The State of the Western North Pacific in the First Half of 2009

by Shiro Ishizaki

Sea surface temperature

Figure 1 shows the monthly mean sea surface temperature (SST) anomalies in the western North Pacific from January to June 2009, computed with respect to JMA's (Japan Meteorological Agency) 1971–2000 climatology. Monthly mean SSTs are calculated from JMA's MGDSST (**M**erged satellite and *in-situ* data **G**lobal **D**aily **SST**), which is based on NOAA/AVHRR data, microwave sensor (AQUA/AMSR-E) data and *in-situ* observations. Time series of 10-day mean SST anomalies are presented in Figure 2 for the 9 regions indicated in the bottom panel.

From January to April, SSTs were above normal in the area east of the Philippines, but SST anomalies turned negative in May. In the South China Sea, positive SST anomalies exceeding +1°C appeared in March, and negative SST anomalies exceeding –1°C were found in May and June. In January, positive SST anomalies exceeding +1°C were found in the seas southeast of the Kamchatka Peninsula. In April and May, SSTs were below normal in the seas east of the Kamchatka Peninsula. In February and March, SSTs were above normal in the region south of Japan, the East China Sea and the Sea of Japan. In June, negative SST anomalies prevailed in the seas around Japan.

Kuroshio and Oyashio

Figure 3 shows a time series outlining the location of the Kuroshio path from January to June of 2009, at intervals of 10 days. The Kuroshio took an offshore non-large-meander path far off the coast to the south of Honshu Island (between 135°E and 140°E). Its southernmost position in relation to Honshu Island was generally around the Izu Ridge (about 140°E). Except in the middle of April, it flowed south of Hachijo Island (33°N, 140°E).

Figure 4 presents the subsurface temperatures at a depth of 100 m in the seas east of Japan for April 2009. This chart is based on the numerical ocean data assimilation system (JMA's Ocean Comprehensive Analysis System).

The Oyashio cold water (defined as areas with temperatures of less than 5°C in Fig. 4) is known to extend southward in spring and return northward from summer until autumn (indicated by the green line in Fig. 5). It can be seen that from March to May of 2009, the coastal branch of the Oyashio cold water was located significantly north of its normal position. Its southernmost point in April was 40.5°N, 143.0°E, which is 200 km north of its normal location.

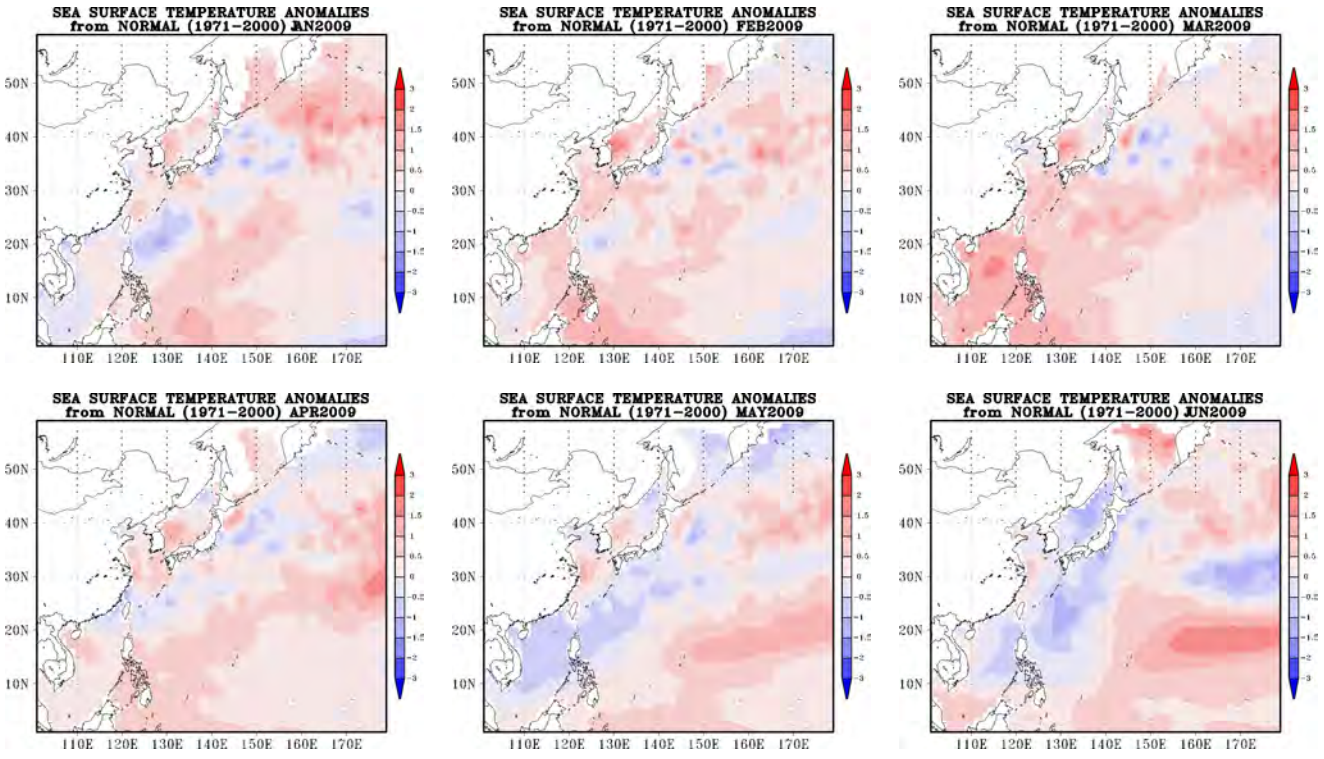

Fig. 1 Monthly mean sea surface temperature anomalies (°C) from January to June 2009. Anomalies are deviations from JMA's 1971–2000 climatology.

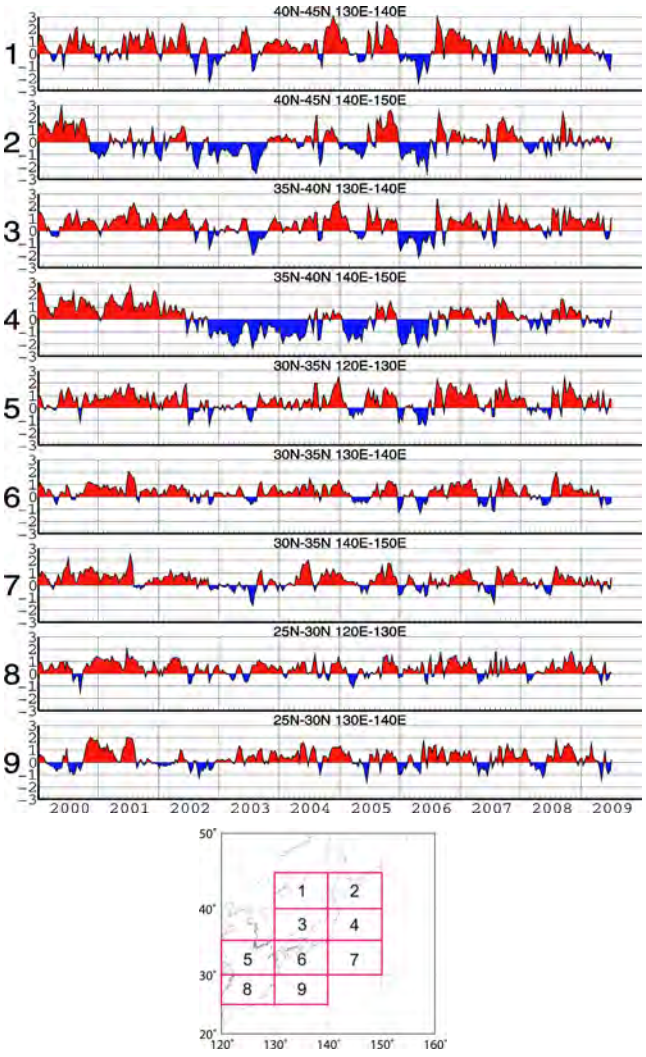

Fig. 2 Time series of 10-day mean sea surface temperature anomalies (°C) averaged for the sub-areas shown in the bottom panel. Anomalies are deviations from JMA's 1971–2000 climatology.

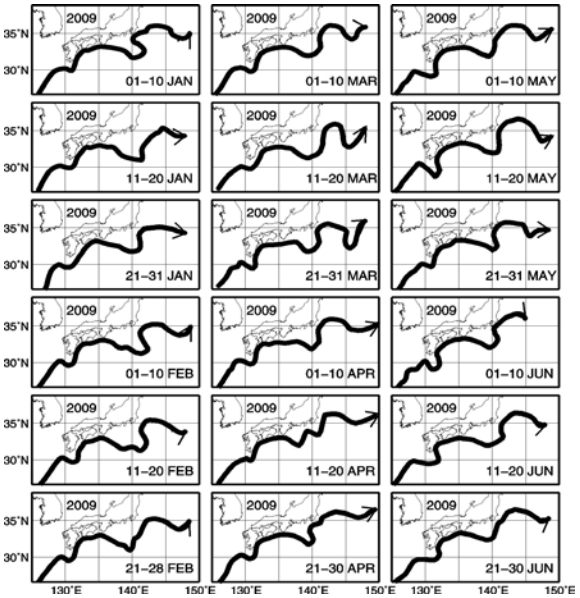

Fig. 3 Location of the Kuroshio path from January to June 2009.

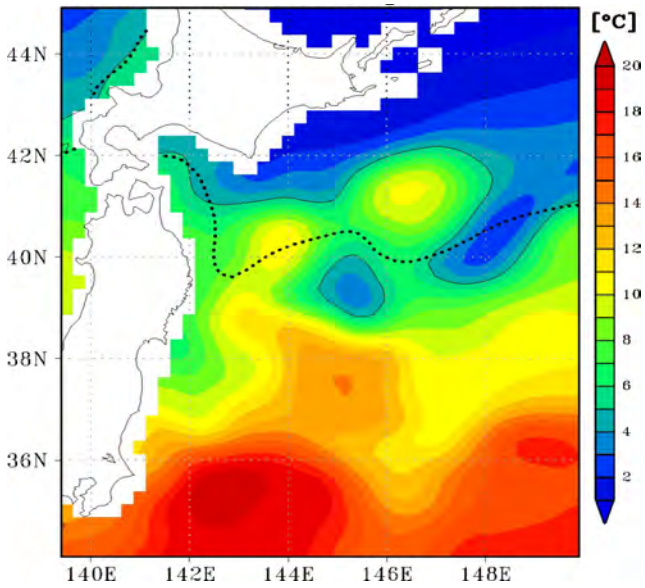

Fig. 4 Subsurface temperatures (°C) at a depth of 100 m east of Japan for April 2009. The solid line denotes the 5°C isotherm, while the dotted line is its climatology (30-year average values from 1971 to 2000).

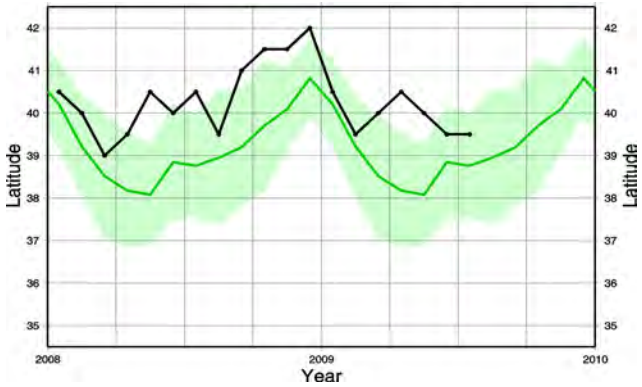

Fig. 5 The southernmost position of the coastal branch of the Oyashio cold water from January 2008 to July 2009 (black line), and the 30-year average values (green line), with a range of one standard deviation (green shading) from 1971 to 2000.

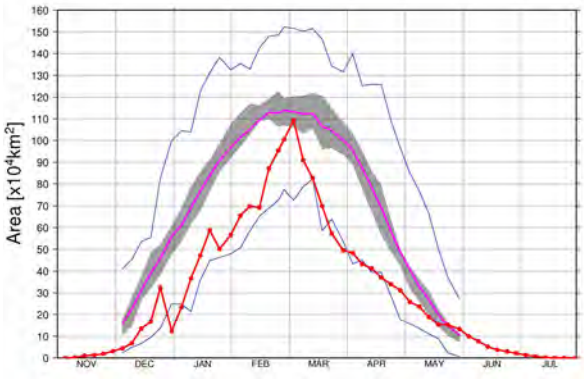

Fig. 6 Time series of sea ice extent in the Sea of Okhotsk from November to July 2009 (red line: 2008–2009 analysis; pink line: JMA's 1971–2000 climatology; blue lines: maximum/minimum sea ice extent since 1971; gray area: normal range).

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In addition to these theme sessions, this year's conference hosted four workshops. The *Green Crab Management* Workshop benefited from input from green crab researchers from around the world to help consider options for management of this high profile invader. Similarly, the participants at the *Invasive Tunicate* Workshop provided input to Washington State's Action Plan to address invasive tunicates in Puget Sound. Workshops on *Spartina/Seaweeds and Shipping Activities* brought together conference participants working in these fields to formulate larger-scale research initiatives that can be conducted in future years. The addition of workshops to the program of the conference was valued by participants.

The Poster Session in front of the Hoffman Hall, Portland State University.

With such a full academic agenda it is important to have a balanced social agenda as well. Conference participants had many opportunities for informal discussions with colleagues and new friends. As with previous conferences on "*Marine Bioinvasions*", participants were provided breakfast and lunch on site, which allowed more discussion and less travel to seek restaurants off-site. Portland is a very easy town to get around with free public transportation in the downtown core that allows wider access to shopping, restaurants, and microbreweries. But the real highlight of the conference was the social evening hosted at the Chinese Gardens in the Chinatown District of downtown Portland. These gardens show what can happen when a small group of individuals come together to convert a vacant urban lot to a tranquil and relaxing environment. Participants were even more relaxed when they found out that snacks and drinks were included!

The conferences on "*Marine Bioinvasions*" have always been a place to showcase emerging research in this fast-paced field. Thus, conference organizers and sponsors encourage presentations by early career scientists. This year was no exception. Thanks to contributions from the co-sponsoring organizations, it was possible to provide travel support to all of the graduate students and postdoctoral fellows who requested it. PICES supported the travel of six graduate students (Heidi Gartner, Stephanie Green, Veronica Lo, Lisa Needles, Kimberly Peyton, and Cascade Sorte) and four post-docs (April Blakeslee, Jennifer Dijkstra, Anya Epelbaum, and Joshua Mackie) from Canada and U.S.A.

As a PICES representative on the conference SSC, I would like to express my thanks to the PICES Secretariat for their professional assistance on the conference planning stage, and especially to Julia Yazvenko (PICES Database and Web Administrator) for her valuable help on site.

Planning has already started on the 7th International Marine Bioinvasions Conference, so feel free to contact any of the Scientific Steering Committee members, especially your PICES representatives, and watch for further details in future issues of PICES Press.

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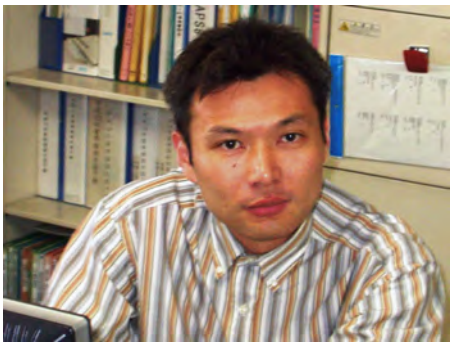
Sea ice in the Sea of Okhotsk

The extent of sea ice in the Sea of Okhotsk was below normal (30-year average values from 1971 to 2000) throughout almost the whole period from December 2008 to May 2009 (Fig. 6). It reached its seasonal maximum of 109.34×10^4 km^2 on March 5, which was slightly less than that of the previous season (110.69×10^4 km^2) exceeding the highest value for the previous season. The accumulated sea ice extent, defined as the sum of the 5-day sea ice areas from December to May, was the second lowest on record since 1971, following the record-setting 2006 extent. Its ratio to the normal value (1971–2000 average of 2568.22×10^4 km^2) was about 64.4%.



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