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The Application of $^{226}Ra_{exc.}$/Ba-Ratios for Dating of Baltic Ferromanganese Concretions

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Increasing attention has been directed to Baltic Fe/Mn-encrustations because of their potential use as geochemical archive over post-glacial times, especially as a monitor for heavy-metal pollution of the Baltic Sea. In this study we measured the concentrations of ^{238}U, ^{234}U, ^{232}Th, ^{230}Th, ^{226}Ra by TIMS and of Ba by ICP-OES on seven Fe/Mn-crusts from the "Mecklenburg Bay" (SW-Baltic) and on one from the "Bothnian Bay" (N-Baltic) in order to constrain their fluxes into Baltic Fe/Mn-encrustations and to test the $^{226}Ra_{exc.}$/Ba-ratio for its use as geochronometer.

^{226}Ra, Ba and ^{232}Th fluxes into the crust exceed those expected from the water column, whereas the data for ^{238}U, ^{234}U, ^{230}Th are matching. This implies for the geochronological relevant ^{226}Ra and Ba in the crusts a supply rather from the pore waters of the adjacent sediments than from the water column. The ^{226}Ra/Ba-ratios decrease as a function of depth within the Baltic crusts. Experimental data and theoretical consideration of Ra- and Ba-fluxes indicate that the decline of the $^{226}Ra_{exc.}$/Ba-ratio is due to the radioactive decay of ^{226}Ra rather than due to diffusion processes. The radiometric determined growth rates are in the range of those established from historical correlated geochemical profiles (Hlawatsch, 1999), *in situ* growth experiments (Heuser, 1988) and some stratigraphic methods (Glasby et al., 1997). The $^{226}Ra_{exc.}$/Ba-ages of crusts from a shallow water environment (20-25m) are between 900 and 4000 years before present. Exclusively for a sample from a deeper environment of formation (70m) an age of about 6000 years could be determined. The observed correlation of maximum age and water depth is interpreted to be linked to the sea level history of the Baltic Sea.

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