A new approach for reconstructing the ^{131}I-spreading triggered by the FDNPS accident in 2011

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As demonstrated by Tsuruta et al. [1], SPM (suspended particulate matter) samples, which are routinely and automatically collected at more than 1500 sites all over Japan for monitoring the environmental condition, could be effectively used for retrieving the spacio-temporal variation of radiocesium spread in the environment by the accident of nuclear power plants in Fukushima caused by a great earthquake and incidental tsunamis in 2011. Following the systematic measurement of ^{134}Cs and ^{137}Cs activities in SPM samples [2], a similar approach for measuring radioiodine (^{129}I) activity was conducted for reconstructing the spacio-temporal variation of another radioiodine, ^{131}I, whose half-life ($T_{1/2}$ = 8 days) is so short that its activity cannot be measured now and couldn't be systematically measured soon after the accident although its radiation exposure to thyroid gland by inhalation was highly worried. With the use of SPM samples as target substances and ^{129}I ($T_{1/2}$ = 1.6 x 10^7 years) as an alternate of ^{131}I, we expected that the spacial as well as time-sequential spreading of radioiodine (or, specifically, ^{131}I) could be traced even now. To bridge a gap between ^{131}I and ^{129}I in figuring the spacio-temporal variation of radioiodine and further assessing the radiation exposure by radioiodine, there exist several problems to be solved. This paper describes what kinds of problems were potentially assumed and how these problems were solved.

[1] Tsuruta *et al*. (2014), *Sci*. *Rept*. 4, 6717 (DOI: 10.1038/srep06717). [2] Oura et al. (2015) *J*. *Nucl*. *Radiochem*. *Sci*. 15, 15-26.