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Techniques for the Radioactive Source Location Problem

In radionuclide monitoring, one of the most significant challenges from a verification or surveillance perspective is the source location problem. Modern monitoring/surveillance systems employ meteorological source reconstruction - for example, the Fukushima accident, CRL emissions analysis and even radon risk mapping. These studies usually take weeks to months to conduct, involving multidisciplinary teams representing meteorology; dispersion modeling; radionuclide sampling and metrology; and, when relevant, proper representation of source characteristics (e.g. reactor engineering expertise). Several different approaches have been tried in an attempt to determine useful techniques to apply to the source location problem and to develop rigorous methods that combine all potentially relevant observations and models to identify a most probable source location and size with uncertainties. The ultimate goal is to understand the utility and limitations of these techniques so they can transition from R&D to operational tools.

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