

Sinking Particles and Pelagic Food Web of the Southeastern Bering Sea



POLLOCK CONSERVATION
COOPERATIVE RESEARCH CENTER

Project Synopsis



Krill, such as *Euphausia pacifica*, are key planktonic components of the North Pacific food web.

CREDIT: RUSSELL HOPCROFT, UAF/SFOS

FUNDING SUMMARY

PRINCIPAL INVESTIGATOR

Susan Henrichs

University of Alaska Fairbanks
School of Fisheries and
Ocean Sciences

YEAR FUNDED

2001

RESEARCH PERIOD

2001-2002

BUDGET

\$36,202

Sinking particles offer clues to changing ocean

The composition, abundance, and distribution of phytoplankton and zooplankton reflect changes in the pelagic food web. Sinking plankton (a component of “sinking particles”) collected by sediment traps mainly reflects the extent of grazing on primary production by zooplankton, and productivity variations over time. The material collected by the sediment traps indicates which materials are being supplied to the deep ocean and seafloor.

WHY IS PCCRC INTERESTED?

Changes in oceanography in recent years have been linked to climate warming influences on sea, air, and sea-ice ecosystems. Such changes may be altering the ocean’s ability to support some fish and marine mammal species, and may have impacts on fish stock composition, abundance, and distribution.

WHAT SCIENTISTS DID

Since 1995, NOAA researchers have used instruments on an oceanographic mooring over the Bering Sea middle shelf near 56°N to measure temperature, salinity, chlorophyll content, current speed, and meteorological conditions.

Researchers added a time-series sediment trap, which collected particles sinking out of the surface waters from 1997 to 2003, with the last two years being supported by the Pollock Conservation Cooperative Research Center.

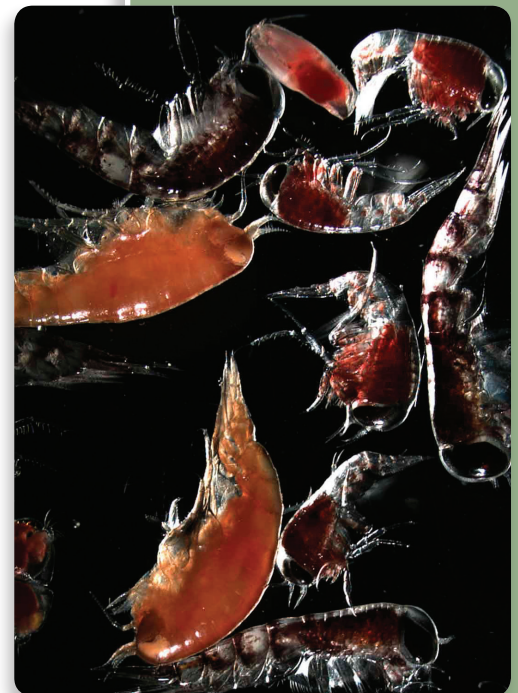
A parallel time series of zooplankton samples was also collected. The carbon and nitrogen stable isotope composition and selected lipids,

OBJECTIVE

Scientists used sediment traps to monitor the role of plankton and other particles in changes occurring in the oceanography of the Bering Sea.

BOTTOM LINE

The data indicate that the spring bloom may not be the predominant source of organic matter to the Bering Sea middle shelf.



Amphipods are among billions of zooplankton that fuel the marine food web.

CREDIT: RUSSELL HOPCROFT, UAF/SFOS

including fatty acids, fatty alcohols, and sterols, have been measured in the sediment trap and zooplankton samples. The composition of sinking organic material collected by the trap has reflected changes in oceanographic conditions and the Bering Sea ecosystem from 1997 to 2003.

The particles collected by Bering Sea sediment traps consist of intact phytoplankton, diatom frustules, coccoliths, zooplankton fecal pellets, and other detritus resulting from food web processes. Using microscopic examination and chemical and stable isotopic analysis of the material, information was obtained on nutrient availability, phytoplankton and zooplankton communities, the timing of phytoplankton blooms, relative extent of phytoplankton grazing by zooplankton, and other ecological data.

WHAT SCIENTISTS LEARNED

From 1997 to 1999, the amount of organic matter accumulated by traps in the fall were comparable to levels observed in spring, when the annual plankton bloom occurs.



Skeletons (frustrules) from diatoms like these were among the particles collected in Bering Sea sediments. CREDIT: STACY SMITH, UAF/SFOS

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School of Fisheries and Ocean Sciences
University of Alaska Fairbanks
P.O. Box 757220
Fairbanks, AK 99775-7220
(907) 474-7210
<http://www.sfos.uaf.edu/pcc/>