

**VIABILITY OF USING DGT PASSIVE SAMPLERS TO
MEASURE DISSOLVED TRACE ELEMENTS IN
SUBTROPICAL FRESHWATER AND ESTUARINE ENVIRONMENTS**

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By
Michael S. Tomlinson

Thesis Committee:
Eric H. De Carlo, Chairperson
Fred T. Mackenzie
David M. Karl
Khalil J. Spencer

ABSTRACT

Dissolved trace element concentrations were measured in a subtropical estuary of O‘ahu and in the upper and lower watershed of this estuary with passive samplers using diffusive gradients in thin films (DGTs). This study was unique being the longest study to date employing DGTs in extensively characterized fresh and estuarine waters. The pHs at all sites always fell within the operational range of the DGTs (5-10) and ionic strength was always greater than 1 mM with the exception of the upper watershed station where ionic strengths <1 mM occurred 0.2 % of the time (equivalent to 17.5 hours/year). DGT results were compared with discrete water samples collected manually and with automated samplers in the watershed. For most trace elements, comparison of mean concentrations from discrete samples compared favorably with DGTs provided there were sufficient discrete samples collected over a wide range of conditions. It is important, however, to remember that DGTs typically measure different species (aquo ions, inorganic complexes, and small organic complexes) than those measured in filtered grab samples, which may include small particulates and organic colloids. Mean concentrations of estuarine Cu, Zn and Pb measured with DGTs were generally higher than concentrations of discrete samples collected concurrently during weekly retrievals of DGTs; conversely DGT Ni and Co concentrations were lower than discrete samples. DGT limitations include 1) pH must remain between 5 and 10, 2) ionic strength must be >1 mM, and 3) after 1-2 weeks, biofouling can be problematic in subtropical estuarine waters. Nonetheless, DGTs provide a viable method for augmenting dissolved trace element data obtained from discrete samples.