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Gaseous iodine monitoring in Europe after the Fukushima accident

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After the Fukushima accident and following the worldwide dispersion of contaminated air masses, many monitoring networks have reported airborne levels of emitted radionuclides, namely and mainly cesium isotopes and iodine 131. Most of the values focused on the particulate fraction (i.e. radionuclide-labeled aerosols) and were dedicated to cesium 137, cesium 134 and iodine 131.
Iodine-131 was also found under gaseous form that accounted for most part of the total (gaseous + particulate)I-131 throughout the world. This gaseous predominance was also noticed after the Chernobyl accident despite differences in the type of accident. This predominance is due to the high iodine volatility and also by a rather low transfer from the gaseous form to the particulate one by adsorption on ambient airborne particles.
Paradoxically, the number of gaseous determinations was rather low compared to the magnitude of data related to the particulate form (around 10 percent).
Routine monitoring of airborne radionuclides species have been extensively based on aerosol sampling for decades as this allows the long term characterization of trace levels of remnant anthropogenic radionuclides.
Moreover the capability of gaseous sampler equipped with activated charcoal to allow the quantification of 131I gaseous at trace level is limited by the contact time required for the sorption of iodine on the sorbent and thus by the low acceptable flow rate (usually between 3 and 5 m3/h, exceptionally 12 m3/h). In this context and despite the fact that airborne level outside Japan were of no concern for public health, this contribute to the lack of information on the actual levels of gaseous iodine.
Other incidents involving iodine determination in the air have been reported in Europe in 2011 and 2012 without any relation with the Fukushima accident. For the same reason as previously mentioned, mainly, if not only, the particulate form was reported whereas it can be supposed that the predominant form was gaseous.
In order to cope with these limitations, some improvements can be done 1) to increase the number of iodine samplers, as engaged by IRSN, 2) to have a number of gaseous surveillance station operating on a routine basis, 3) to diminish the detection limit of the gaseous iodine.