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## **Iron as a reference element for determining trace metal enrichment in Southern California coastal shelf sediments**

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### **ABSTRACT**

Major and trace elements occur naturally in the environment at levels which are detectable by most clean monitoring programs. This natural occurrence of metals in the environment complicates assessments of potentially contaminated marine sediments because measurable quantities of metals do not automatically infer anthropogenic enrichment. In this study, we use iron as a conservative tracer to differentiate natural from anthropogenic components of bulk sediment metal concentrations in the Southern California Bight (SCB). Baseline relationships between iron and eight trace metals were established using data from non-impacted sites distant from known point and non-point sources of pollution. These baseline relationships were evaluated for geographic, depth, and analytical variance, and then were validated using an independent data set. Using the reference element technique, we determined that over half of the 248 SCB sites measured were enriched in at least one trace metal. All trace the greatest sediment enrichment, while arsenic and nickel showed the least enrichment. Degrees of enrichment were unevenly distributed throughout the SCB. Trace metals contamination was extensive in the Santa Monica Bay where approximately 80% of the sites were contaminated by more than three metals. Published by Elsevier Science Ltd.

Keywords: Southern California; Sediment contamination; Trace metal; Reference element

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