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Radiometric Meteorology: radon progeny as tracers MARK GREENFIELD, ATSUSHI IWATA, NAHOKO ITO, KENYA KUBO, Intrnl Christian Univ, KAZU KOMURA, LLRL - Kanazawa Univ, MIHO ISHIZAKI, Tohoku Univ — In-situ measurement of atmospheric γ radiation from radon progeny determine rain and snow rates to better accuracy than standard rain gauges and gives a handle on how droplets are formed. The measured γ ray rates (GRR) have been shown to be proportional to a power of radiometric precipitation rates $(\mathrm{RPR})^{\alpha}$, α giving a handle on the extent to which radon progeny are surface adsorbed or volume absorbed.[1] More recently time dependent ratios of GRR from ^{214}Pb and ^{214}Bi, concentrated from collected rainwater, have been used to determine the elapsed time since activity from RPR, adhered to rain droplets, was removed from secular equilibrium. Ion exchange resins precipitate out the ^{214}Pb and ^{214}Bi ions, which are then filtered from 10s of liters of rainwater or snowmelt. A portable Ge detector is used to integrate the resulting activity over 5-10 min intervals. The measured evolution of these two activities from secular equilibrium to transient equilibrium has meteorological applications enabling both the determination of average elapsed times between the formation of raindrops and the time they reach the ground, as well as an estimate of the initial activity at the source of droplet formation.

[1]M. B. Greenfield et al., **J. Appl. Phys. 93**, (2003) pp 5733-5741.

Mark Greenfield
Intrnl Christian Univ

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