

E1-52: Environmental gamma ray dose rates measured by *in situ* gamma spectrometry

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Gamma ray spectrometry in the environment has been established as a rapid and sound method for the determination of radionuclide activities and dose rate quantities. Several methods have been developed to determine dose rates due to radionuclides in soil from gamma ray spectra. One approach to measure environmental radioactivity is to take the spectrometer to the place of interest and conduct *in situ* measurements.

The objective of this study was to determine if dose rates due to U and Th series obtained by *in situ* gamma spectra using spectrum dose conversion function is comparable with dose rates calculated by choosing proper kerma rates appropriate to each radionuclide present in a spectrum.

Seven sites at Uswetakeiyawa beach were studied and the dose rates calculated for the maximum and minimum measured with a hand held survey meter. Dose rates calculated using the spectrum dose function for U and Th were 0.519, 3.076 and 0.320, 0.818 $\mu\text{Sv h}^{-1}$. The corresponding values calculated using kerma rates were 0.365, 2.655 and 0.155, 0.790 $\mu\text{Sv h}^{-1}$. These values agree within 12.4% error for the high background sites studied.

A rapid evaluation of a radiation contamination as in the event of a fall out situation can be performed by *in situ* gamma spectroscopy. Time and money can also be saved as sampling and sample preparation is not necessary. A rapid determination of dose rates can be obtained using kerma rates if information on parameters such as the distribution of the radionuclides and composition are known. On the other hand the spectrum dose conversion function method can be used to evaluate individual dose rates due to a single radionuclide in addition to its activity concentration for different energies and radionuclide distributions in the soil.

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