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ONR Final Report

This is the final report on a series of ONR-funded projects that extended over 20 years at MIT. The general aim of the various projects was to elucidate the geochemical dynamics of dissolved trace elements in the oceanic water column. At the beginning of the project essentially nothing was known. Analytical methods and sampling protocols had to be developed to deal with concentration levels as low as 10<sup>-15</sup> molar. Early work produced the first reliable data for Cu, Ni and Cd. Over the years methods were developed for Se, Be, Al, Bi, Te and Cr. The first direct measurements of chemical speciation were made, for the oxidation states of Se and Te. The first sea-going measurements were also made, for Se, Be and Al. In addition the earliest accurate profiles were obtained for the suspended material in the water column.

The final phase of this long-term project was directed at the Platinum Group Elements (PGE). Accurate water column profiles have been obtained for Au, Pt and Re and pore water and sediment data have been obtained for Pt, Re, Pd and Ir. These data demonstrate that, in the marine environment, the PGE do not behave as a coherent "group" but instead display very diverse chemical behaviour driven by their differing redox chemistries. The results of this work are in the process of publication.

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