Editorial

iMedPub Journals
www.imedpub.com

Journal Medical Physics and Applied Sciences
ISSN 2574-285X

2021
Vol.6 No.3:e009

Spatial Distribution of Fallout and Lithogenic Radionuclides Controlled by Soil Carbon and Water Erosion in an Agroforestry South-Pyrenean Catchment

Leticia Gaspar*

Department of Medical physics and Visual Sciences, University of Illinois at Chicago, Chicago, USA

Correspondence to: Leticia Gaspar, Department of Medical physics and Visual Sciences, University of Illinois at Chicago, Chicago, USA, Email: kenlin@yahoo.com

Received date: April 05, 2021; **Accepted date:** April 18, 2021; **Published date:** May 25, 2021

Citation: Gaspar L (2021) Spatial distribution of fallout and lithogenic radionuclides controlled by soil carbon and water erosion in an agroforestry South-Pyrenean catchment. med phys and appl sci. 6:e009.

DESCRIPTION

Radionuclides are species of atoms that emit radiation as they undergo radioactive decay through the emission of alpha particles (α), beta particles (β), or gamma rays (γ).

Primordial radionuclides originate in the geosphere, and anthropogenic radionuclides are increasingly entering the geosphere because of human disposal practices. Mining and milling of uranium ore is one of the largest intrusions into consolidated rock with regard to radioactivity. Although uranium solubilized and was transported to specific deposit locations during the genesis of rock formation, it tends to be relatively immobile once deposited. However, groundwater does flow through the consolidated geosphere in fractures in hard igneous and metamorphic rocks, or through a more general percolation within more permeable sedimentary formations. This groundwater movement can solubilize radionuclides from underground deposits, depending on the chemistry of the groundwater and chemical interactions with specific radionuclides. If underground deposits become soluble, radionuclides are mostly retained in the rock because of chemical exchange along the water transport path. Inert gaseous radionuclides (e.g., 222Rn) move more freely, but transport from deep underground to the surface takes years to millions of years, and radioactive decay often allows only small amounts of radionuclides to reach the surface. The nature of the underground deposit is important. For example, surface concentrations of uranium do not reflect a 1.3-billion-yr-old uraninite deposit 450 m below the surface in northern Canada. With very slow transport of radionuclides from deep underground, surface weathering of rock is the greatest source of radionuclides to the biosphere, hydrosphere, and atmosphere.

Radionuclides may be present in the environment either because they are naturally occurring (e.g. radionuclides of primordial origin and their decay products together with other radionuclides of cosmogenic origin) or because they are artificially produced (e.g. those released from the nuclear fuel cycle). However, in addition to generating artificially produced radionuclides, some human activities can result in enhanced concentrations of naturally occurring radionuclides in environmental media. For example, naturally occurring 226Ra and its progeny are concentrated in scales present in pipework and other equipment used by the oil and gas industries. In this chapter, emphasis is placed on biosphere pathways and modelling relevant to artificially produced radionuclides, but many of the techniques discussed and data reviewed are also relevant to naturally occurring radionuclides

Radionuclides are released routinely from nuclear power stations, reprocessing plants, hospitals, industrial facilities, research establishments and various other premises. In addition, accidental releases can occur. Such releases can be to the atmospheric or aquatic environments. Routine atmospheric releases are typically point source emissions (e.g. from stacks), but more dispersed releases from buildings can also occur. Because of substantial cooling water requirements, many major nuclear facilities are located on large rivers or at the coast. Radionuclide discharges from such installations are typically mainly to freshwater, estuarine or marine environments. Hospitals and other smaller users of radioactive materials may direct their discharges to smaller freshwater bodies or to sewage treatment works, where the radionuclides partition between the sludges that settle out at such works and the liquid effluents that are discharged.

A radionuclide is an atom that has excess nuclear energy, making it unstable. This excess energy can be used in one of three ways: emitted from the nucleus as gamma radiation; transferred to one of its electrons to release it as a conversion electron; or used to create and emit a new particle from the nucleus.