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

By Shiro Ishizaki

Sea surface temperature

Figure 1 shows the monthly mean sea surface temperature (SST) anomalies in the western North Pacific from July to December 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.

SSTs were generally above normal in the seas adjacent to Japan from July to November except east of Honshu in July. Positive SST anomalies exceeding +2°C prevailed around Hokkaido from October to November. These anomalies were significant over the past 9 years in Regions 1 and 2. Negative SST anomalies were found in a broad area except around Hokkaido in December. In the region of the Philippines, positive SST anomalies dominated in July and from October to November, while negative SST anomalies appeared from August to September and in December.

Kuroshio path

Figure 3 shows a time series of the location of the Kuroshio for this period. A large meander path of the Kuroshio, which was formed off Tokai in July 2004, was maintained throughout August 2005. This meander moved away to east of the Izu Islands (along 140°E) from September to October. The Kuroshio then flowed eastward off Shikoku Island and off Tokai.

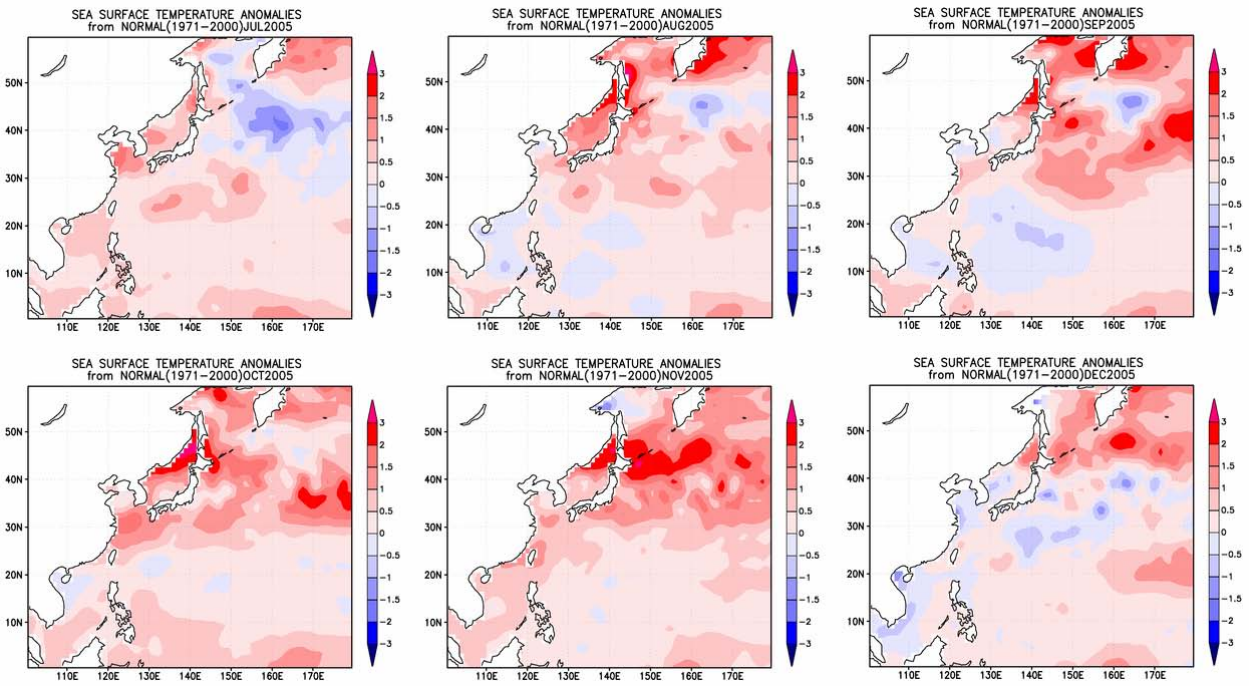
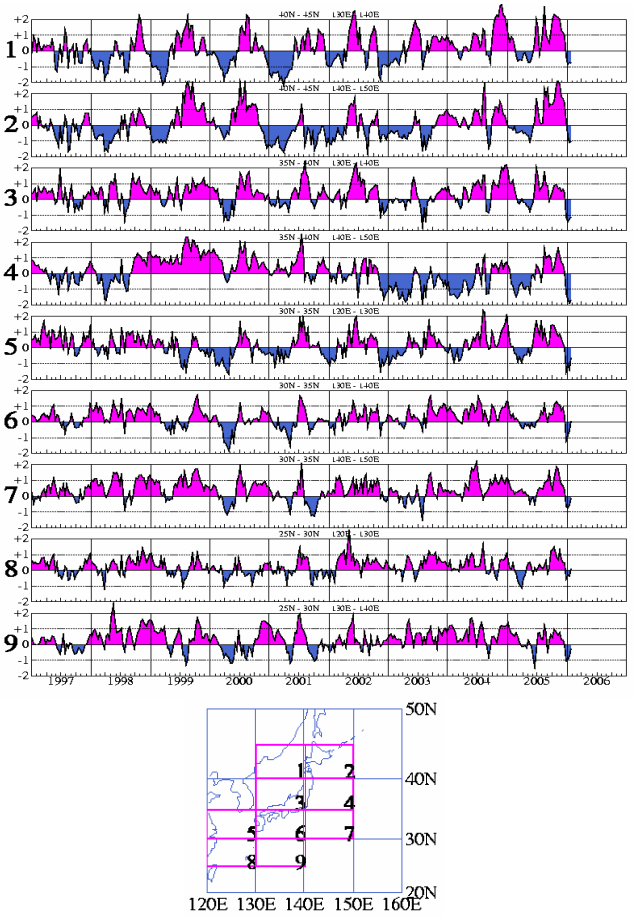


Fig. 1 Monthly mean sea surface temperature anomalies (°C) from July to December 2005. Anomalies are deviations from JMA's 1971–2000 climatology.

Carbon dioxide

JMA has been conducting observations of carbon dioxide (CO_2) in the surface seawater and overlying air in the western North Pacific, on board the R/V *Ryofu Maru* and the R/V *Keifu Maru*. **Figure 4** illustrates the distribution of the difference in CO_2 partial pressure (pCO_2) between the surface seawater and the overlying air (denoted as ΔpCO_2) observed in the western North Pacific in each season of 2005. The ΔpCO_2 value represents the direction of CO_2 gas exchange across the air–sea interface, indicating the ocean to be a potential source (or sink) for atmospheric CO_2 in the case of a positive (or negative) value of ΔpCO_2. In the subtropical region, oceanic pCO_2 was lower than atmospheric pCO_2 in winter, spring and autumn 2005, implying that the ocean was a sink for atmospheric CO_2, whereas the ocean turned into a source in the summer. Oceanic pCO_2 in the equatorial region has been at low levels since 2002, and was much lower than atmospheric pCO_2 in winter and summer 2005.



Left column:

Fig. 2 Time series of the 10-day mean SST anomalies (°C) averaged for the sub-areas shown in the bottom panel. Anomalies are deviations from JMA's 1971–2000 climatology.

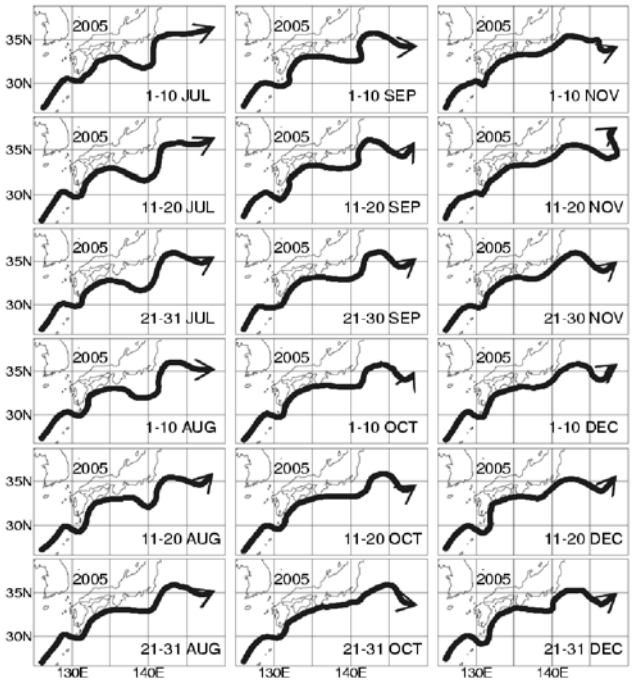


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Fig. 3 Location of the Kuroshio path from July to December 2005.

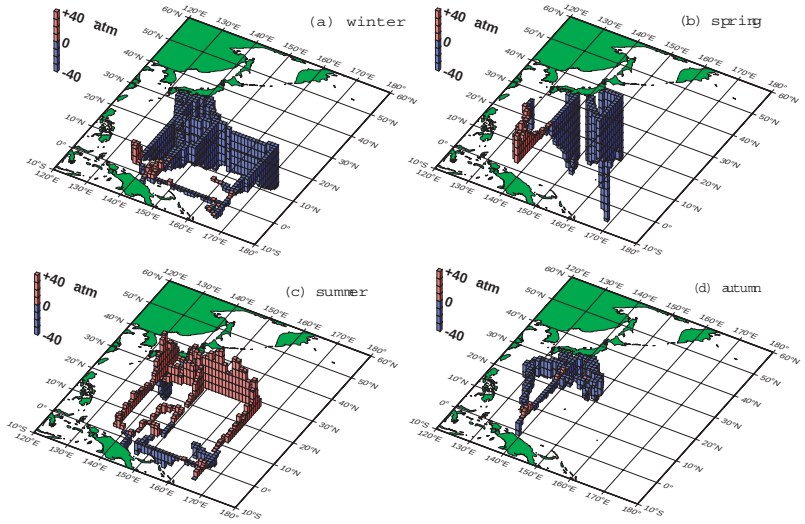

Fig. 4 Difference in CO_2 partial pressure between the ocean and the atmosphere in the western North Pacific in 2005. Red/blue pillars show that oceanic pCO_2 is higher/lower than atmospheric pCO_2.

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