The state of the western North Pacific in the first half of 2005

By Toshiyuki Sakurai

Sea surface temperature

Figure 1 shows monthly mean sea surface temperature (SST) anomalies in the western North Pacific from January to June 2005, computed with respect to JMS's (Japan Meteorological Agency) 1971-2000 climatology. Monthly SSTs are calculated from JMA's MGDSST (Merged satellite and *in-situ* data Global Daily SST), which is based on AVHRR/NOAA data, microwave sensor (AMSR-E/AQUA) data, and *in situ* observations. Time series of 10-day mean SST anomalies are presented in Figure 2 for 9 regions (indicated in the bottom panel).

In January and February, SSTs were generally above normal in the seas adjacent to Japan, except around 40°N, 145°E. Positive SST anomalies exceeding +1ºC were found around 25°N, 130°E, and west of the northern part of Japan. These positive SST anomalies were reduced in magnitude in March and April.

SSTs were below normal north of 30°N in May, and negative SST anomalies exceeding –1°C were found along 40°N. The negative SST anomalies changed to positive values from west of the northern part of Japan to the East China Sea (regions 1, 2, 3 and 5 in Fig. 2) in June. Positive SST anomalies exceeding +1°C were found around 28°N, 155°E and along 20°N from 170°E to 180°, while negative SST anomalies exceeding –1°C prevailed along 40°N east of 160°E and around 28°N, 130°E.

Kuroshio and Oyashio

The Kuroshio took a large-meander path from July of 2004 through the first half of 2005. The most southern position of the meander gradually moved eastward from about 137.5°E in January to about 138.5°E in June. The Kuroshio path showed an S-shaped curve around 139°E, where small perturbations propagated eastward along the Kuroshio, clearly observed from mid-March to early April and from late April to early May (Fig. 3).

Figure 4 shows subsurface temperature at a depth of 100 m east of Japan in March 2005. This chart is based on the numerical ocean data assimilation system (JMAs Ocean Comprehensive Analysis System).

The Oyashio cold water (defined as temperatures less than 5°C in Fig. 4) is known to extend southward at its

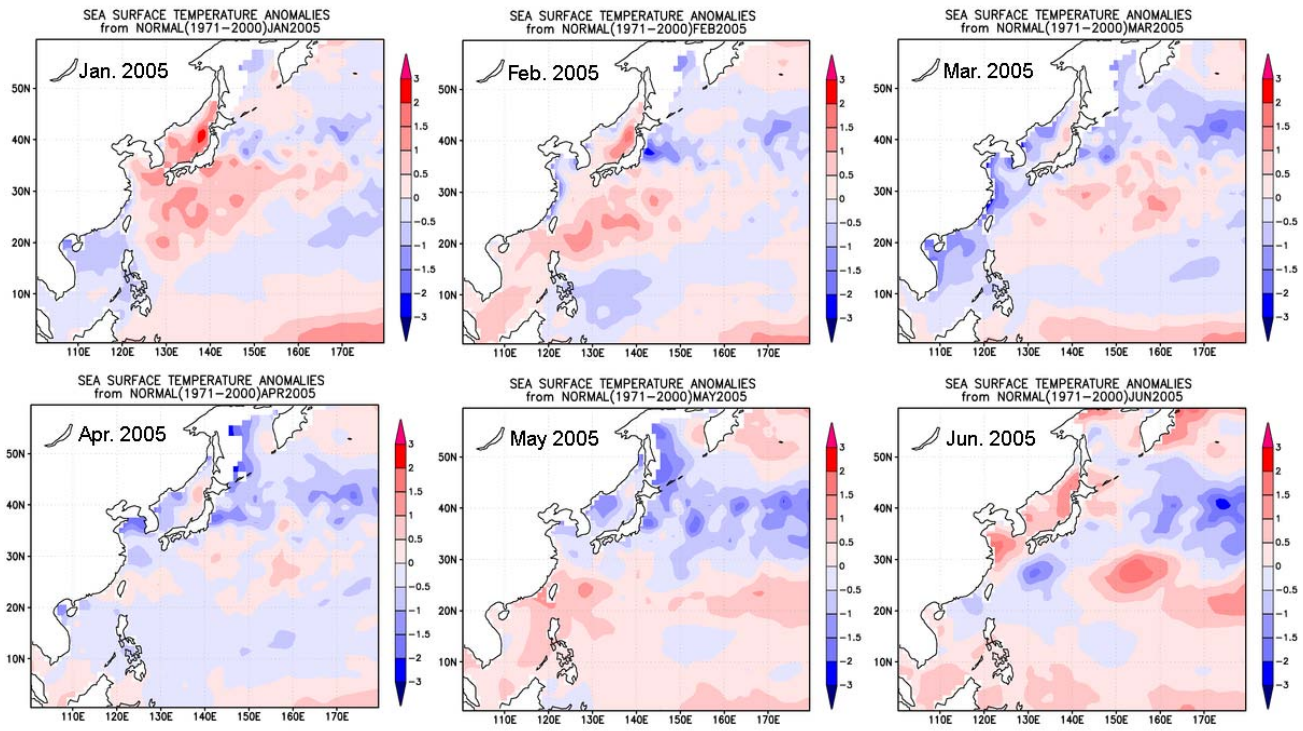

Fig. 1 Monthly mean sea surface temperature anomalies (ºC) from January to June 2005. Anomalies are deviations from JMA's 1971-2000 climatology.

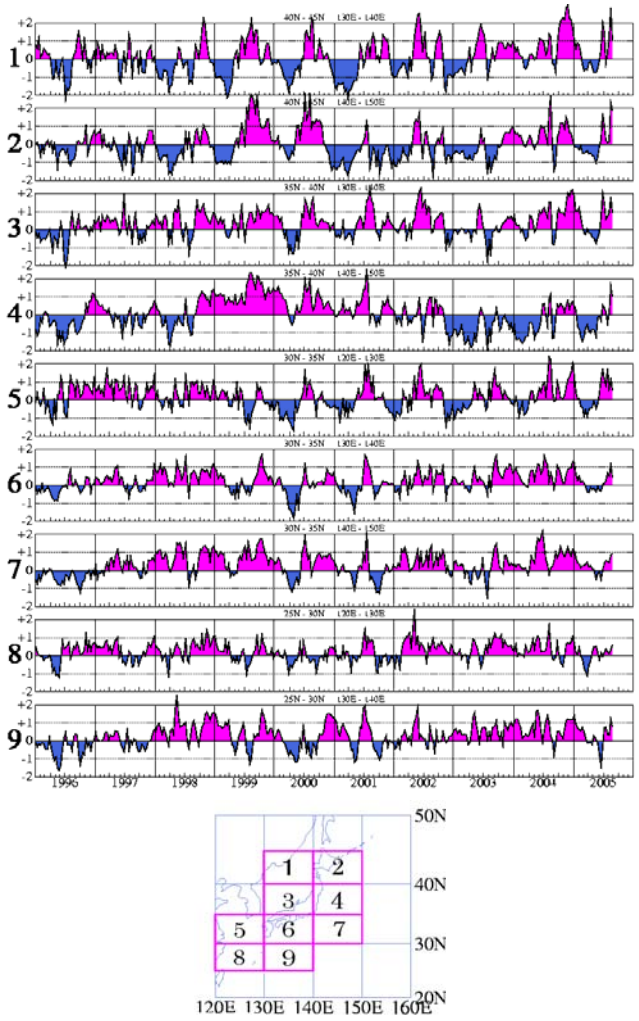

Fig. 2 Time series of the 10-day mean sea surface temperature anomalies (ºC) from JMA's 1971-2000 climatology for the areas shown in the bottom panel.

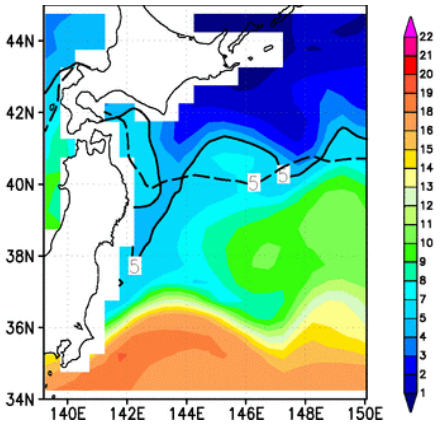

Fig. 4 Subsurface temperature (ºC) at a depth of 100 m east of Japan for March 2005. Solid line denotes the 5ºC isotherm, and dashed line that of the climatology (30-year averaged values from 1971 to 2000).

southernmost position in the spring, and return northward from summer to autumn. The coastal branch of the Oyashio cold water extended southward significantly in March 2005 (black line in Fig. 5), while it returned close to the 30-year averaged latitude after April (green line in Fig. 5). The southernmost latitude in March was 36.7°N, 141.6°E, which is 200 km south of the 30-year averaged value.

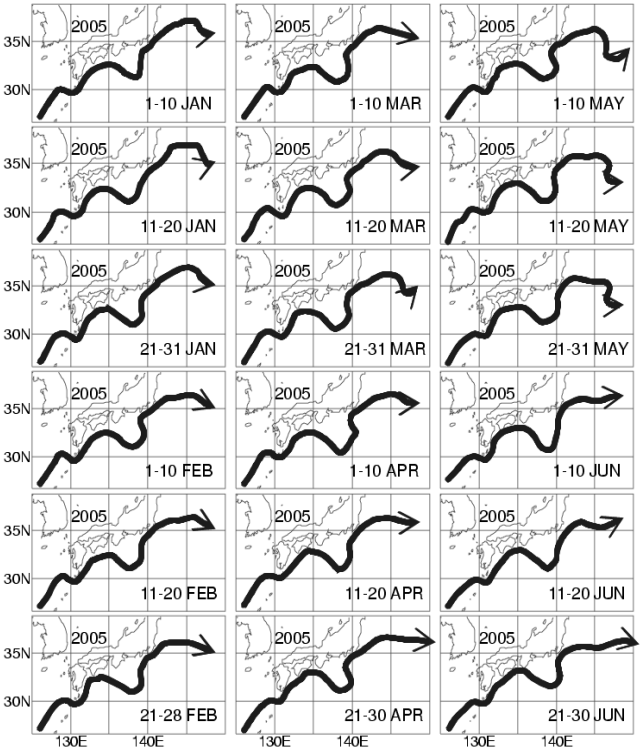

Fig. 3 Location of the Kuroshio axis from January to June 2005.

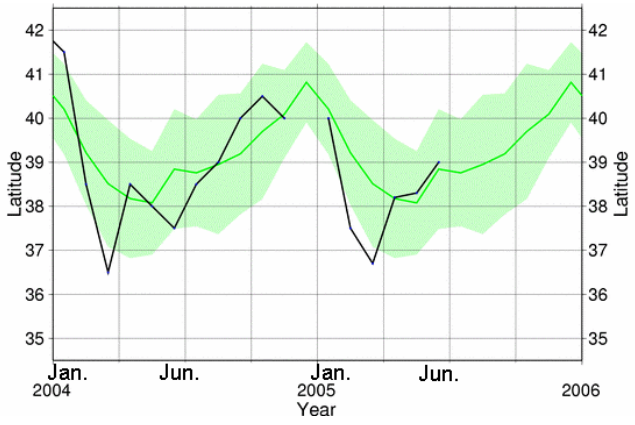

Fig. 5 The southernmost position of the coastal branch of the Oyashio cold water from January 2004 to June 2005 (black line), and the 30-year averaged values (green line), with the range of one standard deviation (green shade) from 1971 to 2000.

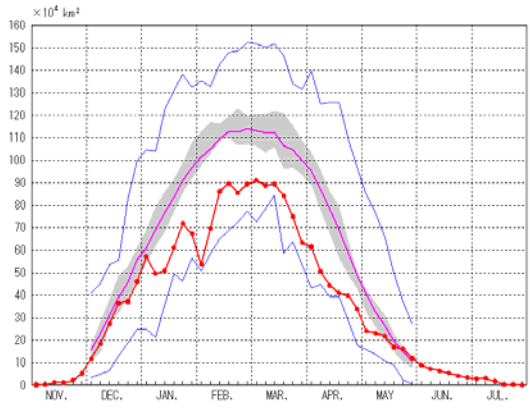

Fig. 6 Time series of sea ice extent in the Sea of Okhotsk from November 2004 to July 2005 (pink line - JMA's 1971-2000 climatology; red line – 2004-2005 analysis; blue lines - maximum/minimum of sea ice extent since 1971; grey area - within the normal range.

Sea ice in the Sea of Okhotsk

The extent of sea ice in the Sea of Okhotsk was below normal (30-year averaged values from 1971 to 2000) in late December 2004 and from mid-January 2005 to early May 2005 (Fig. 6). On February 5, the sea ice area was 53.8×10^4 km^2, which was about half of the normal area, and the second lowest value since 1971 (the lowest value on February 5 was 50.75×10^4 km^2 in 1996). The sea ice area reached its maximum on March 5 at 91.13×10^4 km^2, which was about 74% of the normal area, and the second lowest value since 1971 (the lowest value was 85.81×10^4 km^2 in 1984).

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