SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

# Press Release

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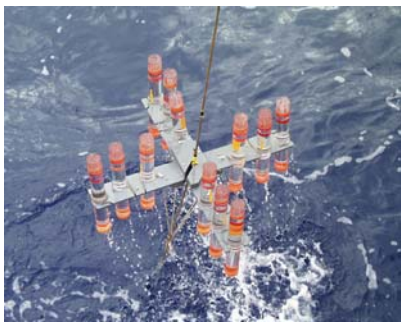
## Global warming could affect ocean plant life

Honolulu, HI –Tiny ocean plants called phytoplankton can be affected by climate change, according to a study in this week's Nature magazine. The team, which includes microbial biologist and oceanographer David M. Karl from the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawaii, along with colleagues from the Netherlands, used climate models to correlate with observations at Station Aloha, a site 100 km north of the state of Hawaii where physical, biological and chemical measurements of the water column have been taken for the past 20 years.



*Collecting water samples at Station Aloha*

The increase in ocean temperature produced by global warming causes less dense warm water at the surface to rise and limits the mixing with the colder water found deeper in the ocean. The analysis suggests that reduced vertical mixing could cause the deep water layers of phytoplankton to oscillate and shift. “Deep chlorophyll layers have been know to occur in the sea for nearly a century, though we are not absolutely certain why they form, what sustains them and what temporal dynamics, if any, they have,” says Karl.

These results will come as a surprise to scientists who had generally assumed that these plankton bands were relatively stable. The discovery that these layers are unstable during climate shifts indicates that the plankton can inspire further warming during these global warming periods.

“The lack of vertical mixing in the ocean due to climate variability and greenhouse gas induced warming are already upon us” says Karl. “We are effectively in the middle of a large, global scale experiment with only a very basic and incomplete understanding of the processes and controls of

ocean plankton dynamics. What will happen when the surface ocean changes its acidity? What will happen when the surface ocean becomes more stratified and further isolates the sea surface from the large supply of nutrient below the lighted zone? What will happen when human activities and land use practices begin to influence the amount of fixed nitrogen entering the coastal zone or the amount of iron rich dust in the atmosphere? These are important, unresolved questions that will need to be addressed."

This study is funded by the U. S. National Science Foundation, the Earth and Life Sciences Foundation (ALW), the Netherlands organization for Scientific Research (NWO), the Dutch BSIK/BRICKS project, and the Gordon and Betty Moore Foundation.

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**High resolution images available, please contact Tara Hicks Johnson**

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Reduced mixing generates oscillations and chaos in the oceanic deep chlorophyll maximum.
Jef Huisman, Nga N. Pham Thi, David M. Karl & Ben Sommeijer
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**About the School of Ocean and Earth Science and Technology, University of Hawaii at Manoa**
The School of Ocean and Earth Science and Technology (SOEST) was established by the Board of Regents of the University of Hawaii in 1988. SOEST brings together in a single focused ocean, earth sciences and technology group, some of the nation's highest quality academic departments, research institutes, federal cooperative programs, and support facilities to meet challenges in the ocean and earth sciences. Scientists at SOEST are supported by both state and federal funds as they endeavor to understand the subtle and complex interrelations of the seas, the atmosphere, and the earth.