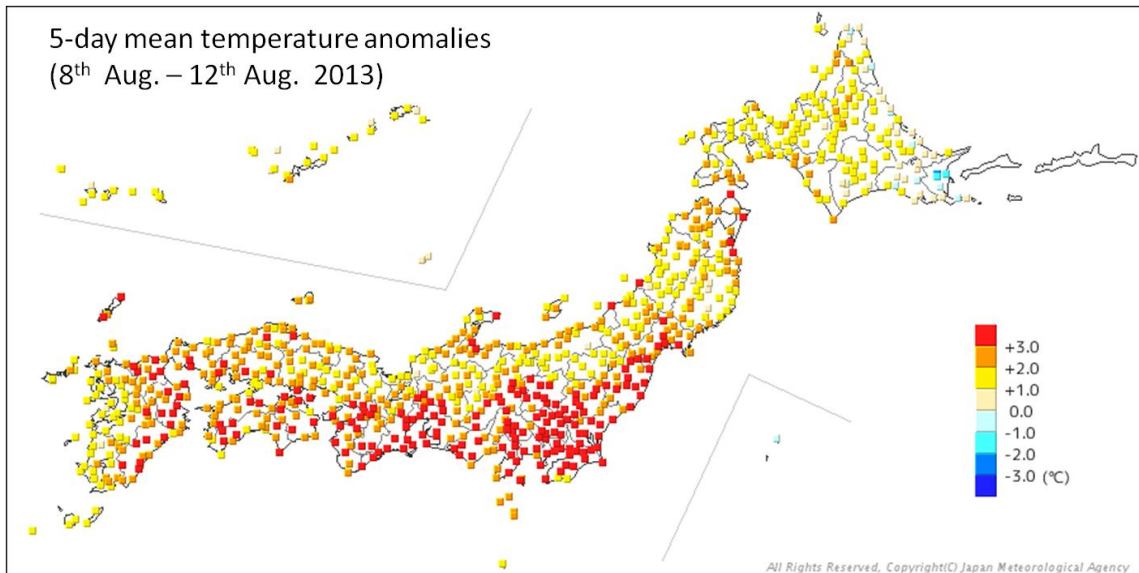


Fig. 2 Five-day mean temperature anomalies (8 – 12 August, 2013)
Anomalies are deviations from the 1981 – 2010 average

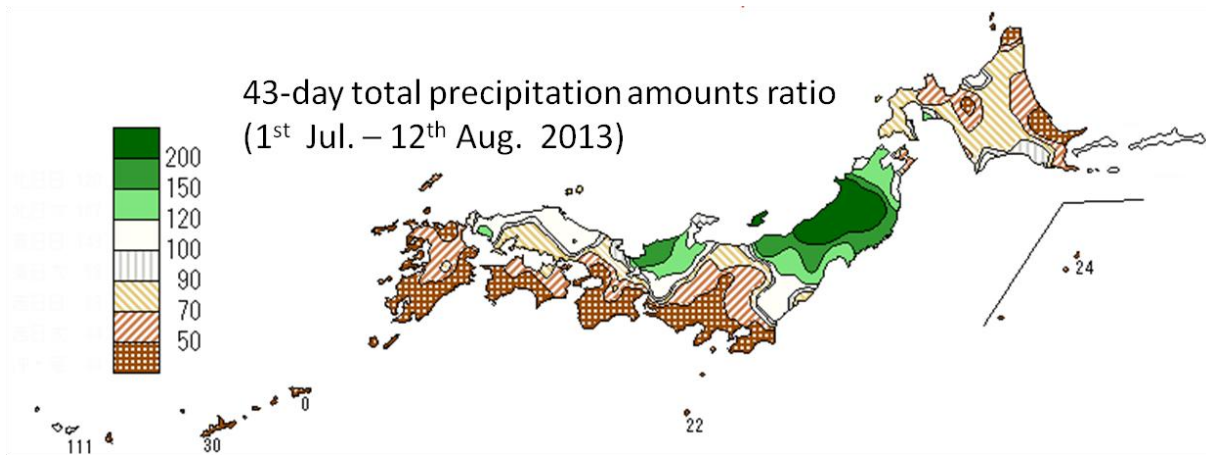


Fig. 3 43-day total precipitation amount ratio (% of the 1981 – 2010 average)
(1 July – 12 August, 2013)

Total precipitation amount ratios are derived from daily observations made at 154 surface meteorological stations.

2. Characteristic atmospheric circulation causing Japan's hot conditions

During the last several days, both lower-level anticyclone (the Pacific High) and upper-level anticyclone (the Tibetan High) were enhanced around Japan. Many parts of Japan experienced significant high temperatures due to predominant sunny conditions (i.e., above-normal amounts of solar radiation) and prevailing downward motion of air associated with high pressure systems.

The enhanced Pacific High remained over southern China and to the south of the main islands of Japan from early July. The Pacific High was enhanced due to predominant downward motion of air originating from Southeast Asia where upward motion of air prevailed associated with enhanced convective activity.

The Tibetan High, which expands to the main islands of Japan during midsummer of normal years, was enhanced over the country in line with northward meandering of the westerly jet stream. The northward meandering flow over Japan formed as a part of wave trains that propagated eastward along the Eurasian subtropical jet stream.

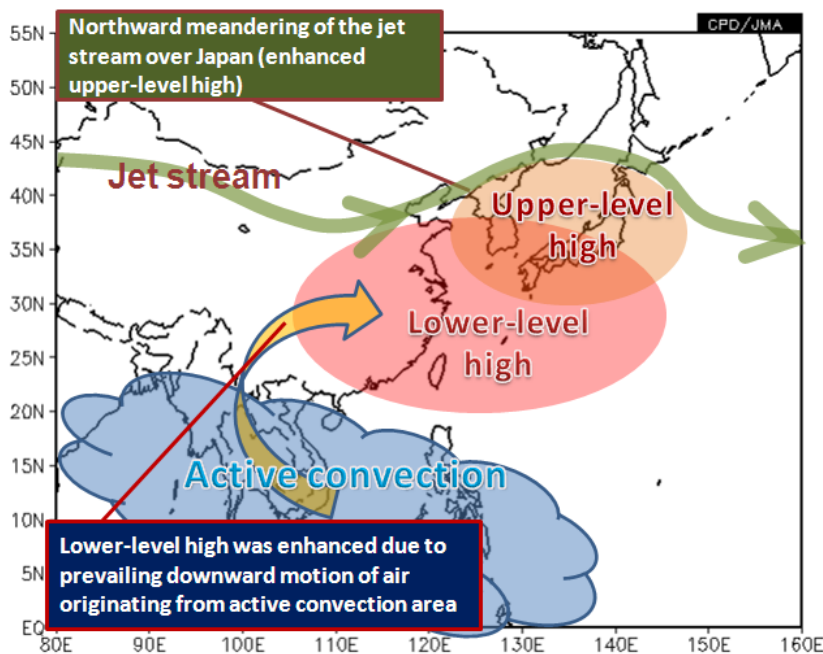


Fig. 4 Primary factors contributing to the hot conditions in Japan (8 – 11 August 2013)

3. Outlook

The North Pacific High is predicted to cover the main island of Japan in the coming two weeks, thus sunny and hot weather is likely to continue. Precipitation amounts are predicted to remain below normal on the Pacific side in eastern and western Japan. JMA urges healthcare including heat stroke prevention, careful crop management, and water saving*.

On the other hand, cloudy and/or rainy weather is expected in Okinawa after later this week due to wet air flow.

* Information on water shortage can be found at

<http://www.mlit.go.jp/tochimizushigen/mizsei/kassui/kassui.html> (in Japanese)