Iodine Isotopes in Precipitation: Temporal Responses to 129I Emissions from the Fukushima Nuclear Accident - DTU Orbit (22/12/2018)

**Iodine Isotopes in Precipitation: Temporal Responses to 129I Emissions from the Fukushima Nuclear Accident**

The Fukushima Dai-ichi Nuclear Power Plant accident in 2011 has released a large amount of radionuclides to the atmosphere, and the radioactive plume has been dispersed to a large area in Europe and returned to Asia. To explore long-term trend of the Fukushima-derived radioactive plume and the behavior of harmful radioiodine in the atmosphere, long-term precipitation samples have been collected over 2010–2012 at Fukushima, Japan for determination of long-lived 129I. It was observed that 129I concentrations of 1.2 × 10^8 atom/L in 2010 before the accident dramatically increased by ~4 orders of magnitude to 7.6 × 10^11 atom/L in March 2011 immediately after the accident, with a 129I/127I ratio up to 6.9 × 10^−5. Afterward, the 129I concentrations in precipitation decreased exponentially to ~3 × 10^9 atom/L by October 2011 with a half-life of about 29 days. This declining trend of 129I concentrations in precipitation was interrupted around October 2011 by a new input of 129I to the atmosphere following a second exponential decrease. Such a cycle has occurred three times until the present. This temporal variation can be attributed to alternating 129I dispersion and resuspension from the contaminated local environment. A 129I/131I atomic ratio of 16 ± 1 obtained from rainwater samples is comparable with a value estimated for surface soil samples. 129I results from Denmark suggest an insignificant effect of 129I released from Fukushima to the 129I levels in Europe.

**General information**

State: Published
Organisations: Center for Nuclear Technologies, Radioecology and Tracer Studies, Scottish Universities Environmental Research Center, Fukushima University
Contributors: Xu, S., Freeman, S. P. H. T., Hou, X., Watanabe, A., Yamaguchi, K., Zhang, L.
Pages: 10851-10859
Publication date: 2013
Peer-reviewed: Yes

**Publication information**

Journal: Environmental Science & Technology
Volume: 47
Issue number: 19
ISSN (Print): 1520-5851
Ratings:
- BFI (2018): BFI-level 2
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 2
- Scopus rating (2017): CiteScore 6.58 SJR 2.535 SNIP 1.941
- Web of Science (2017): Impact factor 6.653
- Web of Science (2017): Indexed yes
- BFI (2016): BFI-level 2
- Scopus rating (2016): CiteScore 6.26 SJR 2.559 SNIP 1.902
- Web of Science (2016): Impact factor 6.198
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 2
- Scopus rating (2015): CiteScore 5.61 SJR 2.546 SNIP 1.838
- Web of Science (2015): Impact factor 5.393
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 2
- Scopus rating (2014): CiteScore 5.5 SJR 2.777 SNIP 2.003
- Web of Science (2014): Impact factor 5.33
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 2
- Scopus rating (2013): CiteScore 5.52 SJR 2.952 SNIP 2.102
- Web of Science (2013): Impact factor 5.481
- ISI indexed (2013): ISI indexed yes
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 2
- Scopus rating (2012): CiteScore 5.17 SJR 3.115 SNIP 2.043
- Web of Science (2012): Impact factor 5.257
- ISI indexed (2012): ISI indexed yes