NOTES – *NOTISER*

Computer Program for Computation of K, U, Th and Associated Data from Laboratory Gamma-Ray Spectrometer Output*

P. G. KILLEEN

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This program, written in FORTRAN 4 for a CDC 3300 computer and Calcomp plotter, calculates the concentrations of K, U and Th, the ratios Th/U, Th/K and U/K and Heat Production. It can list or plot a series of results in a variety of ways and makes some basic statistical calculations.

P. G. Killeen, Mineralogisk-Geologisk Museum, Sars gt. 1, Oslo 5, Norway. Present address: Resource Geophysics and Geochemistry Division, Geological Survey of Canada, Ottawa, Ontario, Canada.

There is at present an increasing realization of the importance of knowledge of the distribution of the radioelements Thorium, Uranium and Potassium, particularly for computing the radiogenic contribution to heat flowing from the earth's surface. This, in addition to their importance in geochemical studies of metamorphic and magmatic processes, differentiation, etc., has led to the recent or forthcoming installation of gamma-ray spectrometers for rapid determination of concentrations of these three radioelements in laboratories which previously had relegated such equipment to a lower priority.

A computer program (KUTH) has been written at Mineralogisk-Geologisk Museum, Universitetet i Oslo to handle output data from laboratory gamma-ray spectrometers. Program KUTH has been written in a form which will take summations from the three radioelement peaks, counting time and sample weight as input on punched cards and compute the concentrations of K, U, Th, K oxide, the ratios Th/U, Th/K, U/K and Heat Production. When the input consists of counting data from several samples, tables of values are listed and a set of useful statistics is computed including geometric means, arithmetic means, variance, coefficient of variation, standard error of the means, etc., for each of the above variables. In addition, since raw counts are used as input, estimated errors for each analysis are computed based on counting statistics.

After completing this basic task the following options are available:

Printed histograms of any of the variables or their logarithms with frequency in units of percent or number of samples.

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X-Y plots of any two of the variables on logarithmic, linear or mixed scales for the axes.

Least squares regression analyses of Y on X and X on Y.

Plotting of either or both of the regression lines on the X-Y plot with or without parallel standard error of estimate lines.

Several sets of data may be plotted on the same X-Y plot, using different symbols.

The program has been written in FORTRAN 4 and designed for the CDC 3300 computer and Calcomp plotter of Universitetet i Oslo. Many research institutions have similar computing facilities and gamma-ray spectrometer output compatible with this program. Even though the output counts of gamma-ray spectrometers may be presented in different forms (typewritten, punched tape or magnetic tape), in most cases it is reduced to a summation of counts under three peaks (usually 2.61 Mev for Th analysis, 1.76 Mev for U analysis and 1.46 Mev for K analysis). As such the program described here becomes of general use when the calibration constants for the particular spectrometer are inserted in the program. Persons interested may write for a copy of the program to Mineralogisk-Geologisk Museum, Sars gate 1, Oslo 5, Norway.

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