



Geochemistry of rare and minor elements in sediments from Brazil Basin of Atlantic Ocean

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This paper reviews the features of the rare and minor elements in the sediment samples recovered from the Brazil Basin at the location of the Station No. 1537 in the Atlantic Ocean during the 18th cruise of the Research Vessel "Akademik Sergey Vavilov". The depth of the sediment column is 470 cm. The sediments are represented by the oxidized miopelagic clay (0-305 cm) which are underlain by the thin bedded Ethmodiscus diatom oozes (305-470 cm). The brown miopelagic clay (0.09-1.25% 3, 0.05-0.28% organic) predominately consist of the clay minerals (91-97%). The top section sediments also include some terrigenous clastic sandy-silt minerals (1-5%), diatoms (up to 2%), manganese micronodules (approx. 1%), occasional spicules, radiolarian, coccoliths and marine fossil fragments. The transition to the lower diatom oozes is associated with the lens-shape structures and increase in the content of diatoms in clay.

The age of sediments at the station No. 1537 is Late Pleistocene. Presence of thin bedded Ethmodiscus oozes is an indirect evidence of re-deposition of the sediments in the central part of the Brazil Basin

The chemical composition has been analyzed on 37 core samples recovered from the column. These core samples have been used to define the content of the chemical composition as well as the rare and minor elements.

The manganese content in the top section of the miopelagic clay varies insignificantly and value is close 0.46%. The rare and minor elements content in the miopelagic clay is quite stable.

The sharp increase in manganese content (to 1.16%) as well as in that of the minor elements such as Co, Cu, Ni, Mo and Tl are observed at the 305-308 cm horizon which corresponds to the bottom of the miopelagic clay. Than, the manganese content decreases to reach its minimum value (0.20%) immediately below this horizon. With further depth increase, the content of manganese starts rising again reaches its maximum value of 2.31% at the 405-407 cm horizon. The diatom oozes, compared with the clayey silts, contain higher concentrations of Co, Cu, Ni, Mo, Tl. The content of other minor elements is considerably lower than that of the clayey silts.

Comparison of the average chemical element contents in miopelagic clay and diatom oozes gives a series sequence of abundance of minor elements:

Ag Mo Tl Mn Cd Ba Co Ni Cu Sr Pb Li Ce Zn V
0.2 0.4 0.5 0.5 0.6 1.2 1.3 1.5 1.7 1.8 2.1 2.1 2.1 2.1 2.3

REE Y U W Th Be Rb Cs As
2.3-2.1 2.3 2.4 2.4 2.4 2.4 2.5 3.5

The miopelagic muds contains high concentrations are reached in three groups of elements: easily hydrolyze elements (REE, Y, Th, Be), elements represented by oxyanions in the ocean water (U, W, V, As) and elements linked with the clays (Li, Rb, Cs).

The concentrations of rare earth elements (REE) in miopelagic muds show almost no change with depth. The compositions of REE include cerium anomaly and light lanthanides. The composition of REE in diatom oozes is more variable. The oozes also include cerium anomaly, but sometimes concentrations of lighter elements are low.