Vertical movement of radiocaesium in Madei paddy field in Iitate village, Fukushima

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ABSTRACT

Most of radiocaesium released from Fukushima Daiichi nuclear power plant has been accumulated in the topsoil within 5 cm. For decontamination of the top soil, Japanese government (Ministry of Agriculture, Forestry and Fisheries) has authorized three methods: topsoil stripping method, puddling method, and plowing method to replace surface soil with subsoil. Among three methods, the topsoil stripping method is being carried out and a lot of flexible container bags containing contaminated topsoil are piled up in the paddy field. However, we have not yet found the final disposal site of the contaminated soil. For agricultural regeneration and early return village, it is important to find a feasible decontamination method that farmers can conduct by themselves. Therefore, we are challenging some field tests that bury the contaminated soil under the ground or flushes out muddy water into a moat in the paddy. We named this method 'Madei-method' that means we treat contaminated soil very carefully. After the harvest in 2013, we measured the vertical distribution of radiocaesium concentration in soil. As a result, leakage of radiocaesium was not confirmed from the buried contaminated soil in the 'Madei' paddy field. This can be explained in terms of the filtering effect of the clay particles even if water penetrates the contaminated soil and colloidal clay particles move downward.

Keywords: radiocaesium. decontamination, Fukushima, clay, monitoring

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Decontamination: Challenge of the Villagers(NHK-WORLD, TOMORROW)

Decontaminating Fukushima: Cleaning up Farms(NHK WORLD)

Stripping topsoil method

Official decontamination methods by Government

MAFF
Ministry of Agriculture, Forestry and Fisheries

From August, 2012

Soil puddling method

Deep plowing method

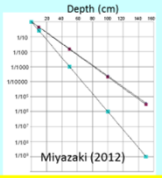
Madei-construction method

Madei means "carefully" or "hearty" in the dialect of Iitate, Fukushima

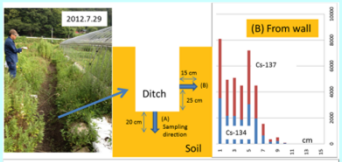
[Madei-2] flush out muddy water into a moat in the paddy

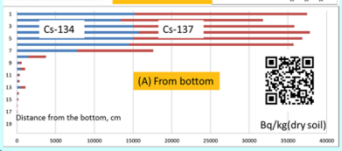
[Madei-1] Strip and bury the contaminated topsoil under the ground

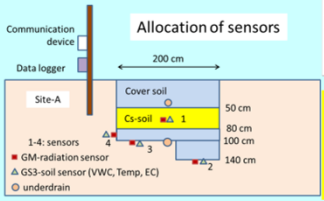
Contaminated soil should be buried in the bare hole!



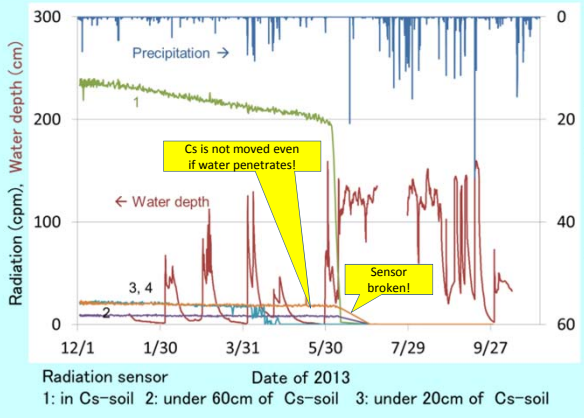
Radiation dose is 1/100 to 1/1000 if the contaminated soil is buried in 50cm deep!



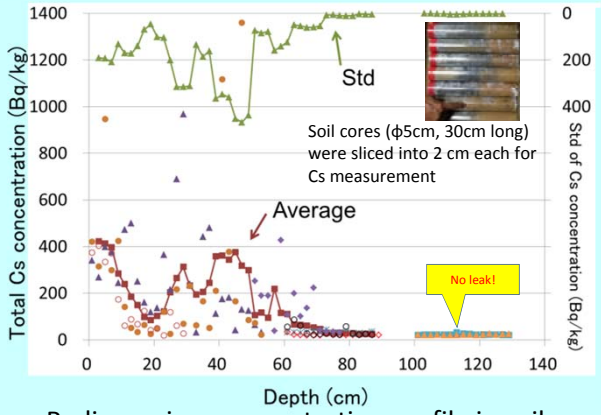




As a result of the measurement of radioactivity at each depth after pouring contaminated muddy water into the ditch, we reveals cesium does NOT penetrate in the soil by the filtration function of soil!



Changes in water level, precipitation and soil radiation dose in "Madei" paddy field



Radiocaesium concentration profile in soil

Conclusion: Leakage of radiocaesium was not confirmed from the buried contaminated soil!

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