

Application models

Applications models are the models used to translate the concentrations of radionuclides to the parameter of interest. In most of our applications, the concentrations of radionuclides serve as a *proxy* and most parameters are measured indirectly, only some parameters are measured directly.

The study of sensing defining soil application models for (geophysical) sensor technologies is also called [pedometrics](#).

Direct measurements

The gamma spectrometer gives a direct measurement of concentrations of radionuclides. Most common are the the concentrations of natural radionuclides (40K, 238U and 232Th) or other man-made radionuclides (or fission products) as 137Cs.

Indirect measurements

Many applications use the concentration of natural radionuclides as a proxy for the parameter is interest. These indirect measurements are based on validated statistical models or pure statistical models.

Validated statistical models correlate the concentrations of the radionuclides to the parameter of interest. In these validated models, the principle why these data are correlated is understood. Depending on the mechanism, the models can be used on a regional scale, or should be determined for every site. Examples are parameters as median grainsize (for sediments) and clay content. The model for mapping clay, for example, depends on geology. This model can be used for the Netherlands as a whole (which is one geological region), but models for clay that are found to be valid for dutch soils are not necessarily valid for soils in Spain. The actual translation between radionuclides and soil properties therefore needs to be re-established again for each new, geologically different region.

Pure statistical models try to correlate the concentrations of the radionuclides to the parameter of interest. These models are not based on a real understanding of the principle why the radionuclides are correlated to the parameter of interest, but just use a statistical correlation. This might work well for a specific site, but there is no guarantee that this approach works for all situations. These statistical models have to be proven each site that was not part of the dataset used for the statistical analysis. Examples are nutrients of soils and pollution of soil.

Application models

- [Texture of soil and sediment](#)
- [Pollution of soil and sediment](#)
- [Agriculture](#)
- [Geology and mineral exploration](#)