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Absorbed dose rate conversion coefficients for reference terrestrial biota for external photon and internal exposures.
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The paper describes dosimetric models that allow the estimation of average radiation exposures to terrestrial biota due to environmental sources in the soil as well as internal uniform distributions of radionuclides. Simple three-dimensional phantoms for 13 faunal reference organisms are specified. The calculation of absorbed dose per unit source strength for these targets is based on photon and electron transport simulations using the Monte Carlo method. The presented absorbed dose rate conversion coefficients are derived for terrestrial reference species. This allows the assessment of internal exposure as well as external photon exposure depending on the nuclide, habitat, target size and environmental contamination. To enable the application of specific radiation weighting factors for -, low energy - (E0<10 keV), - and -radiations, their partial contributions to the total absorbed dose are provided separately. The coefficients for external exposure are listed for organisms living above the ground for an infinite plane source 3 mm deep in soil, as well as for a horizontally infinite volume source uniformly distributed to a depth of 10 cm. Furthermore, the coefficients are also presented for organisms living in a contaminated 50 cm thick soil layer. A multi-layer canopy model for plants is also described. The conversion coefficients are given for 3H, 14C, 40K, 36Cl, 59,63Ni, 89,90Sr, 94Nb, 99Tc, 106Ru, 129,131I, 134,135,137Cs, 210Po, 210Pb, 226Ra, 227,228,230,231,232,234Th, 234,235,238U, 238,239,240,241Pu, 241Am, 237Np and 242,243,244Cm, together with their progeny.

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