**Fractal analysis for radioisotope pollution patterns by nuclear power plant accidents**

Susumu Ogawa1 and Keisuke Saito2

1 Nagasaki University

Bunkyo-machi 1-14, Nagasaki, 852-8521Japan

Phone: 0958192611; Fax: 095-819-2627

E-mail: [ogawasusumu@nagasaki-u.ac.jp](mailto:ogawasusumu@nagasaki-u.ac.jp)

2Kokusai Kogyo Co. Ltd.

Harumi-cho 2-24-1, Fuchu-city, Tokyo,183-0057 Japan  
TEL: 042-307-7426, FAX: 042-330-1048  
E-mail: [keisuke\_saito@kk-grp.jp](mailto:keisuke_saito@kk-grp.jp)

***Abstract:*** The radioisotope pollution shows two types of patterns: dry and wet deposits for nuclear power plant accidents. Two surface pollution patterns were analyzed by fractal. In Fukushima nuclear power plant accident, surface pollution by wet deposits was estimated to occur. However, actually it was no rain and white crystals were observed on the surface. Then, fractal analysis was carried out for the spatial distribution patterns of radio isotopes on the surface to judge the types of deposits. As a reference, Chernobyl nuclear power plant accident was checked for the spatial distribution patterns of radioisotopes on the surface. The objective patterns by fractal analysis were the surface pollution maps in Fukushima and Chernobyl, Abukuma river watershed map, and NOAA/AVHRR. The calculation of fractal dimensions was carried out with the box counting for binarized images. Fractal analysis results suggested the next conclusions.

1. The radioisotope pollution in Fukushima might occur in dry deposit.
2. The dry deposit might make the pollution pattern similar to the watershed, while the wet deposit might make the pollution pattern similar to cloud images.

***Keywords:*** NOAA/AVRR, Fukushima, Chernobyl, Fractal