ID: W2943976889

TITLE: Distribution of dissolved and leachable particulate Pb in the water column along the GEOTRACES section GA10 in the South Atlantic

AUTHOR: ['Christian Schlösser', 'Johannes Karstensen', 'E Malcolm S Woodward']

ABSTRACT:

We measured concentrations of dissolved and leachable particulate lead in the water column along a 40°S zonal transect in the South Atlantic Ocean, as part of the international GEOTRACES section GA10. Dissolved Pb (DPb) concentrations were highest in surface waters (8?29 pmol L?1) and lowest near the sea floor (<5 pmol L?1). Estimates for mineral sourced DPb for the South Atlantic surface ocean yielded a concentration of 5 ± 1 pmol L?1, suggesting that about 59% of the 12 ± 2 pmol L?1 (n = 85) DPb present in today's South Atlantic surface ocean has come from anthropogenic sources. Available values for wet deposition of 14 ± 12 nmol Pb m?2 d?1 (Chance et al., 2015) allow the calculation of an average residence time of 35 ± 31 days for DPb in the South Atlantic surface ocean. Elevated concentrations of LpPb, reaching 28 pmol L?1, were restricted to turbid bottom waters on the South American shelf and in the Argentine Basin, suggesting that strong turbulent mixing and resuspension of sediments was the main source of this Pb fraction. A negative linear regression between LpPb and DPb in these turbid waters indicated that the main removal mechanism for DPb in bottom waters on the shallow South American shelf and in nepheloid layers in the abyssal planes of the Argentine basin was the scavenging of DPb onto the surfaces of resuspended sediment particles. Elevated DPb concentrations in surface waters near the South African (23 ± 3 pmol L?1 (n = 22)), and South American (18 ± 3 pmol L?1 (n = 14)), continental margins coincided with the position and extension of the Agulhas (AC) and Brazil Current (BC). Elevated DPb concentrations of 12 ± 1 pmol L?1 (n = 30) at depth in the Argentine Basin (the western basin of the 40°S transect) coincided with the spreading of North Atlantic Deep Water (NADW) in the depth range of 1750 to 3000 m. Lowest DPb concentrations of 5 ± 1 (n = 26) and 6 ± 1 pmol L?1 (n = 22) corresponded with Weddell Sea Deep Water and Antarctic Bottom Water, located below NADW in the Argentine and Cape Basins (the eastern basin of the 40°S transect).

SOURCE: Deep-sea research. Part 1. Oceanographic research papers/Deep sea research. Part I, Oceanographic research papers

PDF URL: None

CITED BY COUNT: 11

PUBLICATION YEAR: 2019

TYPE: article

CONCEPTS: ['Geotraces', 'Water column', 'Oceanography', 'Particulates', 'Surface water', 'Transect', 'Geology', 'Scavenging', 'Nepheloid layer', 'Sediment', 'Bottom water', 'Water mass', 'Continental shelf', 'Deposition (geology)', 'Sediment trap', 'Environmental science', 'Chemistry', 'Geomorphology', 'Organic chemistry', 'Biochemistry', 'Environmental engineering', 'Antioxidant']