

The Link Between Particulate Silver and POC Fluxes to the Deep Ocean

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It has been hypothesized that silver, like barium, accumulates in settling organic-rich particles and thus may be useful as a paleoproductivity proxy. To test this hypothesis the particulate silver (PAg) flux was determined for sediment trap samples from the northeast Pacific off California, western Arabian Sea, Equatorial Pacific, and Southern Ocean. While there is some lithogenic input, particularly at continental margin sites, even at these locations >80 % of the PAg is non-lithogenic (i.e., xsPAg). The highest xsPAg fluxes (> 40 ng/m²/d, yearly average, 1000 m) occur at continental margin locations, notably off California where average yearly fluxes exceed 100 ng/m²/d. The lowest fluxes (< 30 ng/m²/d, yearly average, 1000 m) are recorded at open ocean sites. At all locations, except the Arabian Sea gyre site, xsPAg flux increases with water depth between ~1000 and 2000 m. Below 2000 m at continental margin locations the rate of increase slows, while at the open ocean sites xsPAg decreases. A strong positive correlation between xsPAg and POC fluxes is observed at most locations and water depths; however, the xsPAg:POC flux ratio is quite variable. In summary, sediment trap data indicate that particulate Ag does accumulate in settling particles, at least at intermediate water depths, and that xsPAg flux is related to POC flux, although various factors (e.g., OMZ depth, amount of POC export below 1000 m) influence how much Ag accumulates.