AIRBORNE GAMMA-RAY SPECTOMETRIC MAP

Airborne gamma-ray spectrometry data collected in the Sharbot Lake-Crotch Lake area of eastern Ontario during the summer of 1977, are presented:

(1) as contour maps of the total count, the potassium, equivalent uranium and equivalent thorium concentrations, and the eU/eTh, eU/K and eTh/K ratios; and

(2) as stacked profiles of the seven radiometric parameters plotted for each of the 33 flight lines.

This survey is of particular interest as it covers part of the area of the Sharbot Lake Area (flown with a 1 km line spacing) released as G.S.C. Open File 582.

The relative merits of a finer line spacing can be readily observed by comparing the two surveys.

The airborne measurements were made using a four window spectrometer, with twelve 22.86 cm x 10.16 cm NaI(Tl) detectors flown at a mean terrain clearance of 400 feet and 190 km/hr. Northwest-southeast flight lines were at 1/2 km line spacing and the numbered flight lines are plotted on each of the contour maps.

Potassium is measured directly from the 1.46 MeV gamma-ray photons emitted by potassium-40, whereas uranium and thorium are measured indirectly from gamma-ray photons emitted by daughter products in their decay chains. Uranium is monitored by means of gamma-ray photons at approximately 1.76 MeV from bismuth-214, and thorium, from 2.62 MeV photons emitted by thallium-208. The energy windows used are as follows:

Total Count		0.41-2.81 MeV
Potassium	^{40}K	1.37-1.57 MeV
Uranium	^{214}Bi	1.66-1.86 MeV
Thorium	^{208}Tl	2.41-2.81 MeV

Total count, uranium, thorium and potassium counts were measured over .5 second intervals. The data have been corrected for dead time, ambient temperature changes, background radiation, spectral scattering and deviations of terrain clearance from the planned survey altitude. The computer programs used to produce the contour maps and profiles are described by R.L. Grasty, 1972, "Airborne Gamma Spectrometry Data Processing Manual", G.S.C. Open File No. 109.

The values for the radioelement concentrations shown on the contour maps are "average surface concentrations", that is, an average of the area on the ground viewed by the spectrometer, an area which may contain varying amounts of outcrop, overburden and surface waters. As a result the concentrations as shown on the contoured maps are usually considerably lower than the concentrations in the bedrock. However, the radioelement distribution shown by the contour maps reflects the distribution of the elements in the bedrock.

Factors for converting airborne measurements to element concentration were determined by relating the corrected airborne count rates over the test strips in the Ottawa area to the known ground radioelement concentrations (R.L. Grasty and B.W. Charbonneau, 1974, Gamma-Ray Spectrometry Calibration Facilities, G.S.C. Paper 74-18, pp. 69-71).

The conversion factors used are approximately those listed below:

Total Count	1 ur	=	170 cps
	1% K	=	82.8 cps
	1 ppm eU	=	8.8 cps
	1 ppm eTh	=	6.4 cps

Total count measurements are presented as units of radioelement concentration (ur), as defined in International Atomic Energy Agency Technical Report Series No. 174, 1976.

Airborne Gamma-Ray Spectrometry Survey 1980
by
Resource Geophysics & Geochemistry Division
Geological Survey of Canada

Base map material supplied by Surveys and Mapping Branch.

Cartography by Geological Survey of Canada.

Scale 1:50,000

Kilometres 1 0 1 2 3 4 Kilometres

Miles 1 0 1 2 Miles

Universal Transverse Mercator Projection

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EQUIVALENT THORIUM / POTASSIUM

SHARBOT LAKE - CROTCH LAKE AREA

ONTARIO

part of 31C/15

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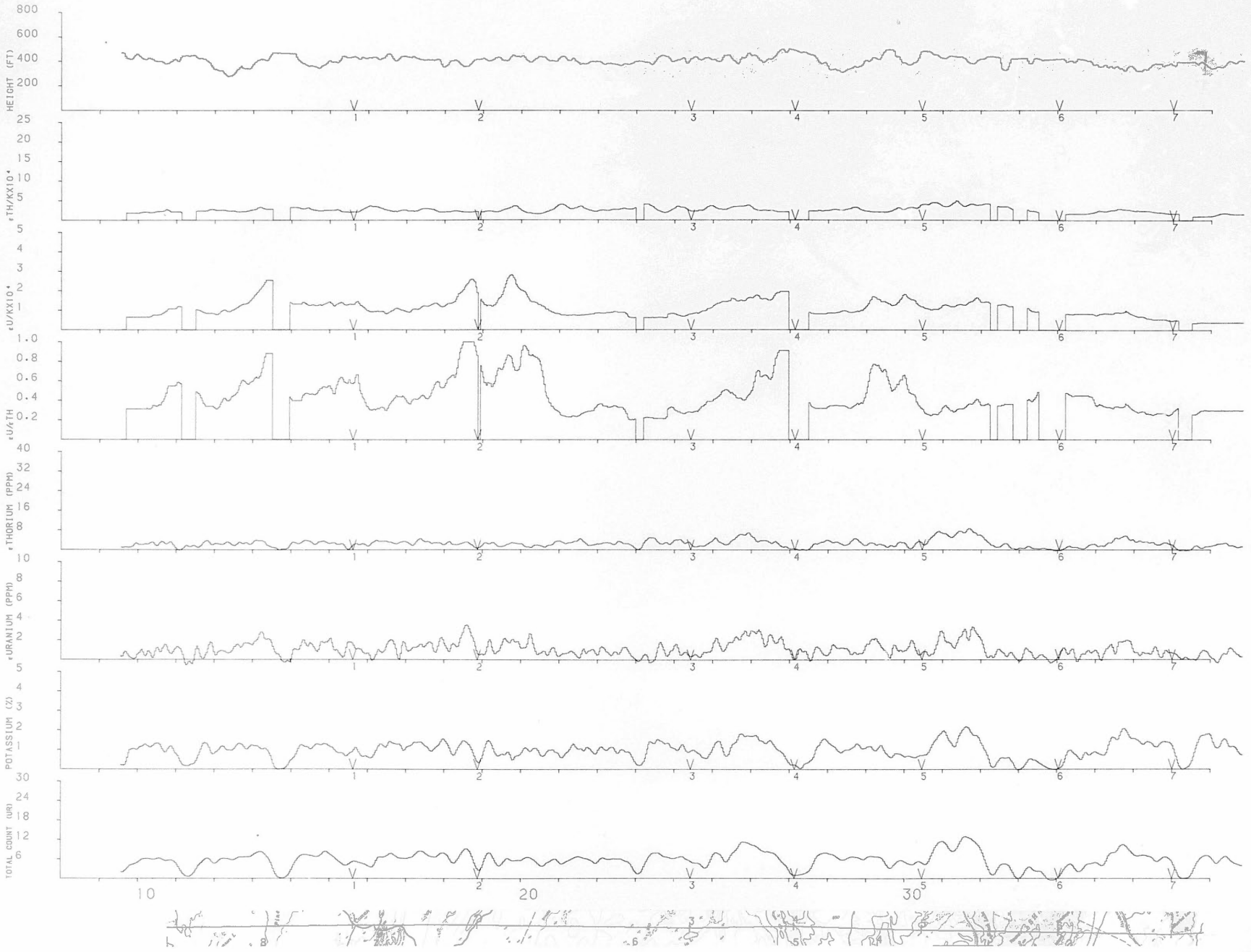
SHARBOT LAKE AREA ONTARIO 1977 1/2 KM.

LINE 2



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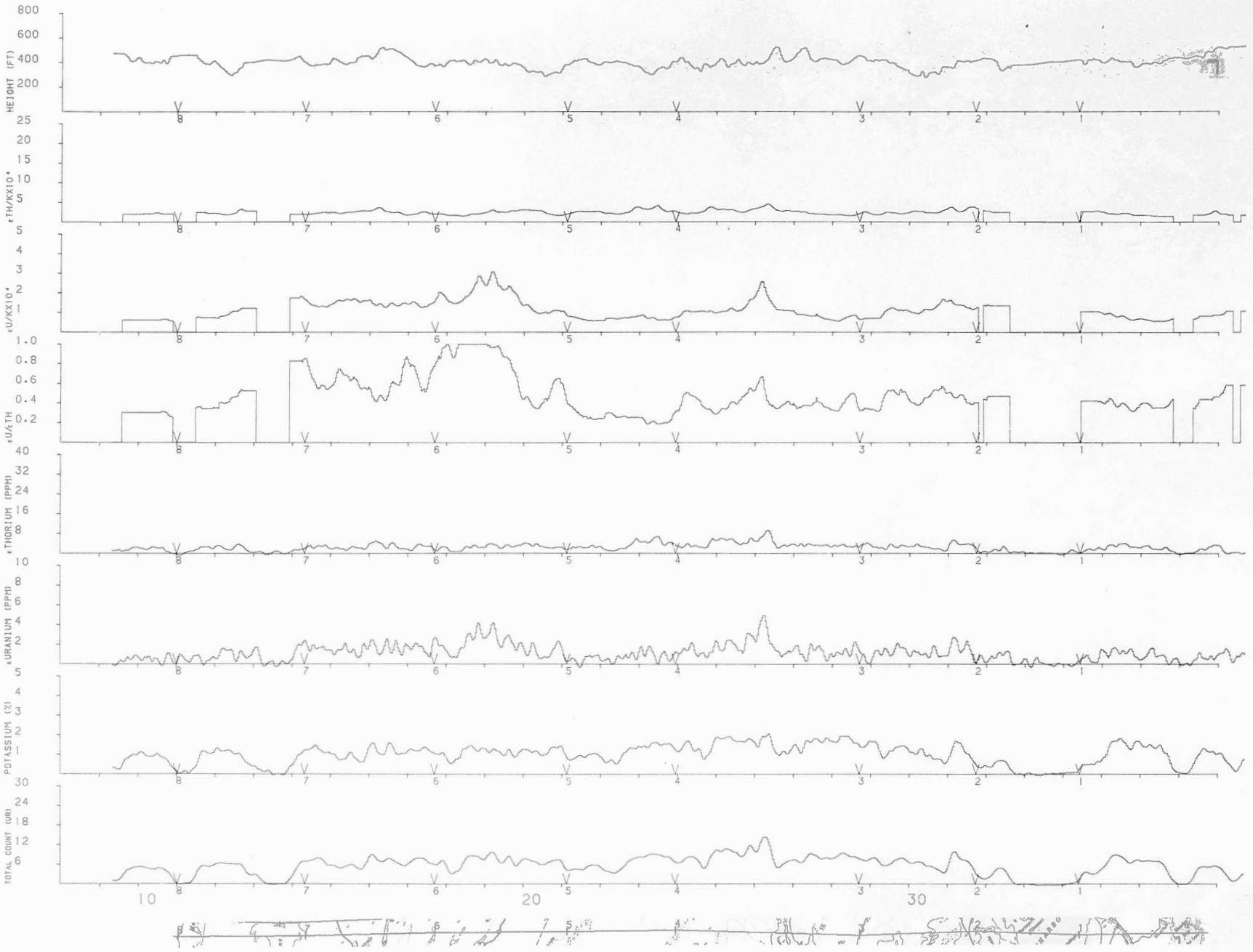

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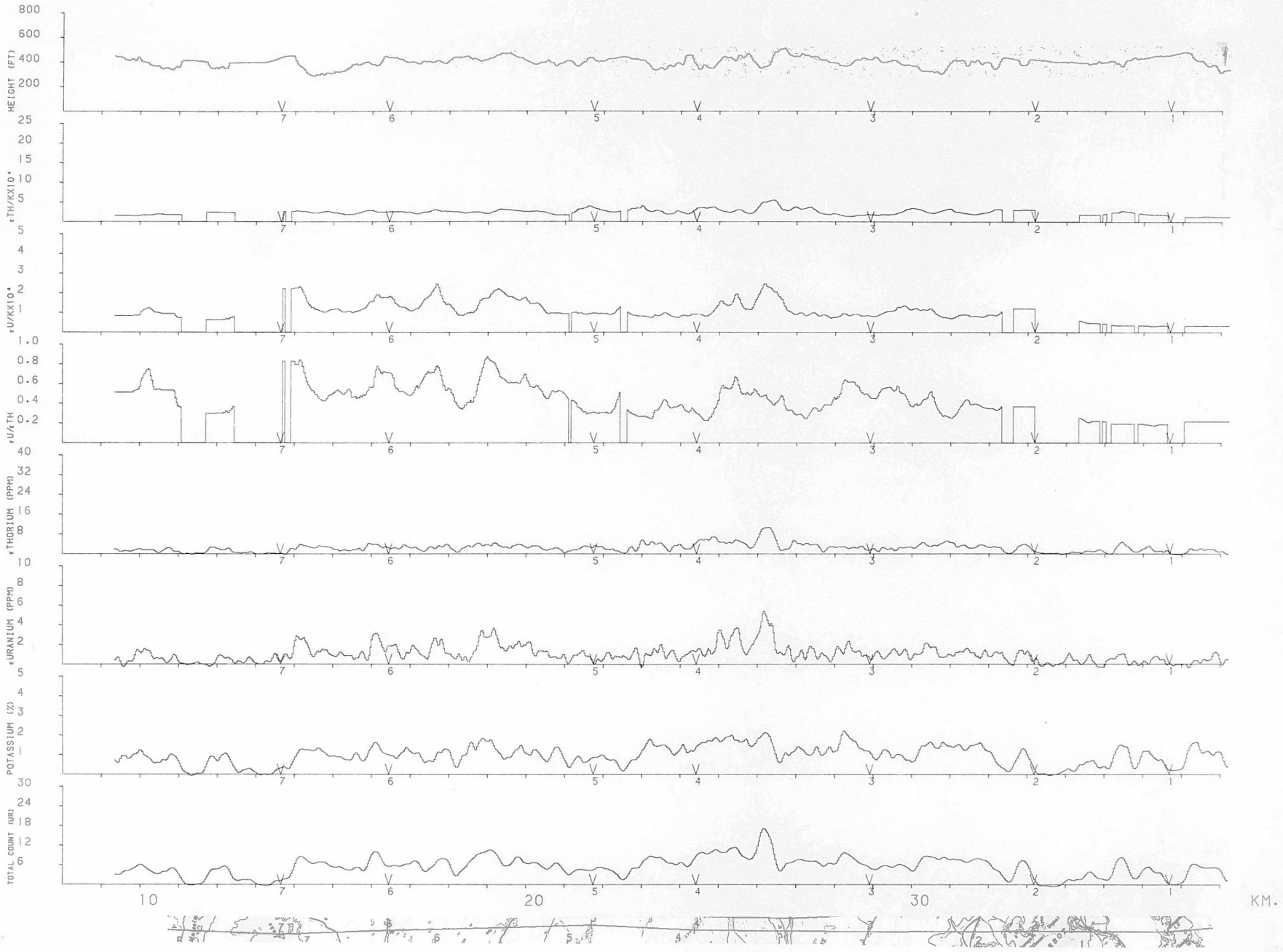
LINE 4



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