Natural Resources Canada | Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA

These new radioactivity maps were produced from the digital archives of the National Gamma Ray Spectrometry Program (NATGAM), from data collected between 1969 and 2000. The surveys were flown by the Geological Survey of Canada (GSC) and contracted aircraft, using Federal and joint Federal-Provincial government funding. All data were originally published in black line contour and stacked profile formats, as 1:250 000 GSC Open Files or Geophysical Series Maps.

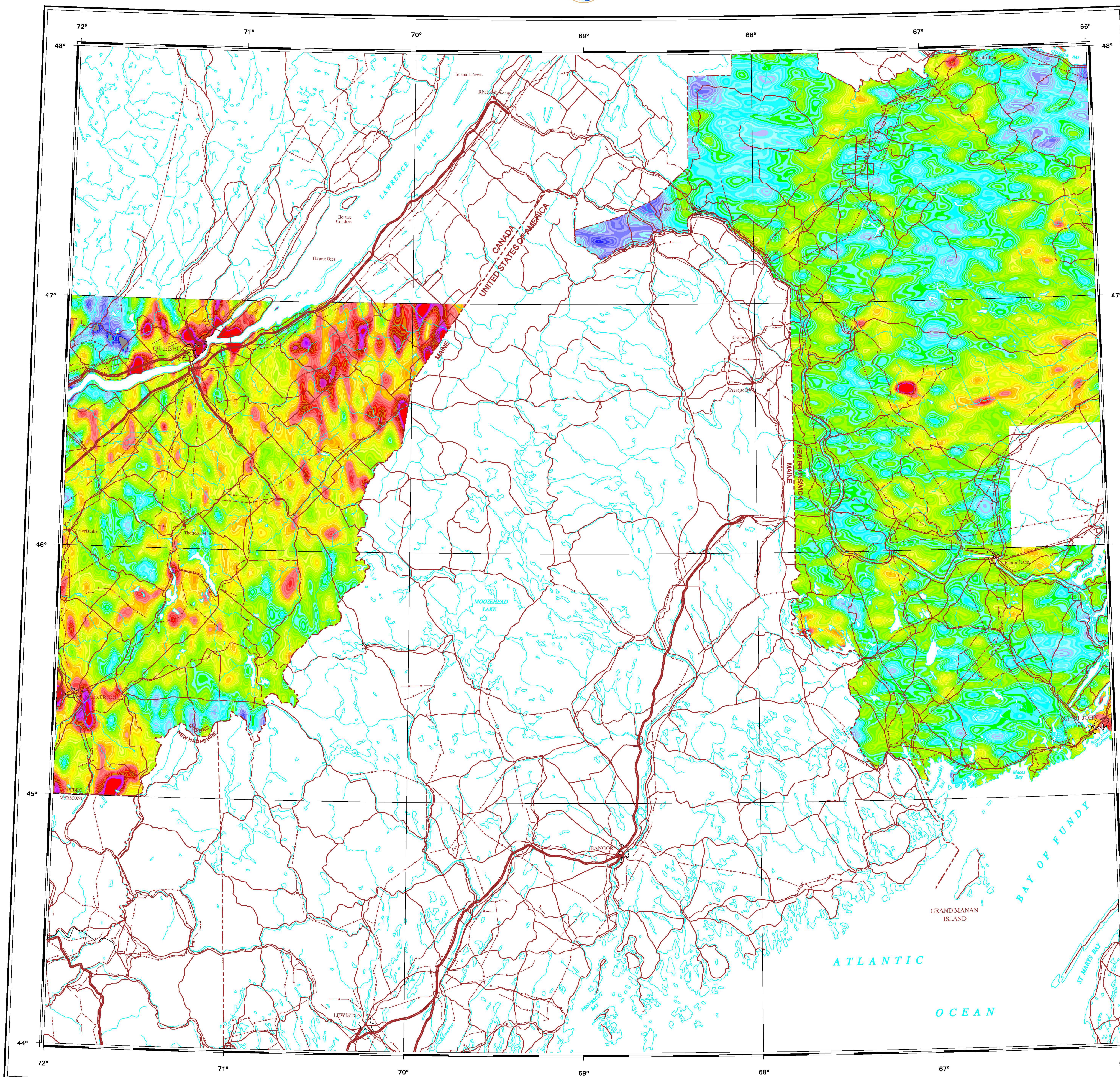
The data were collected using 50 litres of sodium iodide detectors, at a nominal terrain clearance of 120 m, along flight lines spaced at 5000-m intervals. Potassium is measured directly from the 1460 keV gamma ray photons emitted by ^{40}K. Uranium and thorium, however are determined indirectly from gamma ray photons emitted by daughter products ^{214}Bi and ^{208}Tl, respectively, assuming equilibrium between daughter and parent isotopes. For this reason, gamma ray spectrometric measurements of uranium and thorium are referred to as equivalent uranium (eU) and equivalent thorium (eTh).

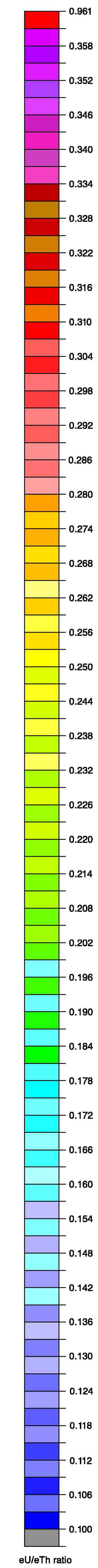
Standard energy windows were used to record the gamma ray counts. These are 1370-1570 keV for potassium, 1660-1860 keV for uranium, 2410-2810 keV for thorium and 400-2810 keV for total radioactivity. Several corrections are applied to the raw window counts prior to conversion to standard concentration units, including: system dead time; background activity from cosmic radiation, the aircraft and atmospheric radon decay products; spectral scattering in the ground, air and detectors; deviations of altitude from the planned terrain clearance; and temperature and pressure variations.

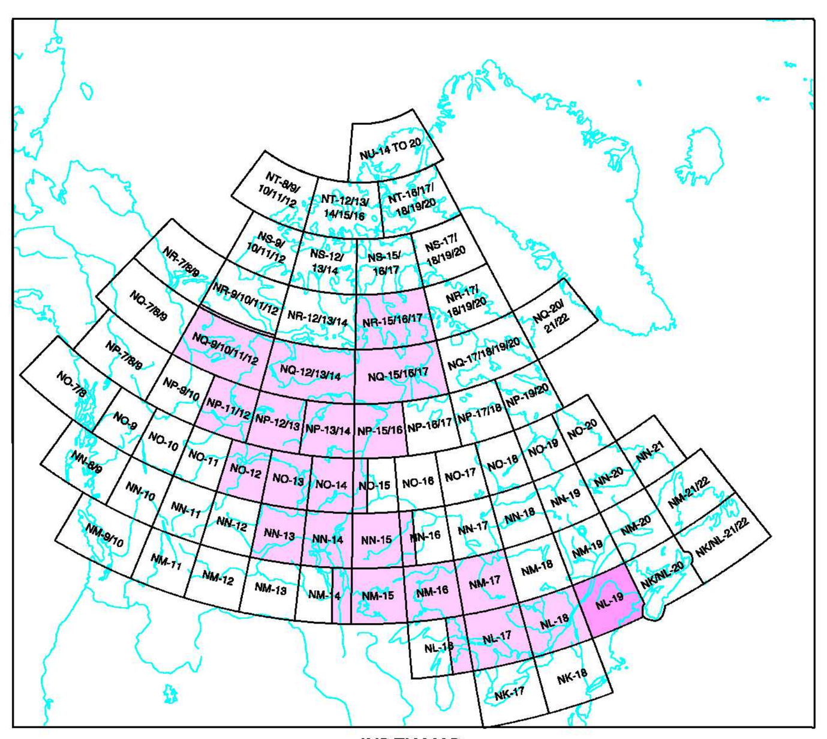
This Open File consists of eight 1:1 000 000 colour maps of three measured variables (potassium, equivalent uranium and equivalent thorium) and five derived products (the natural air absorbed dose rate derived from a linear combination of K, eU and eTh, and eU/eTh, eU/K, eTh/K and ternary radioelement map).

These maps depict radioactivity emanating from the upper 30 cm of the earth's surface. The data represent average surface concentrations, influenced by varying amounts of outcrop, overburden, vegetation cover, soil moisture and surface water. As a result, measured concentrations are usually lower than underlying bedrock concentrations. The variations shown on these colour interval maps support regional interpretations. More detailed application is possible through the use of the original line data, available from the Geological Survey of Canada.

The Radiation Geophysics Section acknowledges Drs. A.G. Darnley, Q. Bristow, K.A. Richardson and R.L. Grasty for their contributions to program development and technical leadership.







INDEX MAP

Geophysical compilation by J.M. Carson, P.B. Holman, K.L. Ford, J.A. Grant, and R.B.K. Shives

Digital cartography by J.A.Y. Pratt, Earth Sciences Sector Information Division (ESS Info)

This map was produced from processes in conformance with the Cartographic Services Section Quality Management System, Ottawa, registered to the Quality System ISO 9001: 1994 standards

Any revisions known to the user would be welcomed by the Geological Survey of Canada

Digital base map at the scale of 1:1 000 000 from the Digital Chart of the World (DCW) from Environment Systems Research Institute (ESRI), with modifications by ESS Info

eU/eTh ratio

OPEN FILE 4461

AIRBORNE GAMMA RAY SPECTROMETRY COMPILATION SERIES

QUÉBEC

QUEBEC–NEW BRUNSWICK

Scale 1:1 000 000/Échelle 1/1 000 000

kilometres 25 0 25 50 75 kilomètres

Lambert Conformal Conic Projection
Standard Parallels 44°40'N and 47°20'N
North American Datum 1927
© Her Majesty the Queen in Right of Canada, 2003

Projection conique conforme de Lambert
Parallèles d'échelle conservée : 44° 40' N et 47° 20' N
Système de référence géodésique nord-américain, 1927
© Sa Majesté la Reine du chef du Canada, 2003

OPEN FILE
DOSSIER PUBLIC
4461
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2003
SHEET 5 OF 8
FEUILLET 5 DE 8

Open files are products that have not gone through the GSC formal publication process.

Les dossiers publics sont des produits qui n'ont pas été soumis au processus officiel de publication de la CGC.

Sheet 5 of 8, Airborne Gamma Ray Spectrometry Compilation Series

Recommended citation:
Carson, J.M., Holman, P.B., Ford, K.L., Grant, J.A., and Shives, R.B.K.
2003: Airborne Gamma Ray Spectrometry Compilation Series, Québec, Quebec–New Brunswick; Geological Survey of Canada, Open File 4461, scale 1:1 000 000.

Canada