

Cobalt Speciation in the Amundsen and Ross Seas During Bloom Conditions

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Cobalt can be found at picomolar concentrations in the oceans and is a necessary nutrient for marine life. The distribution of both labile and ligand-bound dissolved cobalt in the global oceans is not fully understood, although recent efforts by the GEOTRACES program have greatly improved our understanding of basin-wide cobalt distributions and dynamics. Cobalt's role as a co-factor in vitamin B12 (cobalamin) is of particular interest because vitamin B12 is necessary for many types of eukaryotic plankton but is only produced by some bacteria and archaea. Recent studies in the Southern Ocean suggest that vitamin B12 could exhibit co-limitation or secondary limitation with iron. This study examined cobalt and iron speciation measured via shipboard voltammetry along a transect from the Amundson Sea to the western Ross Sea, an area that is understudied by trace metal chemists. The transect contained 6 full-depth stations and 67 samples analyzed for dissolved labile and dissolved ligand-bound cobalt and iron. We also explored cobalt and surface iron speciation within Terra Nova Bay over the course of a one-month bloom event. Understanding the distribution of trace metal nutrients in the Southern Ocean during summer phytoplankton blooms is important to our understanding of trace metal biogeochemistry, nutrient limitation, and carbon export in the productive oceans surrounding Antarctica.