Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02908, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02908
EGU General Assembly 2008

Radon atmospheric transport: Extracting radon emanation rates at distant locations from environmental gamma radiation measurements.

J.-F. Mercier (1), R. d'Amours (2), B. Tracy (1), F. Chagnon (2), I. Hoffman (1), E. Korpach (1), S. Johnson (1) and K. Ungar (1)

(1) Radiation Protection Bureau, Health Canada, Ottawa Ontario (2) Environment Canada, Dorval Quebec

Environmental gamma radiation levels are observed to increase noticeably during precipitation events. This increase is due to the presence of radon progeny in the rain droplets (or snow flakes) and shows great variability even for precipitation events of similar type and intensity. Because of the highly inhomogeneous radon emanation rate and the scale of the radon half life (3.825 days), raincloud air mass origin and history are believed to play an important role in the variation of environmental gamma-ray intensity. We use year-long records of both rain fall amount and gamma-ray activity collected at two Canadian monitoring stations (Ottawa, Ontario and St-John's, Newfoundland) together with air mass back trajectory analysis to show that a large part of the variation of the environmental gamma-ray intensity increase can be explained with cloud air mass origin and history. We further propose a way to use these types of data to obtain estimates of radon emanation rates for regions that could be located far from the actual detector. As an example we obtain relative emanation rates from three distinct zones (oceanic, and two continental North American regions). The results obtained are consistent with expected values.