

## Environmental radiation measurements enabling comparison of efficiency calibrations of HPGe detector with GEANT4

A low background Hyper Pure Germanium detector was used to determine the radioactivity levels in soil samples collected from Southern area of Chad in Central Africa.

The calculated activity concentrations were determined for the following radionuclides:  $^{226}\text{Ra}$ ,  $^{238}\text{U}$  and  $^{232}\text{Th}$  as well as  $^{40}\text{K}$  and  $^{137}\text{Cs}$  (anthropogenic).

In order to validate our experimental result regarding efficiency calibration, GEANT4 Monte Carlo code was utilised to test the peak efficiency characterizations of  $^{40}\text{K}$ ,  $^{22}\text{Na}$ ,  $^{137}\text{Cs}$ ,  $^{60}\text{Co}$  and  $^{152}\text{Eu}$ . This comparison should show how the code agree with experimentally obtained efficiencies of our detector and in which part of the spectrum do the discrepancies appear.

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