

# REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words) The objective of this DURIP award was the acquisition of an instrument to enhance analytical capabilities in support of grant no. N00014-96-1-0025 (Bay Ocean Exchange Processes: Development and Application of a Meroplankton Tracer Technique). This research is concerned with (1) determining the uptake and retention of trace metals by invertebrate larvae and (2) elemental fingerprinting of naturally occurring larvae as a means to determine site of origin. The objective was to quantify composition of multiple trace elements for small samples (i.e., individual larvae). With DURIP funds an Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES, model Optima 3000DV) was purchased for the Scripps Institution of Oceanography analytical facilities. The ICP-OES has been used to characterize the elemental composition of newly hatched crab larvae sampled from San Diego Bay, neighboring embayments and coastal habitats. Results have shown that elements (e.g., copper, aluminum, zinc, strontium) can be quantified for individual larvae and are useful in distinguishing larvae originating from inner vs outer San Diego Bay and coastal habitats. Other applications of the Scripps ICP-OES since its purchase include trace element characterization of (a) contaminated sediments to develop remediation methods (B. Tibo), (b) meteorites to model age of the early solar system (G. Lugmair and C. Maclsaac), and (c) igneous rocks to track earth history (P. Castillo).			
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Determining Trace Element Concentrations in Marine Larvae Using  
Electrothermal Vaporization and Laser Ablation Technology

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The objective of this DURIP award was the acquisition of an instrument to enhance analytical capabilities in support of grant no. N00014-96-1-0025 (Bay Ocean Exchange Processes: Development and Application of a Meroplankton Tracer Technique). This research is concerned with (1) determining the uptake and retention of trace metals by invertebrate larvae and (2) elemental fingerprinting of naturally occurring larvae as a means to determine site of origin. The objective was to quantify composition of multiple trace elements for small samples (i.e., individual larvae). With DURIP funds an Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES, model Optima 3000DV) was purchased for the Scripps Institution of Oceanography analytical facilities. The ICP-OES has been used to characterize the elemental composition of newly hatched crab larvae sampled from San Diego Bay, neighboring embayments and coastal habitats. Results have shown that elements (e.g., copper, aluminum, zinc, strontium) can be quantified for individual larvae and are useful in distinguishing larvae originating from inner vs outer San Diego Bay and coastal habitats.

The ICP-OES has been made available to all users of the Analytical Facilities at Scripps Institution of Oceanography. Brad Tibo (Marine Biology Research Division), has employed the ICP-OES to characterize and compare sediment trace element compositions between contaminated and control sites as part of a program to develop remediation techniques for estuarine and marine sediments contaminated with heavy metals (e.g., Cr, Cu, Pb). Paterno Castillo (Geosciences Research Division) and associates are using the ICP-OES to obtain high quality trace element data for igneous rocks to (1) constrain the volcanic trace of the Iceland plume in the Axel-Heiberg Island of Canada, (2) track abandoned spreading axes in the eastern Pacific, and (3) examine elemental signatures of the Marquesas Island, central Pacific, and of Tethyan ophiolites in central China. Gunther Lugmair and Chris MacIsaac (Geosciences Research Division) use the ICP-OES to measure the elemental composition (e.g., Mn, Cr, Fe) in meteorite in support of NASA research concerned with modeling the age of the early solar system.

Presentations (Primary Project Only):

DiBacco, C. Development of a Meroplankton Tracer Technique. Oceans Sciences Meeting, San Diego, California, 12-16 February 1996.

DiBacco, C., L. Levin. Bay-Ocean Exchange Processes: Development and Application of a Meroplankton Tracer Technique. ONR Harbor Processes Workshop, Washington DC, 12-13 April 1996

DiBacco, C. L. Levin. Trace element contamination of crab larvae in San Diego Bay: Consequences and Application as a Meroplankton Tracer Technique. Marine Benthic Ecology Meeting, Portland, Maine 3-6 April 1997.

DiBacco, C. Copper and Crab Larvae in San Diego Bay, SPAWAR Copper Workshop, San Diego California, 3-4 June 1997

DiBacco, C. Temporal and Vertical Distributions of Crab Larvae in San Diego Bay. Oceans Sciences Meeting, San Diego California, 9-13 February 1996.

DiBacco, C., L. Levin. Bay-Ocean Exchange Processes: Development and Application of a Meroplankton Tracer Technique. ONR Harbor Processes Workshop, Washington, DC, 28-29 May 1998

Posters:

DiBacco, C. The Influence of San Diego Bay Versus Coastal Waters on Development and Survival of Shore Crab Larvae (*Pachygrapsus crassipes*) in Southern California. University of California Toxic Substance Research and Teaching Program Symposium. 23-25 April 1998, Berkeley, Ca

Papers in preparation :

Use of naturally occurring and anthropogenically enriched trace elements to track marine invertebrate larvae.

Application of a New Larval Tracking Technique to Validate Flux Estimates of Crab Larvae (*Pachygrapsus crassipes*) in San Diego Bay, California

The Influence of Bay Versus Coastal Waters on Development and Survival of Shore Crab Larvae (*Pachygrapsus crassipes*) in Southern California

Temporal-Spatial Distributions of *Pachygrapsus crassipes* (Decapoda, Brachyura) in San Diego Bay