

研究ノート

福島第一原発事故によるCs起源放射線の福島県における時間、位置および気象依存性

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Time, Location and Weather Dependence of Radiation of Cs-origin in Fukushima Prefecture due to the Accident at the Fukushima Daiichi Nuclear Power Plant

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Summary

The data on air dose rates of Cs-origin acquired at 155 points in central and eastern Fukushima prefecture by the central and local governments during the period of June 10th through December 5th (the summer and the fall) in 2011 are analyzed to investigate their temporal as well as locational variations. The average air dose rate in the region had declined at a remarkably swift pace with the half-life of 1.4 years, showing the importance of weathering effects. The average reduction rate was twice as large as that due to radioactive decay of Cs. Owing to the strong weathering effects, the reduction rate tends to sensitively depend on the season; the average reduction rate in the summer was twice as large as that in the fall. Several locations with extreme behaviors were introduced and analyzed. It is also found that extensive areas in Fukushima were still being weakly contaminated. The possible sources of this secondary contamination may include forests, farmlands and roads from where radio-aerosols were resuspended and transported presumably via wind, rainwater etc. As the wind effects are extensive, and sensitive to geographical features, detailed work will be needed to predict future dose rates with reasonable precision.

Key Words : Fukushima Daiichi Nuclear Power Plant, dose rate, space-time dependence, wind transport, resuspension, secondary contamination

和文要約

2011年6月10日-12月5日の半年間（夏季と秋季）に文部科学省や福島県によって測定された、福島県中・東部155ヶ所における、主としてCs起源の空間線量率を解析して時間・位置および気象依存性を求めた。平均線量率は、放射性崩壊を基に算出した理論値の2倍速いペース（期間半減期1.4年）で減衰し、この期間におけるウェザリング効果の重要性を示した。この強いウェザリング効果のため、夏の減少率は秋の2倍になるという季節依存性をも示した。また、福島県の一部地域が2次汚染された傾向が判明した。増加率や減少率が特に大きい地点を特異事例として紹介し、解析した。2次汚染源としては、放射性物質が風雨で輸送され得る、森林、農地、道路等が考えられる。例えば、気象データとの整合性が高い、風の2次汚染効果は比較的弱めだが広範にわたり、しかも地形にも影響されるため、線量率を充分高い精度で予測するには綿密な事前調査や手法が必要になる。