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Review of the geosecs project

Willard S. Moore

Department of Geology, University of South Carolina, Columbia, South Carolina 29208, USA

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Abstract

The Geochemical Ocean Sections Study (GEOSECS) provided the first comprehensive data set for the distribution of chemical species in the world ocean. For the first time chemists who measured nutrients, radiosotopes, stable isotopes, carbon, gases, trace metals, and particles were on the same ship working on the same or almost the same samples. They were supported by high quality hydrographic data available soon after each leg was completed. There were numerous intercomparison studies involving different laboratories which helped to sort out many analytical problems. But the data themselves provided an even more valuable criteria as the principle of oceanographic consistency began to be appreciated. This principle states that chemical data from the ocean generally follow relatively simple patterns illustrated by profiles of salinity, temeerature, nutrients, oxygen or other tracers which have been measured reliably. Even if several laboratories produced similar data sets of widely scattered concentrations of a trace metal, the data would be suspect unless some reason could be found for the scatter. This principle is still not widely appreciated by chemists studying other natural waters.

Only four isotopes were routinely measured on GEOSECS by alpha spectrometry: ^{228}Ra, ^{228}Th, ^{210}Pb, and ^{210}Po (the two beta-active isotopes were measured by extracting their alpha-active daughters). The criteria for assessing the results were based on laboratory intercomparisons and on the oceanographic consistency of the data.

Other low level radioisotope measurements include ^{14}C, ^{222}Rn, ^{137}Cs, ^{90}Sr, and ^{32}Si. With the exception of ^{222}Rn which was measured by alpha scintillation counting aboard the ship, the analyses were made by beta or gamma techniques in shore laboratories.

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