

Presentation abstracts for the 11th International Deep-Sea Biology Symposium

Poster abstract submitted by **Beaulieu, S. E., Shank, T. M., Soule, S. A., Fornari, D., Rzhanov, Y. & Mayer, L.** for **Automated generation of geo-referenced mosaics from video collected by deep-submergence vehicles: an example from Rosebud vent (Galapagos Rift):**

Many advances in understanding biological processes at the deep seafloor are facilitated by direct observation. Mosaics of seafloor imagery have significant advantages over collections of still photographs and video footage as they are able to capture large areas while retaining sufficient resolution to identify small-scale features. With mosaics of the seafloor, deep-sea biologists are able to “see” the distribution of disjunct communities in a larger spatial context. Importantly, geo-referenced seafloor mosaics allow for assessment of community development over time on repeated surveys at target sites. Here, we present the initial results of a project to automate the process of creating geo-referenced seafloor mosaics from video and navigation data. This methodology is designed for the submersible Alvin, but may be modified for use with other underwater vehicles. Our processing consists of four stages: (1) using navigation data (position and altitude) to determine 15-m segments of imagery from an entire dive, (2) acquiring video sequences from DVCAM tapes, (3) processing of frames and pair-wise registration, and (4) constructing a geo-referenced mosaic, ready to incorporate into a Geographic Information System (GIS). During a cruise to the Galapagos Rift in May 2005, we utilized the above software with video and navigation data from Alvin to mosaic the seafloor at Rosebud vent (0° 48' N, 86° 14' W). For validation of the automated processing, we compared automatically-generated video mosaic segments to manually-constructed still camera mosaics. Rosebud, discovered in May 2002, is a relatively nascent vent field (on the order of several years old). We are now poised to use the above software to generate geo-referenced mosaics of the seafloor at Rosebud from “legacy video” during Alvin dives in 2002, to quantify the temporal changes in vent community distribution.