

The state of the western North Pacific in the second half of 2013

by Takashi Yoshida

The western North Pacific in the second half of 2013 was characterized by a significantly warm summer. In the North Pacific, remarkably positive sea surface temperature (SST) anomalies were seen over a large area north of 30°N in summer. During July and August, the North Pacific High

was enhanced to the south of Japan and extended to eastern China and western Japan. The enhancement brought significantly positive SST anomalies in the seas around the Northeast Asian countries, especially in August (Fig. 1).

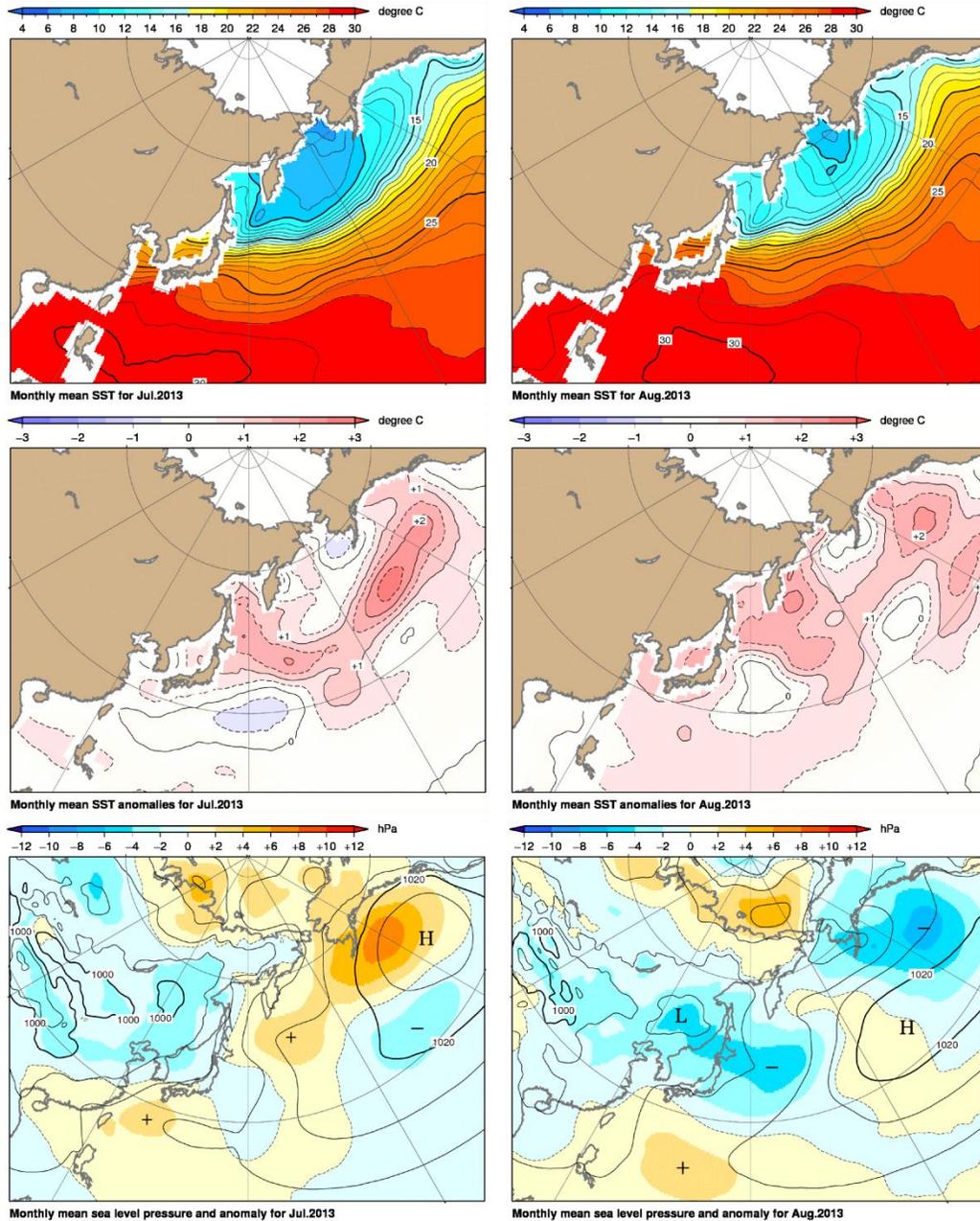


Fig. 1 Monthly mean sea surface temperature (upper), SST anomalies (middle) and sea level pressure (SLP) anomalies (bottom) for July and August 2013. Monthly mean SSTs and SLPs are based on JMA's COBE-SST (Centennial in situ Observation-Based Estimates of variability of SST and marine meteorological variables) and JRA-55 (Japanese 55-year Reanalysis), respectively. Anomalies are deviations from 1981–2010 climatology.

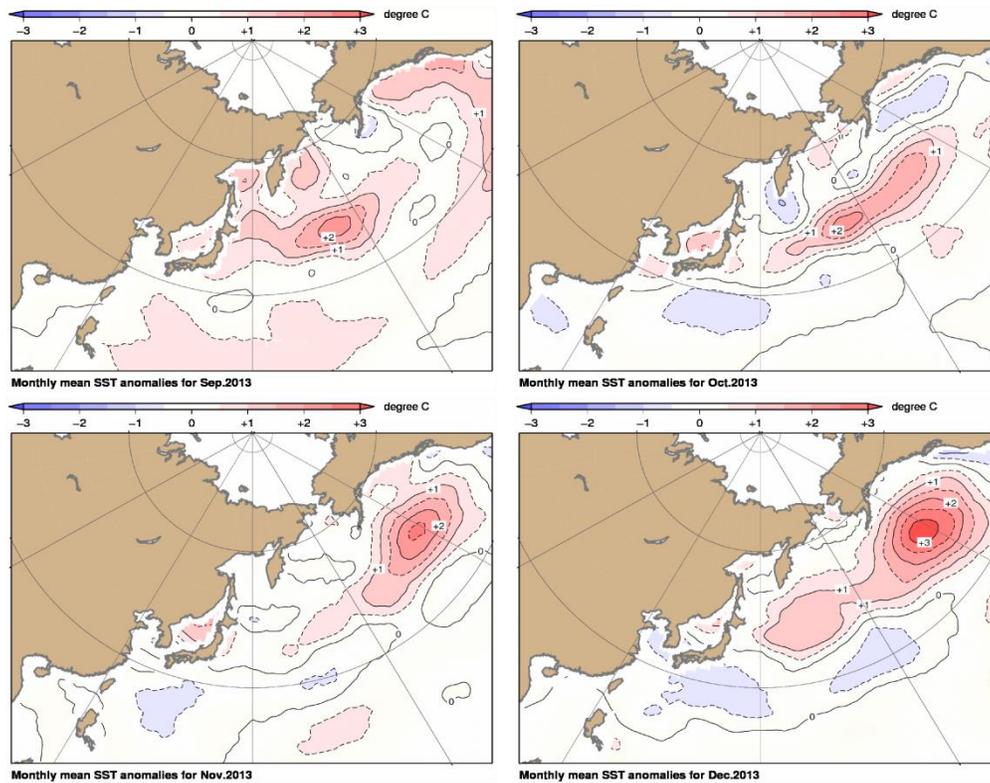


Fig.2 Monthly mean SST anomalies from September to December 2013.

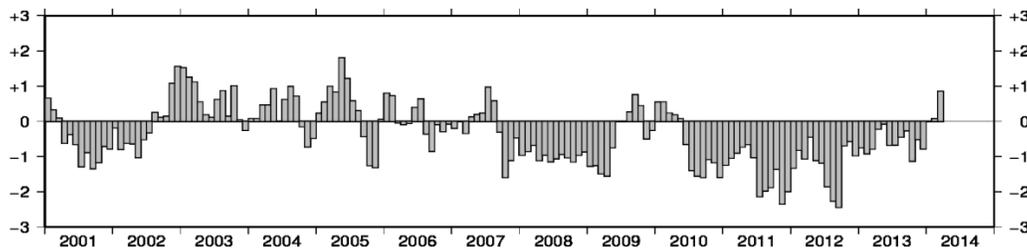


Fig.3 Time series of Pacific Decadal Oscillation (PDO) index from January 2001 to March 2014.

Several impacts of the significant warm climate on fisheries and aquatic life were reported. In the Okhotsk Sea, coastal fishermen experienced unusual yellowtail catches in their salmon fixed nets from August to October. Fishermen also experienced unusual bluefin tuna catches in the Oyashio region, the sea southeast of Hokkaido, usually occupied by cold subarctic waters where tuna have been rarely caught. Warmer water temperatures delayed the southwest migration of Pacific saury, causing its short supply in early September. Slower growth of oysters in several Japanese oyster farms and coral bleaching in Okinawa were observed in these months, which are also considered to be impacts of the warm episode.

The Pacific Decadal Oscillation (PDO), which had positive and negative SST anomalies in the central and eastern parts of the North Pacific, respectively, was in the negative phase throughout almost the whole year, although the pattern was slightly obscure from summer to autumn 2013 (Fig. 2). The PDO is an SST anomaly pattern of Pacific climate variability that shifts phases on

an inter-decadal time scale usually covering more than 10 years. Recently (since mid-2010), the negative phase of the PDO with positive SST anomalies in the central part of the North Pacific has been occurring frequently (Fig. 3).

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