



LONG-TERM ATMOSPHERIC DEPOSITIONAL FLUXES OF RADIONUCLIDES AT MÁLAGA (COASTAL MEDITERRANEAN STATION)

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The deposition of radionuclides on the ground represents an important factor in environmental radioactivity monitoring. To predict the long-term radiological consequences of an accidental deposition of the radionuclides to the ground, it is a prerequisite to know the environmental long-term behaviour of these radionuclides and a relatively large number of values is required for statistically meaningful conclusions. ^{210}Pb is a nuclide used in studies of atmospheric research, oceanography and marine geology. ^7Be is another radionuclide used as tracer and chronometer in aquatic and atmospheric systems. Both ^7Be and ^{210}Pb are highly particle active and they are easily scavenged by aerosols. Little attention is paid to ^{40}K in airborne materials. Its origin is lithogenic and is mainly originated from the suspension of soil. ^{40}K is found in most types of soil and can easily be transported by re-suspended material. This nuclide has been previously associated with the arrival of coarse re-suspended material (PM_{10} , particulate matter with a diameter below $10\ \mu\text{m}$) from the African continent.

The specific activities of ^7Be , ^{210}Pb and ^{40}K varied from 0.6 to $8.3\ \text{Bq L}^{-1}$ (mean = $2.6\ \text{Bq L}^{-1}$), 0.05 to $1.3\ \text{Bq L}^{-1}$ (mean = $0.41\ \text{Bq L}^{-1}$) and 0.02 to $0.84\ \text{Bq L}^{-1}$ (mean = $0.23\ \text{Bq L}^{-1}$), respectively. The temporal variations of radionuclides exhibit similar seasonal behaviour with low values in winter-autumn months and maximum values in spring-summer months. The time variations of the different radionuclides concentrations have been discussed in relation to various meteorological factors and the mean values have been compared to those published in recent literature for other sites located at different latitudes. Bulk depositional fluxes of ^7Be , ^{210}Pb and ^{40}K have been evaluated for period of measurements. Bulk depositional fluxes of ^7Be , ^{210}Pb and ^{40}K varied between 4 and $1779\ \text{Bq m}^{-2}\ \text{month}^{-1}$ (annual mean = $1300\ \text{Bq m}^{-2}\ \text{year}^{-1}$), 1.17 to $102\ \text{Bq m}^{-2}\ \text{year}^{-1}$ (annual mean = $150\ \text{Bq m}^{-2}\ \text{year}^{-1}$) and 0.47 to $81\ \text{Bq m}^{-2}\ \text{year}^{-1}$ (annual mean = $70\ \text{Bq m}^{-2}\ \text{year}^{-1}$). Data on the atmospheric depositions of radionuclides in Málaga show that the seasonal variation is not uniform from year to year and the amount of rainfall controls mainly the depositional fluxes. A positive correlation has been found between the fluxes and amount of rainfall, the rainfall duration and the number of wet days. A negative correlation has been found with the number of dry days. There is a statistically relationship between ^7Be and ^{210}Pb fluxes indicating that removal behaviour from the atmosphere is relatively similar.