Determination of precipitation "age" via gamma rays from accreted radon progeny M.B. GREENFIELD, N. ITO, A. IWATA, K. KUBO, M. ISHIGAKI, Int'l Christian Univ., K. KOMURA, LLRL Kanazawa Univ. — Measurements of γ ray activities from ^{214}Pb and ^{214}Bi condensed from precipitation can determine the average time activity has been removed from secular equilibrium. Atmospheric γ rates arising from adsorbed/absorbed radon progeny on/in the surface/volume of droplets are proportional to the 0.4 to 0.6 power of rain rates, respectively, assuming that on average most progeny are accreted early in the formation of droplets rather than scavenged[1]. Thus, the average elapsed time between accretions of radon progeny onto droplets until the droplets reach ground may be estimated. After removal from secular equilibrium the initial ratio of ^{214}Bi to^{214}Pb activity evolves towards a limiting ratio which is independent of absolute activity. Measurement of relative activities may thus determine the "age" of precipitation, limited only by the statistical uncertainty. Activity in condensates from 5-30 L of rain viewed with 2π solid angle by a 50% efficient, high-resolution Ge detector is typically 10s up to 100s of cts/sec (during thunderstorms)[2]. The half-lives of γ activities from ^{214}Bi and^{214}Pb, 19.7 and 26.9 minutes, respectively, are on the same scale as rain "ages" and close enough to each other to enable estimates of rain "ages" to within a few minutes. [1]Greenfield et al., J. of Appl. Phys. **93,** 5733 (2003); [2]preceding abst.

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