

An overview of 2012 summer climate over Japan

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Abstract

Temperatures were above normal in northern, eastern, and western Japan this summer (June – August 2012), because the Pacific High was strong east of Japan and extended westward around the main land of Japan. Maximum temperatures of $\geq 35^{\circ}\text{C}$ were observed at some stations from the last half of July to the end of August. On the other hand, the Okhotsk High appeared over the Sea of Okhotsk and brought cool and moist wind to the Pacific side of northern and eastern Japan several times from June to July.

Precipitation amounts were above normal and sunshine durations were below normal in western Japan and Okinawa/Amami this summer due to frequent approach of tropical cyclones, the active Baiu-front, and frequent warm and moist southerly flow. The summer precipitation amounts in Okinawa/Amami were largest since 1946. The number of strong rain events with over 50 mm of precipitation per hour (every hour on the hour) was largest since 1976. At the end of the Baiu period, heavy rainfall on Kyushu Island caused floods and landslides, especially in the northern region.

Severe lingering summer heat continued in northern and eastern Japan. From the last dekad of August to the second dekad of September, the dekad mean temperature in northern Japan continued to be highest since 1961 (dekad: ten days). The characteristics of atmospheric circulation during the period are shown in Figure 1. The Pacific High was enhanced northeast of Japan and extended westward around northern and eastern Japan in association with the large northward meander of the upper-level westerly jet stream. Temperatures in northern and eastern Japan got high due to warm southerly flow around the Pacific High on one occasion and due to long sunshine duration by the presence of the Pacific High over northern and eastern Japan on another occasion. The large northward meander of the upper-level westerly jet stream is considered to have been caused by active convection from the Arabian Sea to the Bay of Bengal associated with Asian summer monsoon. The Pacific High was extended westward around northern and eastern Japan also by active convection northeast of the Philippines and the passages of tropical cyclones through Okinawa and the East China Sea.

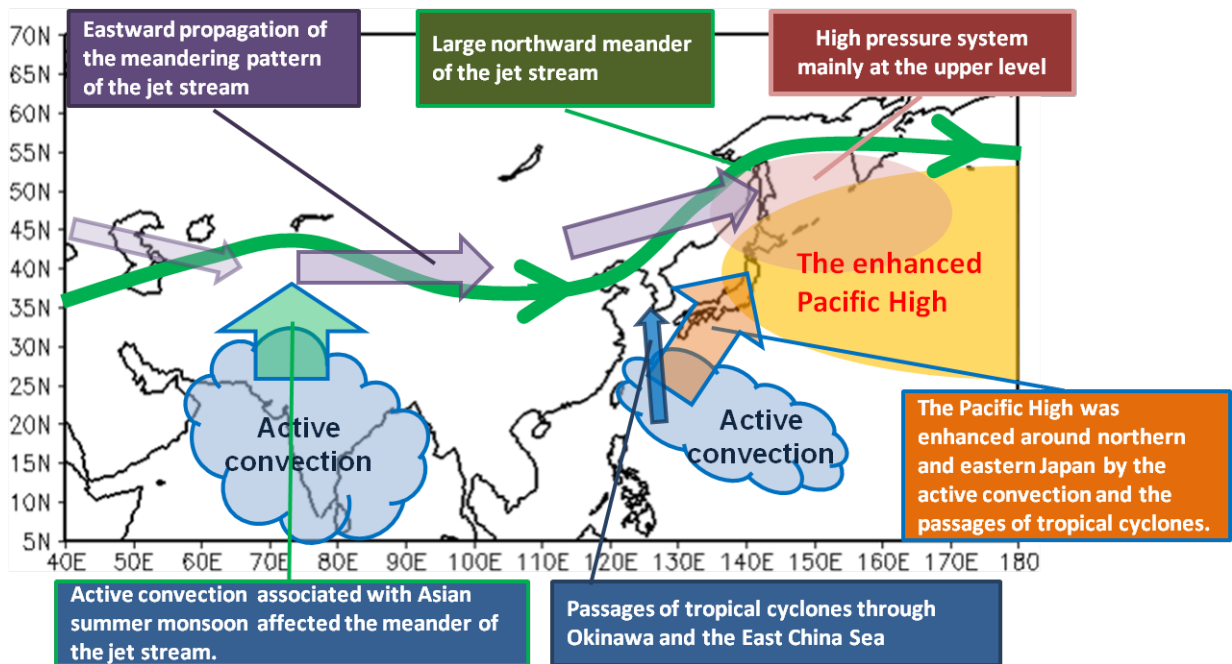


Figure 1 Characteristics of the atmospheric circulation during the severe lingering summer heat in northern and eastern Japan (21 August – 20 September 2012).