Influence of the “Galerna” meteorological phenomenon on the emission of radiological "false alarms" in real time

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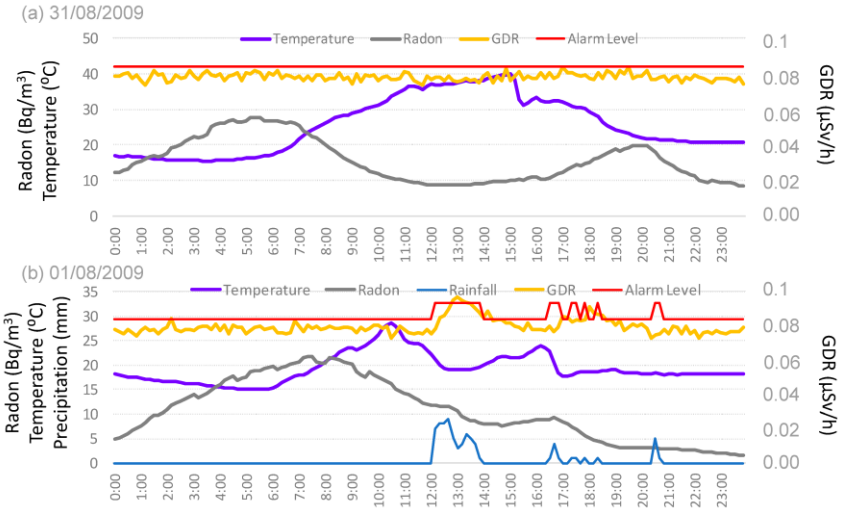
The Gamma Dose Rate (GDR) is a crucial parameter in radiation protection, as highly penetrating gamma radiation poses significant health risks, including an increased risk of cancer after exposure. prolonged. Therefore, monitoring and understanding GDR is essential for public health and safety, environmental surveillance, and regulatory compliance.
Meteorological conditions play a critical role in measuring both radon and GDR concentrations.
In this work, the GDR from 2009 to 2018 measured in Bilbao (northern Spain) has been analyzed for:

- characterize GDR concentrations.
- determine the impact of precipitation on GDR concentrations.
- analyze the impact of the occurrence of "Galerna", which is a local meteorological event in this area, which can develop both with and without precipitation.
- establish correlations and dependencies between the variations in GDR and 222Rn levels under Galerna events, with precipitation and without precipitation

The daily mean concentration of GDR is 0.07624 ± 0.00004 µSv/h, where the uncertainty is given as the standard error of the mean.
The average over the entire 2009-2018 period of daily and P95 GDR concentrations are higher under precipitation (0.07655 ± 0.00001 µSv/h and 0.0811 ± 0.0002 µSv/h, respectively) than without precipitation (0 .0759 ± 0.0008 µSv/h and 0.07955 ± 0.0008 µSv/h, respectively).
The relationship between GDR and radon concentration during precipitation days and non-precipitation days can be explained by several environmental factors.
The Galerna produces an increase in the GDR even if there is no precipitation, as shown in the figure.



The analysis has shown increases in GDR under precipitation accompanied by reductions in radon concentrations when the Galerna develops. These GDR concentrations should be recognized as natural radiological events, requiring the classification of such GDR peaks as false alarms in the radiological surveillance network. Understanding these interactions improves the ability to accurately interpret radiological data and improve public safety measures.