

Radon Mapping Program in Sri Lanka

N.D. Subasinghe¹, P.D. Mahakumara², T.B. Nimalsiri¹, N.B. Suriyaarachchi¹
and C.B. Dissanayake¹

¹Institute of Fundamental Studies (IFS), Hantana Road, Kandy, Sri Lanka.

²Atomic Energy Authority (AEA), No. 60/460, Baseline Road, Orugodawatta, Wellampitiya, Sri Lanka.
(Email: deepal@ifs.ac.lk)

ABSTRACT

Radon (Rn) produced by radioactive decay of uranium and thorium in rocks and soils is the heaviest naturally occurring noble gas. Radon itself is radioactive and its most stable isotope is having a half-life of ~ 3.8 days. Ionization radiation emitted during the decay of radon is a potential health hazard to the humans and animals. In the USA, inhaling radon is the leading cause of lung cancer, after smoking. Since the radon emitted from the ground is short-lived, its concentration varies temporally and spatially, depending on several factors. Many countries have produced radon concentration maps while some others have imposed a law that a radon level report should be produced when a property is sold. However, in Sri Lanka, radon level measurements have not been made to produce a radon map. We took the initiative to produce a preliminary radon map of Sri Lanka. In addition to pinpointing the potentially hazardous zones, elevated radon levels will indicate the mineral deposits rich in U and Th.

In hazardous areas, Radon concentrations are usually high in fractures, faults and any other deep structures and openings into the earth. Waters from the deep ground-water springs are generally rich in radon due to deep percolation and anomalous radon concentrations around thermal springs is an indication of water coming from deep fractures. In Sri Lanka, 50 passive radon detectors donated by Japan have been placed at locations selected on the basis of geology, deep structural features as well as the proximity to the hot springs. In-situ and off-site radiation measurements of air, soil and water are being measured at those locations for comparison. Preliminary results indicated areas with high background radiation in Sri Lanka, recorded mostly at river outfall locations. For example, the highest value so far was recorded at Kumana, where Kumbukkan Oya outfalls to the sea, having over 29.6 millisievert (mSv) per year. Some of the other high-background radiation areas include Kalutara (28.9 mSv/yr), Uswetakeyyawa (22.8 mSv/yr), Pulmodai (20.7 mSv/yr) and Dikwella (15.8 mSv/yr). The worldwide average background dose for a human being is around 2.4 mSv/yr.
