

**BASELINE STUDY OF HEAVY METAL CONCENTRATIONS AND  
HUMAN ACTIVITY IMPACT ANALYSIS IN THE HAWAIIAN  
ENVIRONMENT**

**A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE  
UNIVERSITY OF HAWAII AT MANOA IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF SCIENCE**

**IN  
OCEANOGRAPHY  
DECEMBER 1996**

**BY  
HAISHENG LI**

**THESIS COMMITTEE:  
ERIC H. DECARLO, CHAIR PERSON  
KHALIL SPENCER  
TELU, YUANHUI, LI**

## Abstract

Because knowledge of natural baseline concentrations of heavy metals in the environment is essential to studies of geochemical processes or in managing environment quality, an investigation of heavy metal concentrations and Pb isotopic compositions in sediment was undertaken in Lake Waiau (on Mauna Kea) and Pololu Valley, Hawaii. Chronology of the Pololu core was determined using  $^{210}\text{Pb}$  and  $^{137}\text{Cs}$  radiometric dating methods.

Pb isotope analysis and leaching experiments demonstrated that the sedimentary environment of Pololu Valley is slightly contaminated with anthropogenic Pb from local farming activity. Continental silicate dust also make a less contribution to the variation of elemental composition downcore. The baseline of heavy metals in the unimpacted Hawaiian sedimentary environment was determined based on the results of analysis of sediments deposited in Pololu valley before the 1940s. Human impacts on the environment were evaluated for a highly urbanized area of Oahu, Hawaii. Results indicate that soils and sediments on Oahu are substantially contaminated with certain heavy metals relative to unimpacted area of Hawaii.