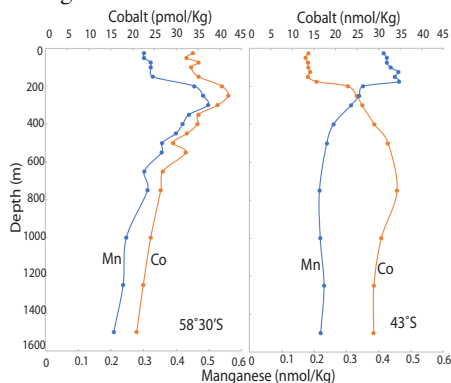


Winter distribution of Cobalt in the Southern Ocean: First results from the 30°E line

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Here we present the preliminary assessment of dissolved cobalt cycling within the western Indian sector of the Southern Ocean. Seven depth profiles were collected along the 30°E longitude in July of 2017 aboard R/V SA Agulhas II in order to assess the winter re-set state of the Southern Ocean. The surface cobalt concentration varied from ~38 pmol Kg⁻¹ towards the ice (56°S) to ~13 nmol Kg⁻¹ in the north (42°S). In general cobalt profiles exhibit a hybrid behavior with the subsurface maxima moving progressively closer to the surface as one moves from South to North. Surprisingly though, at the two north most stations the profile shape changes to a nutrient like profile, which persists till the sampled depth of 1500 m. The highest cobalt concentrations were also observed in the depth profiles of these two north most stations sampled south of the Agulhas current and may represent the leakage of shelf signal through retroflected eddies.



Cobalt is bioactive as it is required for enzymatic reactions for phytoplankton growth – confirmed by the lower surface concentrations. Below mixed layer, Co is remineralized and removed through scavenging on Mn oxide particles. A good correlation is observed between dissolved Co and Mn within the sub-Antarctic zone and below; however, above the sub-Antarctic polar front, a decoupling of Co from Mn is observed. The contrast in the North vs South depth-concentration profiles suggests that different mechanisms are responsible for the cobalt cycling in different water masses of Indian and Southern Ocean.