

Large-Scale Radiation Map for Minami-Nagareyama (Nagareyama City, Chiba Pref.)

Konstantin Greger (Doctoral Program in Geoenvironmental Sciences)

1. Introduction

Since the accident in the Fukushima Daiichi nuclear power plant (福島第一原子力発電所事故) following the Great East Japan Earthquake (東日本大震災) in March 2011 large parts of the Japanese population are very concerned about the levels of radiation in their immediate surroundings, regarding soil, groundwater and rain.

While the soil radiation levels in the Kanto (関東) area north of Tokyo are generally said to be rather low and be-low harmful levels even for small children, even the official data issued by the Japanese government (cf. MEXT, 2011) shows a so-called “hotspot” with higher radiation levels measured in the area around the cities of Matsudo (松戸市), Ichikawa (市川市), Abiko (我孫子市), Kashiwa (柏市), and Nagareyama (流山市), which can be seen in Figure 1.

In comparison to large-scale radiation measurement studies as performed by the Japanese government and other researchers, the aim of this study was a micro-scale analysis of current radiation levels in a clearly defined study area.



Figure 1

2. Methodology

All 71 measurements for this study were taken with a consumer Geiger counter (ガイガー計数, Geiger-Müller tube) at a constant height of 50 cm from ground level. In addition to the radiation measurement the location of the measurement point was also recorded using a GPS device. Also, a 360 degree panoramic photo was taken at each measurement location, which can help to get a better post hoc understanding of local peculiarities.

Elevated radiation values were expected to be found near water bodies (e.g. canals, rivers, puddles), vegetation (e.g. parks, gardens, overgrown lots, small agriculturally used parcels) and construction sites. The former two are suspected to conserve the radiation over a longer period of time without being washed out, or rather being the sink that the polluted is washed to by the rainwater; the latter tend to disperse dust during

earth moving activities, which again is suspected to lead to a spread of radioactive particles.

3. Results

The recordings showed radiation values ranging from 0.19 $\mu\text{Sv/h}$ to 0.53 $\mu\text{Sv/h}$. Therefore the measurements prove the radiation hotspot mentioned in MEXT (2011). The local distribution of the measured radiation values, which can be seen in Figure 2, shows a rather inconsistent structure, without any clear trends.

Three larger hotspots in the south-west and south of the study area, as well as one medium large hotspot in the north-west corner, and three smaller hotspots are visible.

- While the scope of the study was very limited, both spatially and temporally, some results were found, which can be summarized as follows:
- The study area, which is part of an officially declared radiation hotspot, shows elevated radiation values.
- While elevated, the measured values ranging from 0.19 $\mu\text{Sv/h}$ to 0.53 $\mu\text{Sv/h}$ do not pose a danger to the health of the population living within the study area.
- Expected contributors to local radiation maxima, such as construction sites, parks, agriculturally used patches and overgrown lots, as well as water bodies could not be proven in the field.
- Elevated radiation levels could be measured in the vicinity of child-related institutions such as schools, kindergartens, and playgrounds.

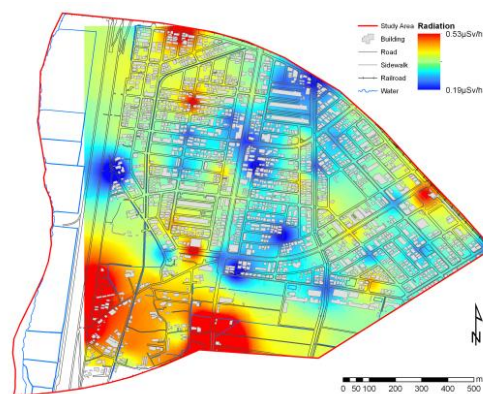


Figure 2

Bibliography

文部科学省 (MEXT) (2011). 文部科学省による東京都及び神奈川県航空機モニタリングの測定結果について. Unreleased governmental report.

Available online at:

<http://www.scribd.com/doc/67734922/1910-100601>.

Accessed on 22.11.2011.