O17-2 THE ESTIMATION OF NATURAL RADIOACTIVITY OF THE ALBANIAN CLAYS

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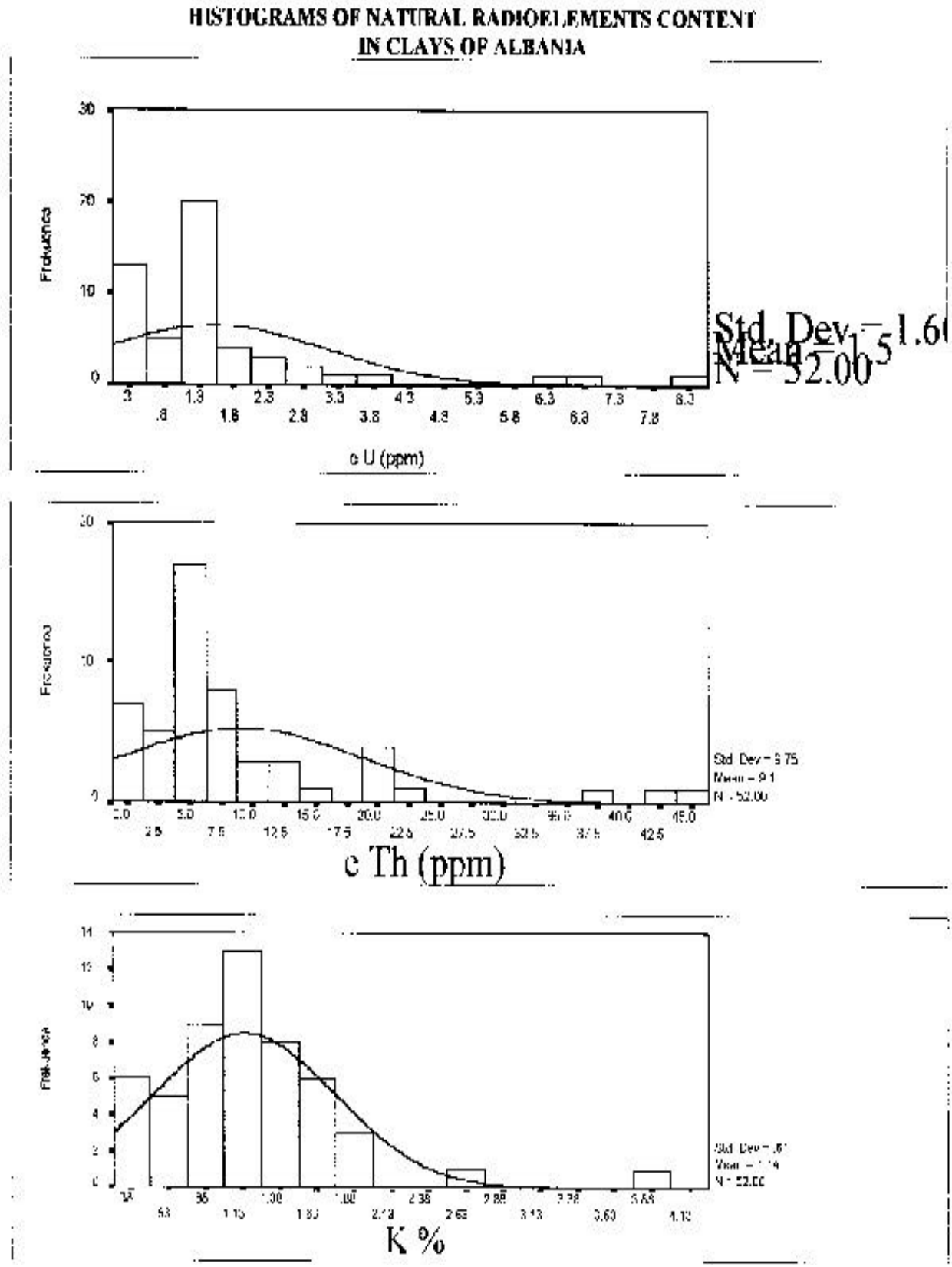
The paper deals with the natural radioactivity of Albania's clays which serves as raw materials for construction industry (bricks, ceramics, cement, fillers etc.) The clays of Albania are investigated already in geological and mineralogical aspects as well as their reserves and the physical-mechanical properties. Therefore it was necessary to investigate also their natural radioactivity for their complete classification. The clays have good absorbent features, especially as clay colloids. They contain also natural radioactive elements and rare elements.

In this paper results of 52 clays samples analyses from different sites of Albania, including brick factories are treated.

Due to their natural rock composition and the absorbing features, the clays contain numerous rare elements. Besides the most important natural radioactive elements like U, Th, K, Ra, Rn the clays must have in their composition radioactive isotopes of rare elements like Rb-87, Sm-152, Lu-76, Re-187 etc. The main irradiator of the clays is U-238 (in equilibrium) with 0.33μCi/gr specific activity. 1 gr U-238 emanates $3{,}3.10^4$ gamma-quantum/sec and $8{,}4.10^3$ beta particles/sec. The specific radioactivity of Th-232 (in equilibrium) is 0.11μCi/gr.Thus, 1gr. Th-232 emanates $1{,}7.10^4$ gamma-quantum/sec and $1{,}5.10^3$ particle-beta/sec. K-40 is gamma and beta irradiator In one disintegration, it radiates 0.11 gamma-quantum and 0.89 beta particle. So, 1gr Potassium (K-40=0.0118% K) emanates 3.3 gamma-quantum/sec and 27.5 beta particle /sec[4]. The number of the natural radioactive elements is nine, but from the radiation intensity, only three of them (U, Th, K) is the most important and therefore the radiometric and gammaspectrometric analyses are done for these elements.

From the measurements it's evident the contrast of radioelement concentrations for different samples through the values of eUtc as well as for particular radioelements. The obtained are presented through respective histograms as well as through the correlations between U, Th, K(Fig.1). In the figure 1 are represent the most important deposits for the industrial clays in Albania, where the sampling is done.

The maximum concentration value is respectively eTh(up to 45ppm), eU(up to 6.5ppm) and K(up to 3.8%). The relative low value for U concentration brings about low emanation of Rn-222, which becomes a positive factor for the radiation protection in the dwellings. From the radioactive concentration point of view, the 'normal' clays that were used as construction materials for the dwelling and public buildings etc., content some ppm U, and Th, while for K the figure is less than 4%. In the case when the concentration of these radioactive elements in clays is more than 10ppm for U , 20ppm and Th and more than 5% for K , it is necessary to review the possibilities of the limitation of these clays for construction materials. The reason for this limitation comes from the high value of the exposures, which create radioactive materials for the human beings. As a general rule the total natural radioelement concentration of clays for the dwellings and public use should not exceeded 30 ppm Ue (uranium equivalent) . In the building industry, the most used raw materials are the clays (production of bricks, tiles, ceramics, fillers etc.).



Conclusions

The obtained results show that the radioelement concentration of the clays and soil is within the values accepted as 'normal'. The value of the 30 ppm for eU_{TC} is not overcome for the majority of the clay samples under measurements. From the radiation safety, the clays of Albania are below the recommended limits for their gamma dose rate, therefore they can be used for all kinds of public buildings.