

Seasonal variations in chromium isotopes and dissolved/particulate metal concentrations in SF Bay

KATHLEEN SCHEIDERICH¹

¹USGS-WMA 345 Middlefield Road, Menlo Park, CA 94025
kscheiderich@usgs.gov

Surface and bottom water samples were collected in order to assess seasonal variations in Cr isotopes and metal concentrations related, potentially, to factors such as freshwater influx and particulate load from the San Joaquin-Sacramento rivers; phytoplankton activity in the Bay, and internal circulation within the embayments of the estuary, as well as in-situ redox speciation of Cr. Samples were either filtered, then acidified to assess the dissolved load, or acidified, then filtered, in order to capture the metals potentially adsorbed to particulates (operationally, the “particulate” fraction).

Chromium concentrations and isotopes vary greatly between the dissolved and “particulate” fraction. Chromium extracted from many of the acidified samples appears to reflect a geogenic source, similar to bulk silicate earth values, ($\delta^{53}\text{Cr} \sim -0.1\%$). One possible interpretation is that this is reflective of strong inputs of Cr from mafic rocks in the Coast Range ophiolites of California, which are drained by the Sacramento and San Joaquin rivers, together with intense resuspension of sediments derived therefrom. There is, however, a superimposed seasonal signature which may indicate fractionation due to redox reactions on organic particulate surfaces, as the spring acidified samples—when particulate load is highest as a result of phytoplankton blooms—are isotopically heavier than in other seasons. Stations 34 and 36, the most southerly stations, which see limited freshwater input, have the highest Cr concentrations and lightest isotopic compositions, (both dissolved and particulate) which is likely due to the sediment resuspension that occurs in these shallow waters. $\delta^{53}\text{Cr}$ values of filtered water, reflective of the dissolved Cr, is broadly similar to open-ocean water (1-2‰), with relatively large geographic and seasonal variations. Mixing with river water and possible flocculation could account for some variation, as well as loss to particulates from redox transformation to relatively more particle-reactive Cr(III).

Other metals (Ba, Sr, La, REEY, Zr, Mo, Pb, Al, B, Li, Ag, Sn, U, and Tl) were analyzed via ICPMS using an autosampler (SeaFAST by ESI) operated in Direct mode on the same water fractions. Seasonal and geographic variations appear, and a closer assessment of the data may reveal details of estuarine processing that have been shown for more-commonly studied elements in the SF Bay system (e.g. Cu and Zn).

**This abstract is too long to be accepted for publication.
Please revise it so that it fits into the column on one page.**