U.S. Geological Survey

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Characteristics of radioactivity patterns and their relations to geologic features in the southeastern quarter of the Winston-Salem quadrangle, N.C., Va., Tenn.

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Tectonic unit and formations	Total gamma ray intensity (counts per second) Extreme range	General range	Relation of radioactivity patterns to geologic features [1]
Fries block of the Blue Ridge thrust sheets			
Alligator Back Formation - gneiss member (abg) [1]	123 - 3730	600 - 900	A cresentic belt of high anomalies (the highest in the map area) occurs in the northwest corner of map area. Count in much of area is above 1000; local highs are above 2000; maximum is 3730. Cause of anomalies is unknown; they may be partly due to mass effect of large natural exposures on Blue Ridge front, and extensive artificial exposures in new road cuts of highway I-77. There are also several low anomalies (count below 500, minimum of 123) in this high anomaly area whose causes are unknown. Possible causes are artificial lakes or unmapped bodies of ultramafic rock. A belt of low anomalies (count below 600), about 5 km wide, occurs along southeast edge of area underlain by abg member. Cause of anomalies is unknown. Remainder of area underlain by abg member has count that generally ranges from 600 to 900.
Alligator Back Formation - schist member (abs)	468 - 998	650 - 900	abs member occurs in belt 3-7 km wide just north of Brevard fault zone. Count in much of belt is above 800, in contrast to parallel belt of anomalies below 600 in abg to north.
Granitic pluton at Mount Airy (Pzs)	598 - 1194	700 - 900	Radioactivity pattern does not correlate closely with outline of pluton; much of count over pluton is above 800.
Large ultramafic body south of Galax (ur)	470 - 700	550 - 650	Two small low anomalies are over southwestern part of pluton.
Sauratown Mountains anticlinorium			
Ashe Formation (p€ag), southern belt	444 - 1086	550 - 800	There is some correlation between cresentic trend of southern belt of Ashe and general trends of high and low radioactivity. Cause is unknown, but small bodies of pegmatite and granite may be more abundant in areas of higher radioactivity.
Ashe Formation (p€ag, p€as), northern belt	540 - 980	600 - 800	There is little correlation between geology and radioactivity trends.
Biotite gneiss (p€b)	402 - 1107	600 - 800	A belt of low anomalies (count below 600) about 13 km long is adjacent to Ashe belt on southwestern nose of anticlinorium. Another belt of low anomalies (count below 600) about 15 km long is just north of the Dan River Triassic basin; this belt extends southwestward across the Ashe Formation. Cause of these low anomalies is unknown.
Quartzite of the Sauratown Mountains (qt)	478 - 1360	700 - 900	The highest anomaly in the Sauratown Mountains anticlinorium is the eastern half of Hanging Rock Mountain, the largest area of quartzite exposures.
Elk Park plutonic group (p€ec, p€ep)	453 - 951	550 - 850	A belt of low anomalies (count below 600) correlates with the granodioritic pluton about 21 km long that extends southwest of the town of Pilot Mountain. A belt of higher anomalies (count above 800) extends for about 26 km along axis of large pluton on southeastern limb of anticlinorium.
Crossnore plutonic-volcanic group (p€cg)	535 - 1084	650 - 850	Highest anomaly (1084) is centered over small granitic body on southwestern nose of anticlinorium. Radioactivity over much of pluton that extends about 8 km west of Hanging Rock Mountain has count of 800 to 900.
Inner Piedmont belt			
Henderson Gneiss (hg)	518 - 1290	600 - 900	A discontinuous belt of low anomalies (count below 600) correlates with the belt of Henderson Gneiss.
Biotite gneiss (bag), and sillimanite-mica schist (ss)	505 - 1418	700 - 1000	Geologic trends and radioactivity patterns are both very irregular, and have no obvious correlation. High anomalies may be caused by abundant small bodies of granite and pegmatite.
Granitic rock (Pzg)	592 - 1744	700 - 1200	Geologic trends and radioactivity patterns are both irregular, but areas of high anomalies (count above 1000) correlate somewhat with geologic trends.
Charlotte belt			
Biotite gneiss (bc)	275 - 1550	700 - 1100	A belt of low anomalies (count below 600) trends about 11 km northeast from large pluton of mafic rock at west end of belt; these low anomalies may be caused by small mafic dikes and sills in the biotite gneiss. Another belt of low anomalies (count below 500) that trends about 8 km northerly at east end of belt correlates closely with Belews Lake. A broad belt of high anomalies (count 1000 to 1400) trends about 20 km east through Winston-Salem and continues eastward into large granitic pluton -- cause of these anomalies and their trend across major structural trends is unknown. Possibly a zone of small bodies of granite and pegmatite occurs in the biotite gneiss.
Quartz-feldspar gneiss (qgc)	452 - 942	550 - 750	A belt of low anomalies (count below 600) trending south from Germantown is parallel to structural trends; some amphibolite occurs in belt.
Metagabbro and metadiorite (Pzcm)	362 - 1000	450 - 600	Low anomalies (count below 600) are closely associated with large irregular pluton of mafic rock southwest of Winston-Salem.
Granitic rock (Pzc)	553 - 1899	800 - 1200	A belt of high anomalies (count above 1000) extends east across trend of main granite pluton and biotite gneiss. Cause is unknown; possibly a zone of pegmatite bodies occurs in the granite. There is a rough correlation between radioactivity values (count mostly between 800 and 900) and the oval-shaped pluton of granite 15 km northeast of Winston-Salem.
Carolina Slate belt (?)			
Granite (Pzc) and amphibolite and quartz-feldspar gneiss (aqg)	409 - 800	500 - 800	Irregular low anomalies (count below 600) are associated with rocks that may belong to Carolina slate belt. Area is too small to determine trends of radioactive anomalies.
Smith River allochthon			
All rock units	448 -1211	700 - 900	Radioactivity over major rock unit, biotite-feldspar gneiss (srg), has count between 700 and 900, but no pattern. A belt of low anomalies (count below 600) about 30 km long and 2 km wide along the south edge of the allochthon is over area that has considerable mafic rock. High anomalies (count above 1000) are associated with granite pluton that extends about 15 km northeast of Westfield.
Brevard fault zone			
All rock units	547 -1156	700 - 850	Some radioactivity trends are related to rock types and structural trends locally. The highest anomaly (1156), about 7 km southwest of Elkin, is over granitic rock of Crossnore plutonic-volcanic group (p€cg) and phyllonitic schist and gneiss complex (p€sg). A line of small low anomalies (count below 700), lies over the Yadkin fault (southeast border of Brevard zone) for about 25 km. Two small low anomalies (count below 600), about 5 km northeast of Elkin, are on trend of several small bodies of ultramafic rock.
Dan River Triassic basin			
All rock units	443 - 900	550 - 700	There is no correlation between radioactivity and geologic patterns.
Davie County Triassic basin			
All rock units	480 - 733	500 - 650	Radioactivity contour for 600 counts is near northwestern side of basin, and contour for 500 counts is along part of southeastern side.

1/ The radioactivity patterns discussed here are shown in the northwest part of the following map:
U.S. Geological Survey, 1977, Aeroradioactivity map of north-central North Carolina: Open-File Report 77-193, 1:250,000 scale.

Geologic features and the letter symbols used to identify formations are shown in the following map:
Espenshade, G. H., Rankin, D. W., Shaw, K. W., and Neuman, R. B., 1975, Geologic map of the east half of the Winston-Salem quadrangle, N.C., Va., Tenn:
U.S. Geological Survey Miscellaneous Investigations Map I-709-B, 1:250,000 scale.

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