DRY SEASON ELEVATED RADIOACTIVITY IN $PM_{2.5}$ RAISES CONCERNS IN THAILAND

Thawatchai Itthipoonthanakorn[1], Prannicha Hongpitakpong[1], Yutthana Tumnoi[1], Supitcha Chanyotha[2]*
[1]Safety Research and Development Section, Regulatory Technical Support Division, Office of Atoms for Peace, Bangkok 10900, Thailand
[2]Natural Radiation Survey and Analysis Research Unit, Department of Nuclear Engineering, Chulalongkorn University, Bangkok 10330, Thailand.
*e-mail: supitcha.c@chula.ac.th

Abstract:
Increased levels of fine inhalable particulate matter (PM2.5) during the dry season, surpassing the WHO recommended maximum level of 5 µg m-3 have raised health concerns in Thailand in recent years. Additionally, the Radionuclide Monitoring Station (RN65) in Nakhon Pathom, Thailand has identified average levels of natural atmospheric radioactive aerosols including 212Pb at 462 mBq m-3, which are higher than those in neighboring countries. This has prompted concerns about potential respiratory health risks, not only from PM2.5 but also from the radioactivity attached to the dust. Therefore, this study explores the connection between atmospheric particulate matter (PM2.5) and radionuclide concentrations (212Pb and 7Be) in Thailand's surface air. High-quality data from multiple monitoring stations, spanning January 2020 to December 2022, reveal seasonal PM2.5 patterns, primarily peaking during the dry season due to forest fires and agricultural burning. Significant correlations between PM2.5, 212Pb, and 7Be enable radiation exposure risk assessments. The study highlights the influence of meteorological factors, especially Northeast Monsoon winds, on aerosol distribution and emphasizes health risks associated with radionuclide exposure. These findings are valuable for assessing the risk of inhaled radiation doses as a health concern during dry season, particularly in regions with high levels of PM2.5 and airborne radioactivity.

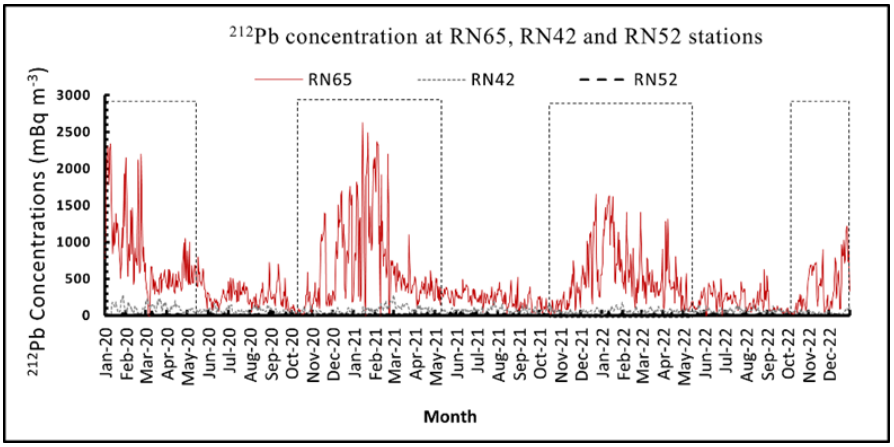

Figure 1.
Daily activity concentrations of ^{212}Pb between year 2020 and 2022 at station RN65 compared to RN station in Malaysia (RN42) and Philippines (RN52). The periods of the dry season and the wet season in Thailand are depicted inside and outside the highlighted dotted frame, respectively.