June 19, 2012
JAMSTEC

Recent Large Changes in Bering Sea Phytoplankton Communities

Overview

Team Leader Naomi Harada and colleagues of the Research Institute for Global Change at the Japan Agency for Marine-Earth Science and Technology (JAMSTEC: Asahiko Taira, President) investigated recent coccolithophorid algae blooms in the eastern Bering Sea continental shelf region by analyzing marine sediments from the past 70 years. The results show that blooms became prominent from the second half of the 1970s and that there is a high probability that this was caused by climate change.

These results have shown that the low trophic level organisms forming the base of the Bering Sea ecosystem, a fisheries resources for Japan as well as a rich marine resource for the world, are now changing due to the effects of recent global warming. The results are expected to contribute to predicting near future changes in the biological resource environment.

These results will be published on June 19 (local time) in *Global Biogeochemical Cycles*, the journal of the American Geophysical Union.

Title:	Enhancement of coccolithophorid blooms in the Bering Sea by recent environmental changes
Authors:	Naomi Harada[1], Miyako Sato[1], Kazumasa Oguri[1], Kyoko Hagino[2], Yusuke Okazaki[1,3], Kota Katsuki[4], Yoshinori Tsuji[5], Kyung-Hoon Shin[6], Osamu Tadai[7], Sei-Ichi Saitoh[8], Hisahi Narita[9], Susumu Konno[3,10], Richard W. Jordan[10], Yoshiro Shiraiwa[5], Jacqueline Grebmeier[11]
Affiliations:	1. JAMSTEC, 2. Okayama University, 3. Kyushu University, 4. Korea Institute of Geoscience and Mineral Resources, 5. University of Tsukuba, 6. Hanyang University, 7. Marine Works Japan, Ltd., 8. Hokkaido University, 9. Tokai University, 10. Yamagata University, 11. University of Maryland

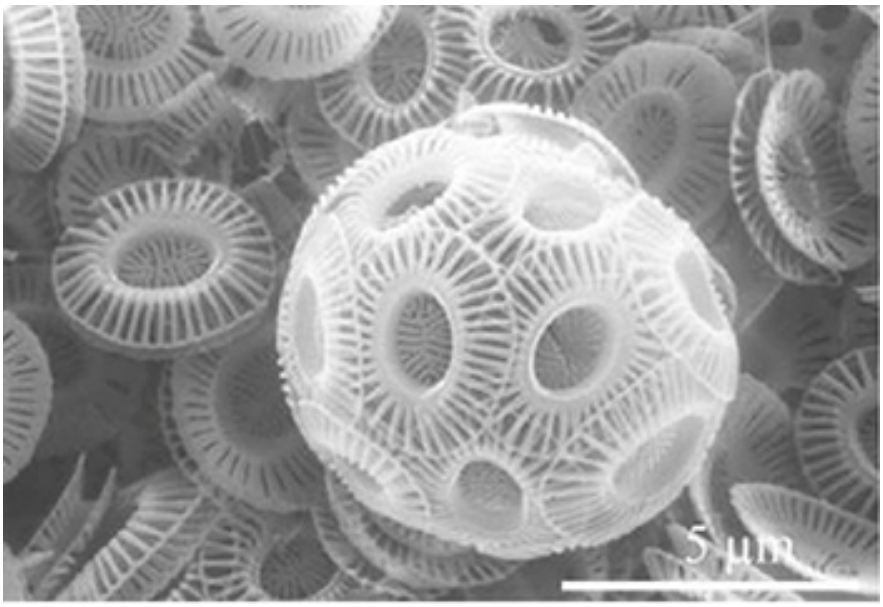

Figure 1 : A scanning electron micrograph of *Emiliania huxleyi*, a species that forms coccolithophorid algae blooms. This is an image of a seawater sample collected from a coccolithophorid bloom during the 2006 cruise MR06-04. The sample was filtered and part of the sample collected on the filter paper was micrographed. In the areas of coccolithophorid bloom observed during this research, the phytoplankton was almost totally composed of *Emiliania huxleyi* with 2 to 5 million cells per liter of seawater. The white is the calcium carbonate shell.

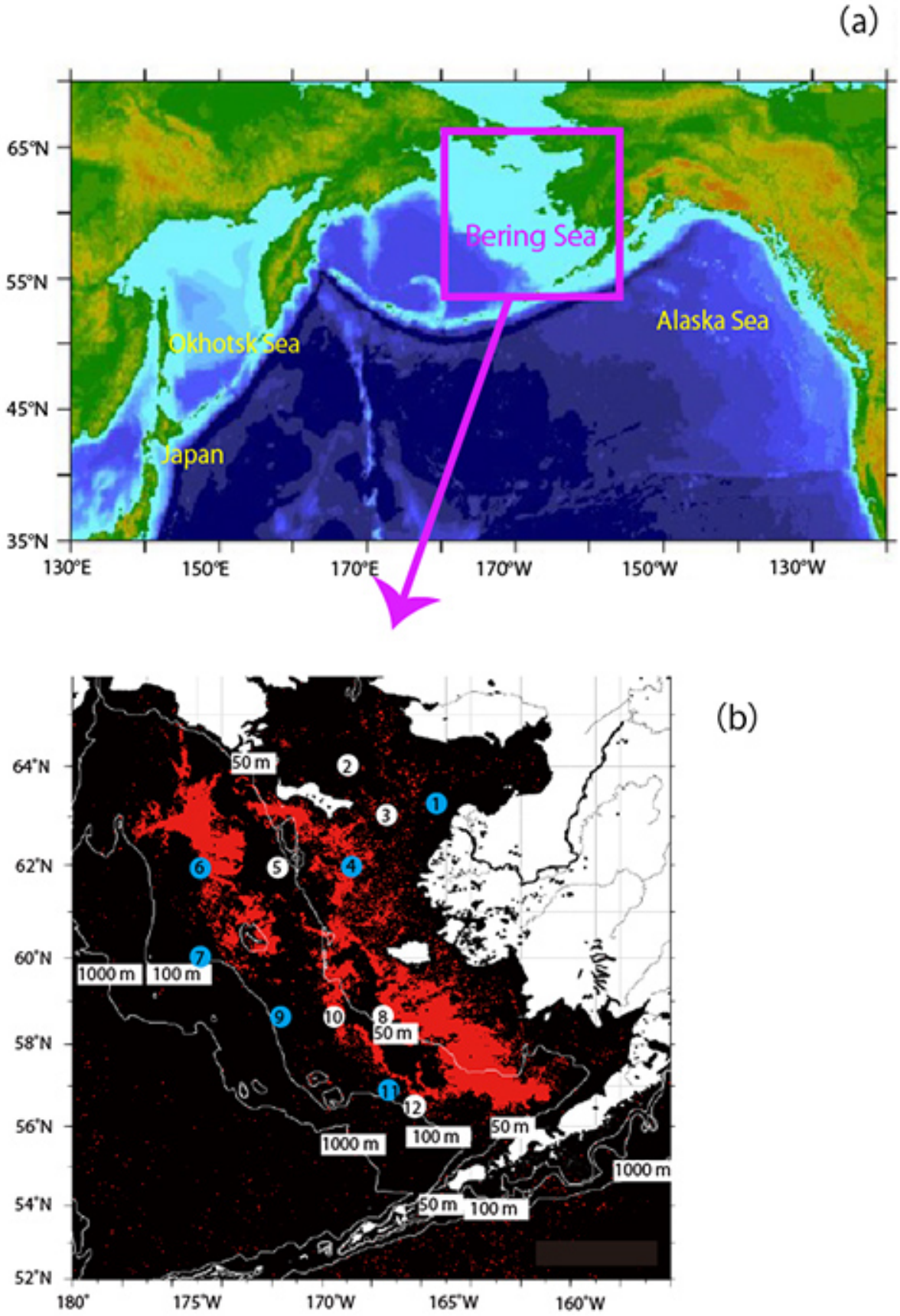

Figure 2 : (a) The observation area for this study is within the square framed area. (b) Observation by the SeaWiFS ocean color sensor of coccolithophorid blooms in the eastern Bering Sea continental shelf area (September 2000). Red regions are bloom areas. The white and blue circles are observation points where sediments were collected. Blue circles are the points where the samples analyzed in this research were collected.

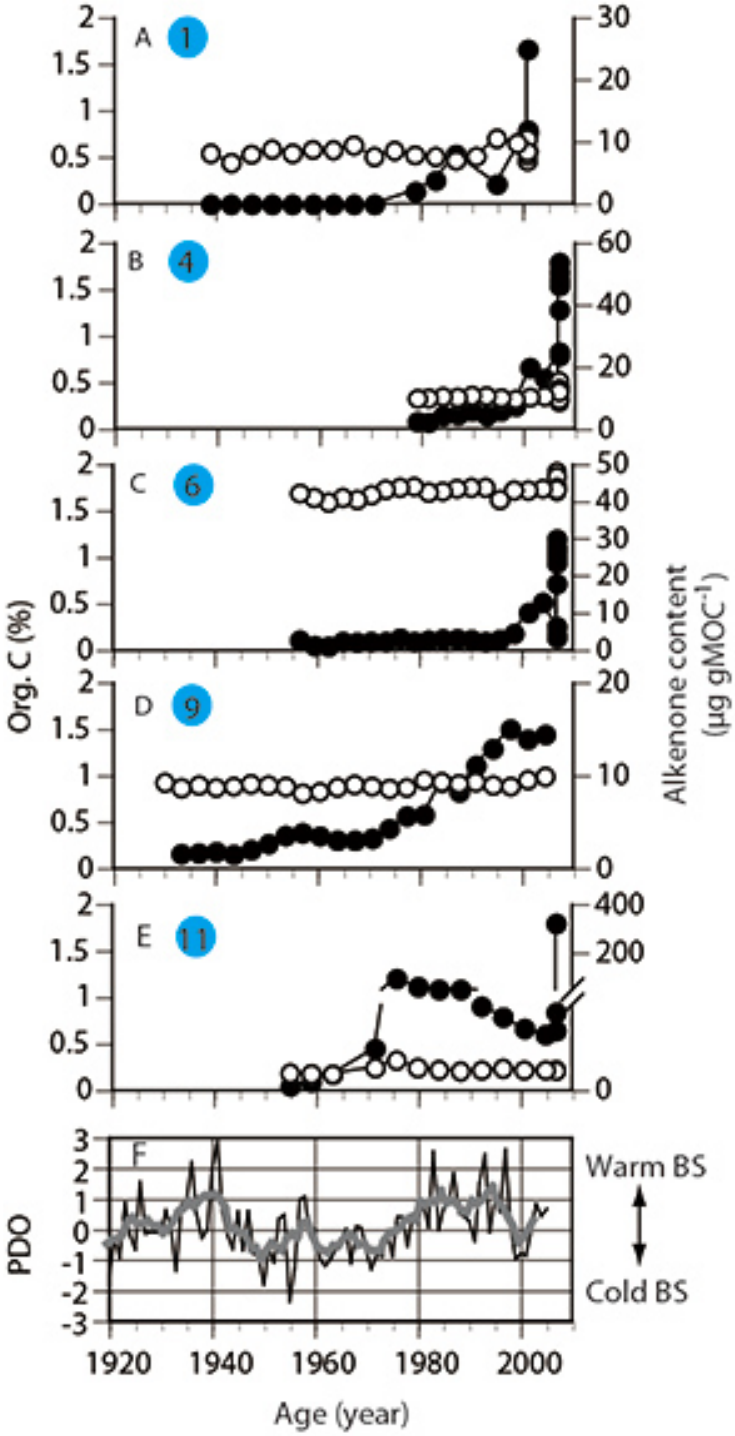

Figure 3 : (A–E) Organic carbon (open circles) in sediments from sites 1, 4, 6, 9, and 11 in the eastern Bering Sea and C37 alkenone (black circles) normalized by marine organic carbon. (F) The Pacific Decadal Oscillation (PDO) index variations in summer(June–August) since 1920: BS, Bering Sea.

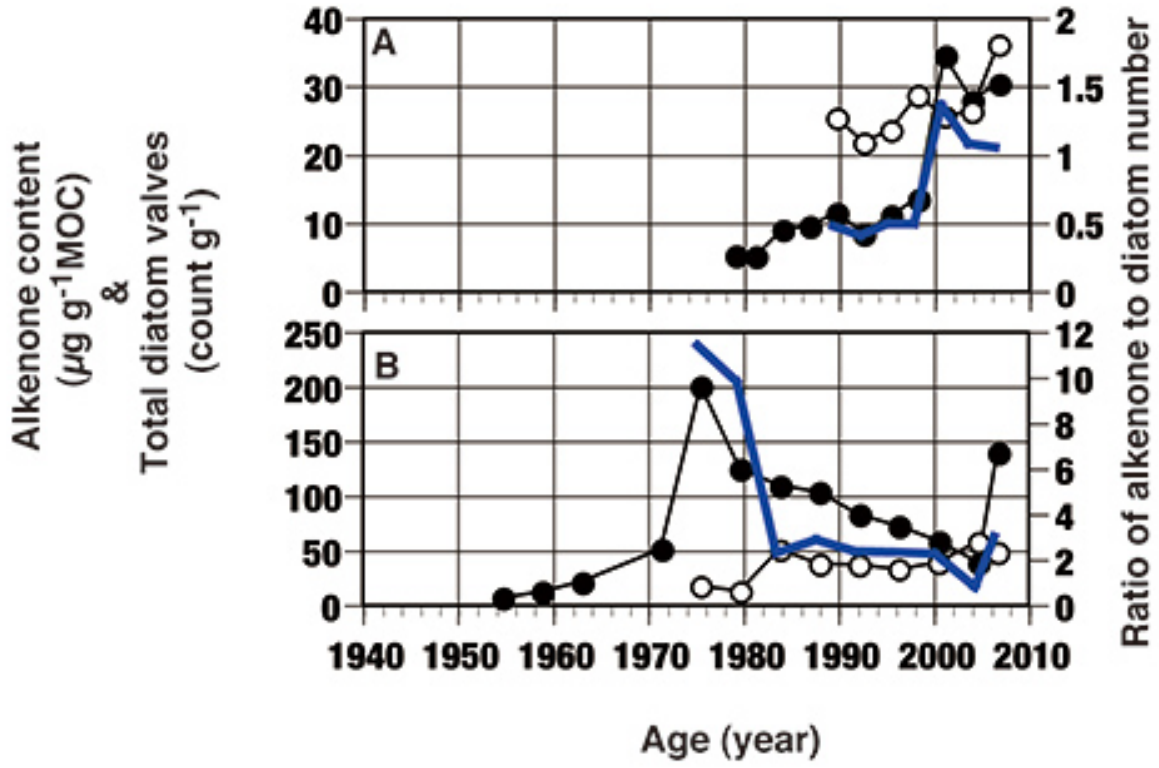

Figure 4 : Alkenone content (black circles), total number of diatom valves (open circles), and ratio of the alkenone content to total number of diatom valves (blue line) at (A) northern site 4 and (B) southern site 11 in the eastern Bering Sea.

Contacts:
Japan Agency for Marine-Earth Science and Technology
(For the study)
Naomi Harada, Team Leader
Environmental Biogeochemical Cycle Research Program Paleooceanography Research Team
Research Institute of Global Change(RIGC)

(For publication)
Kazushige Kikuchi, Director
Planning Department, Press Office
Email: press@jamstec.go.jp