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radioxenon data validation for increased measurement reliability

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Radionuclide event formation needs reliable detections. Because of the relatively large uncertainty in atmospheric transport modelling, which radionuclide event formation relies on, radionuclide event formation benefits from higher quality measurement analysis, specifically minimizing the number of false positive and false negative detections. This work proposes a quality scale that algorithmically assesses measurement reliability by examining measurement metadata and spectrum values to generate a reliability index for each measurement. Individual measurements used to form an event can be weighted such that lower reliability measurements have less influence on the final event and higher reliability measurements have more influence on the final event. In addition to being useful for automatic event formation screening, it is anticipated that this work will help prioritize samples for analyst review and shorten time needed to review samples. When used to complement the radioxenon Noble Gas Categorization scheme this algorithm reduced the number of samples brought to analyst attention, samples categorized as level C, by 12%.

Promotional text

This project provides an automated method to improve nuclear test monitoring and verification by increasing the reliability of measurements.

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