



Trace metal enrichments and their sources in the Equatorial Undercurrent of the central and eastern Pacific

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High resolution sampling with a trace metal clean rosette sampling system across and along the axis of the Equatorial Undercurrent (EUC) during two cruises to the central and eastern Pacific, shows elevated values of the trace elements Al and Fe associated with the EUC. At 140°W dissolved Al levels of up to 10 nM coincided with the high velocity core of the EUC. Elevated Al values were observed continuously across the equatorial Pacific associated with the core of the EUC with values of 7 nM at 115°W. Dissolved Fe levels were also observed to be elevated in these sections but the pattern of enrichment was not as closely correlated with the high velocity core of the EUC. Dissolved Fe concentrations at the depth of the EUC core at 140°W were up to 0.7 nM, during both cruises, but values dropped dramatically along the EUC flow path to less than 0.1 nM in the upper waters at 120°W. The relative enrichment of the trace elements suggests a pluvial rather than a hydrothermal source for these materials. A likely source is the high energy sediment remobilization regimes off the large tropical rivers that drain the tropical highlands of Papua New Guinea, and are close to the pathways of the EUC source waters. The relative depletion of the dissolved Fe compared to that of the dissolved Al provides a clear example of geochemical separation of trace elements along an advective flow path which may provide a useful natural laboratory for calibrating the relative removal rates of other trace elements.