Dissolved lead in the deep southeast Pacific Ocean: Results of the 2013 US GEOTRACES cruise

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A number of studies have shown the human impact on oceanic Pb in many parts of the world ocean, but little Pb data has been available for the Southeast Pacific Ocean. We will present the dissolved Pb (<0.2μm) results from the US GEOTRACES cruise in 2013, which sailed from Manta, Ecuador, to Tahiti along around 12 degrees south.

Pb concentrations in the southeast Pacific Ocean range from <1 to 32 pmol/kg. Higher Pb concentrations are found in the upper water column (<~2000m), showing the impact of anthropogenic Pb inputs to the ocean. At most stations, a subsurface Pb maximum (25-28 pmol/kg) appears at 200-250m, and then Pb continuously decreases to <8 pmol/kg at ~2000m. Pb in deep waters below 2500m is mostly <5 pmol/kg, which is comparable to the Pb observed in the central Pacific a few decades ago. In the east-west transect, relatively higher Pb concentrations are found near the coast than in the subtropical gyre. This trend appears more clearly in the surface Pb distribution, implying Pb inputs from the South American continent. Lowest Pb is observed at stations near the ridge crest, probably due to Pb scavenging by FeMn oxides or FeS precipitates from hydrothermal vents. At the two stations immediately west of the hydrothermal vent, average Pb concentration below 2200m is 0.9 +/- 0.5 pmol/kg (n=33), which is close to our detection limit for 1.5ml samples. This is similar to what we observed in the TAG plume in the North Atlantic, although the degree of scavenging is stronger in the southeast Pacific.