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TEMPORAL VARIATION OF BE-7 AND PB-210 ACTIVITY CONCENTRATIONS IN AEROSOL PARTICLES IN GROUND LEVEL AIR AT SCAVÉM (PORTUGAL)REIS M¹, FONSECA H¹, SILVA L¹

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Atmospheric radioactivity monitoring of natural and anthropogenic radionuclides is important, not only for radiological protection purposes but also in studying global atmospheric transport and deposition processes. Atmospheric radioactivity resulting from anthropogenic activities has dropped to very low levels. However, natural occurring radionuclides such as ⁷Be and ²¹⁰Pb are always detected in air monitoring programmes based on the collection and measurement of aerosol particles, providing important long-term data that could be used to study air masses transport pathways and aerosol particles behaviour in the atmosphere. ⁷Be (with a half-life of 53.3 days) is mainly produced in the stratosphere by spallation reactions through the interaction of cosmic rays with light atmospheric nuclei, such as nitrogen and oxygen. ²¹⁰Pb (with a half-life of 22.3 years) is produced by the decay of ²²²Rn, which diffuses from soils into the continental boundary layer. Since ²²²Rn flux from the oceans is negligible, ²¹⁰Pb could be used as a natural tracer of continental emissions. Following their production in the atmosphere, both nuclides rapidly attaches to existing aerosol particles. As ⁷Be and ²¹⁰Pb are of different origin their relative activity on aerosol particles should depend on the altitude from which the particles were transported, on the strength of continental influences and on removal processes. In this paper weekly measurements of ⁷Be and ²¹⁰Pb activities in aerosol particles are reported for a period of approximately 4 years. Aerosol sampling was carried out using a high volume ASS-500 station with an average air flow of about 800 m³ h⁻¹. The activity of all the samples was measured by γ spectrometry, using a well type HPGe detector. ⁷Be/²¹⁰Pb activity ratios were also calculated, attempting to understand the origin and atmospheric pathways of the air masses that influence the local atmospheric radioactivity levels. The activity concentrations of ⁷Be in ground level air were found to be in the range of 1.2 to 12.2 mBq m⁻³, with an average of 3.8 mBq m⁻³. The concentrations of ²¹⁰Pb were in the range of 0.1 to 4.7 mBq m⁻³, with an average value of 0.6 mBq m⁻³, while the ⁷Be/²¹⁰Pb activity ratios were found to be in the range of 1.3 to 32.9.