

Three-dimensional space analysis of radioxenon isotopic activity ratios for characterizing a nuclear event

This study on the nuclear release timing aims analysing radioxenon isotopic activity ratios in three-dimensional space. When real data from nuclear test are used, the first results obtained are promising for nuclear event zero time determination and nuclear release discrimination. This presentation focuses on the methodological approach considered in this study. Obviously three isotopes are less likely to be detected simultaneously than two isotopes are. However, if three isotopes are available, making use of all three together offers a much more powerful analysis mechanism than with only two isotopes. In the three-dimensional space the analysis of timing and event screening can be separated. A time-independent screening can be achieved through the projection along the decay axis and the time of the event origin can be determined for each kind of source scenario by projecting the isotopic ratios on the decay axis and scale it in units of time. The time-independent screening is most useful for CTBT monitoring purposes since the time of origin of a remote detection is in general not known.

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