

Abstract for Benthic Habitat Symposium 2002

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Analyzing time-lapse photographs of the sea floor for changes in benthic community activity

Time-lapse photographs or repeated photographic surveys of the sea floor can be used to study the response of benthic fauna to a natural or anthropogenic disturbance. **We are interested in the responses of epibenthic megafauna to a temporally-varying food supply, or flux of particulate matter to the sea floor.** At a deep-sea study site, we have amassed ~10 years of time-lapse photographs, taken once per hour, of ~20 m² of the sea floor. We would like to analyze this 10-yr time series for seasonal changes as well as long-term trends in the benthic community. In addition to species composition, **abundance, size, and activity of megafauna (with an activity index based on area traversed per unit time)**, we would like to trace sediment features such as mounds and tracks. Because manual analysis of the large number of photographs is very labor-intensive, we developed image processing routines that make it easier to analyze oblique photographs, such as detecting organisms and their tracks. Our methods include: 1) digitizing the film, 2) adjusting light on the images (histogram equalization), 3) converting oblique photographs to plan view, and 4) automated image processing, with routines based on edge detectors and morphological operators. We will present results for a 4-mo time series at the deep-sea site, with natural disturbance from a massive accumulation of phytodetritus on the sea floor. We plan to use these algorithms for photographs taken in other soft-bottom habitats, including images transmitted in real-time from the Hawaii-2 Observatory in the abyssal Pacific.