Characterisation of Xenon-133 atmospheric civil source distribution using graph models on simulated data

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- Precise characterisation of Xenon-133 atmospheric background is crucial to detect anomalies.

- New approach to represent this background on simulated data:

  - Simulations of Xenon-133 concentrations on period 2020-2023

  - Emitters gathered in 19 distinct sources

  - Graph model representing the IMS network

- Graphs allow to cluster the IMS stations into regional areas based on source distribution.

- Method to estimate source contributions from total concentrations on each station.

- First step to develop new anomaly detection methods.

★ Medical isotope production
  - 9 plants
Total : ∼ 75 TBq/day

○ Nuclear power plant
  - 163 sites
  - 410 reactors
Total : ∼ 3 TBq/day