

DISTRIBUTION OF ^{210}Po ACROSS THE APOLLO 16 GROUNDTRACK
AND CORRELATION WITH LUNAR SURFACE FEATURES, Leon Golub, Paul
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We have detected a non-uniform distribution across the Apollo 16 groundtrack of the isotope ^{210}Po in the ^{238}U decay series. The measured rates above background are shown in the following table:

Table: Relative Rates of ^{210}Po Decay Across the Apollo 16 Groundtrack (a, b)

Lat. Long.	10 - 15°S	0 - 10°S	0 - 10°N
0 - 20°E		3.8 ± 1.8	
20 - 40		3.5 ± 1.7	
40 - 60		5.8 ± 1.9	
.		11.5 ± 2.3	
.			-0.4 ± 2.9
.			-1.2 ± 2.7
.			-1.0 ± 2.8
.			0.8 ± 2.4
160 - 180°E			-1.6 ± 2.0
180 - 160°W			3.0 ± 2.0
.			4.8 ± 2.2
.			-0.1 ± 2.0
.			0.2 ± 2.4
.		-0.3 ± 2.7	1.5 ± 3.7
.		6.1 ± 2.1	
.		3.2 ± 1.8	
40 - 20	3.1 ± 3.9	4.1 ± 2.1	
20 - 0°W	2.8 ± 4.0	5.4 ± 2.1	

- a.) Relative to constant background of 21.0×10^{-3} counts/sec
b.) Rates are counts/sec. Conversion is counts/sec = $0.36 \text{ dis/cm}^2\text{-sec}$

In the previous paper we reported detection of ^{222}Rn in the vicinity of the crater Aristarchus during Apollo 15. In the Apollo 16 data, we find an increase in ^{210}Po near the crater Grimaldi at the rate of $(11 \pm 3) \times 10^{-3}$ counts/sec, or $(4.0 \pm 1.1) \times 10^{-3} \text{ dis/cm}^2\text{-sec}$ at the surface. There is a smaller and less localized increase near the crater Alphonsus.

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The strongest signal in the ^{210}Po energy range comes from the region $40 - 80^\circ\text{E}$ near the equator. The Apollo 15 and 16 groundtracks overlap in this region and find values of $(3.6 \pm 1.1) \times 10^{-3}$ and $(3.1 \pm 0.5) \times 10^{-3}$ dis/cm²-sec, respectively in the two experiments. The increase in ^{210}Po activity is not uniform throughout the region. In particular, there is a striking effect associated with the edges of Mare Fecunditatis. The average rate of ^{210}Po across the center of the Mare (47 to 57°E) is $(1.6 \pm 1.0) \times 10^{-3}$ dis/cm²-sec, whereas the rate at the edges of the Mare (40 to 45°E and 60 to 65°E) is $(8.0 \pm 1.3) \times 10^{-3}$ dis/cm²-sec. The other Maria under the Apollo 16 groundtrack are consistent with this finding although the effect is less pronounced. A preliminary examination of data from Maria Fecunditatis, Tranquillitatis, Nubium, Cognitum and Oceanus Procellarum yields the following result:

Table: Rate of ^{210}Po Decay as a Function of Distance from Edges of Maria (Lunar Degrees)^a

$-(8, 9, 10)^\circ$	$-(5, 6, 7)^\circ$	$-(2, 3, 4)^\circ$	$\pm 1^\circ, 0$	$2 - 4^\circ$	$5 - 7^\circ$	$8 - 10^\circ$
3.7 ± 1.1	2.7 ± 0.6	2.8 ± 0.6	6.5 ± 0.8	3.3 ± 0.7	3.2 ± 0.7	3.4 ± 0.7
		← Mare	Edge	Highland		→

a.) Units are 10^{-3} dis/cm²-sec. Each bin corresponds to ≈ 100 km in longitude by ≈ 300 km in latitude.