

Distribution of Ra-226 downstream a uranium mining site.

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Many small uranium mines developed in Saxony and Thuringia after World War II up to 1960. Today, leachates contaminated with radionuclides still emerge from the respective dumps and tailings.

The uranium mining site Zobes-Bergen-Neuensalz is situated near Plauen (Saxony). Here Ra-226-activity concentrations were measured by gamma-spectrometry (Silena-MATEC GmbH) in the sediment and in organic plant litter and – for chosen samples – Mn- and Fe-contents by AAS (Solar, Unicam).

Background of the specific activity of Ra-226 varies between 0.045 and 0.1 Bq*g⁻¹.

High specific activities of Ra-226 were found at the eastern as well as the western leachate exit point. Specific activities of Ra-226 in samples from the ochre coloured eastern leachate exit points varied between 4.4 – 9.5 Bq*g⁻¹ at U-235 activities of 0.031 – 0.062 Bq*g⁻¹. In the western sediments Ra-226 activities were significantly higher (app. 20 Bq*g⁻¹). Specific activities of Ra-226 decrease with increasing distance from the exit point.

Organic litter found directly at the western leachate exit point displays activities up to 8.5 Bq*g⁻¹ Ra-226. 250 m downstream specific activities are reduced to 0.2- 0.9 Bq*g⁻¹.

Generally, leaves show higher specific activities than twigs.

Specific Ra-226 activities may be reduced by washing organic litter samples with water – in opposition to U-238. Mn-contents are likewise reduced. Untypically, Mn-contents are higher than Fe-concentrations.

Organic litter could function as an active surface, where hydroxides are precipitated and Ra-226 is co-precipitated. Sorption or ion-exchange of alkalies or earth-alkalies by Ra-226, which releases Ra-226 at decay.