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## Advances in radon research and protection in Cameroon

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Indoor radon measurements started in Cameroon since 2012 by measuring  $^{222}\text{Rn}$  using the Electret Ionization chambers (EIC) in about 500 dwellings of some ore bearing areas, followed by the discriminative measurements of  $^{222}\text{Rn}$  and  $^{220}\text{Rn}$  in 450 dwellings using RADUET detectors in some mining and ore bearing areas of Cameroon. The collected data helped to build a Technical Cooperation Project with the International Atomic Energy Agency (IAEA) on establishing a national radon plan for controlling public exposure due to radon indoors. A total of 1500 RADTRAK detectors to measure  $^{222}\text{Rn}$  were deployed in the whole country, collected and analyzed. The results of indoor radon measurements and inhalation dose assessment showed the importance to put in place radon regulation and national radon action plan. Radon regulation was drafted and the national radon action plan adopted in October 2020. The priority tasks for 2022-2025 are radon-risk mapping, radon mitigation, radon-risk communication and the integration of radon issue in the training of building professionals.

$^{222}\text{Rn}$ ,  $^{220}\text{Rn}$  and  $^{220}\text{Rn}$  progeny measurements confirmed the importance to consider  $^{220}\text{Rn}$  in dose assessment to avoid biased results in epidemiological study. At the international scale, reference levels should be defined for  $^{220}\text{Rn}$  as done for  $^{222}\text{Rn}$  some decades ago. Effective dose due to  $^{220}\text{Rn}$  determined from the equilibrium factor is unreliable. Therefore, the risk of public exposure due to  $^{220}\text{Rn}$  and its progeny may therefore be higher than that of  $^{222}\text{Rn}$  and its progeny in many parts of the world if the equilibrium factor of  $^{220}\text{Rn}$  is no longer used in estimating total effective dose. It is therefore important to directly measure  $^{222}\text{Rn}$  and  $^{220}\text{Rn}$  progenies for a correct estimate of effective dose.

Uncertainty assessment in biokinetic and dosimetric models of  $\alpha$ ,  $\beta$ ,  $\alpha\gamma$ ,  $\beta\gamma$  -emitters for ingestion and inhalation dose coefficients was carried out followed by the determination of the inhalation dose coefficients of  $^{219}\text{Rn}$  progeny, stemming from the disintegration of  $^{223}\text{Ra}$  used in nuclear medicine to treat bone metastasis due to prostate cancer.

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