Factors controlling the dissolved ^{137}Cs seasonal fluctuations in the Abukuma River under the influence of the Fukushima Nuclear Power Plant accident

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Yasunori Igarashi[1], Kenji Nanba [1], Toshihiro Wada [1], Yoshifumi Wakiyama [1], Yuichi Onda [12] and Alexei Konoplev [1]

[1] Fukushima University, Institute of Institute of Environmental Radioactivity, Radiological Hydrology, Fukushima, Japan, [2] Department of Integrative Environmental Sciences, Faculty of Life and Environmental Sciences, University of Tsukuba, Ibaraki, Japan

Fukushima University
INSTITUTE OF ENVIRONMENTAL RADIOACTIVITY

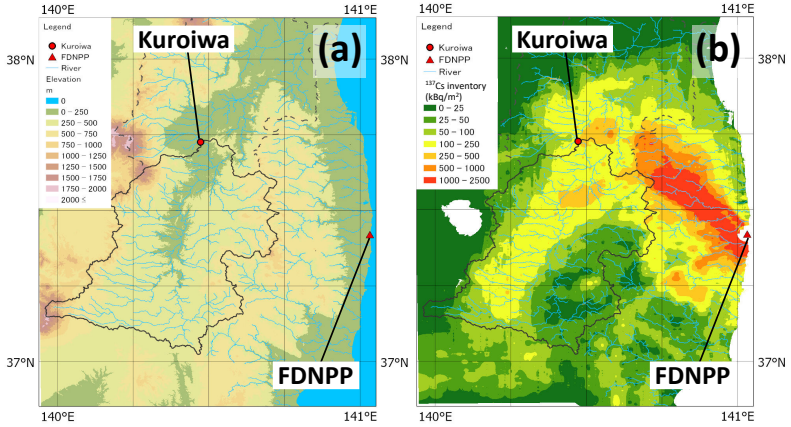

Figure 1. (a) Main and sub streams in the Abukuma River Basin, (b) the ^{137}Cs inventory from MEXT (2011).

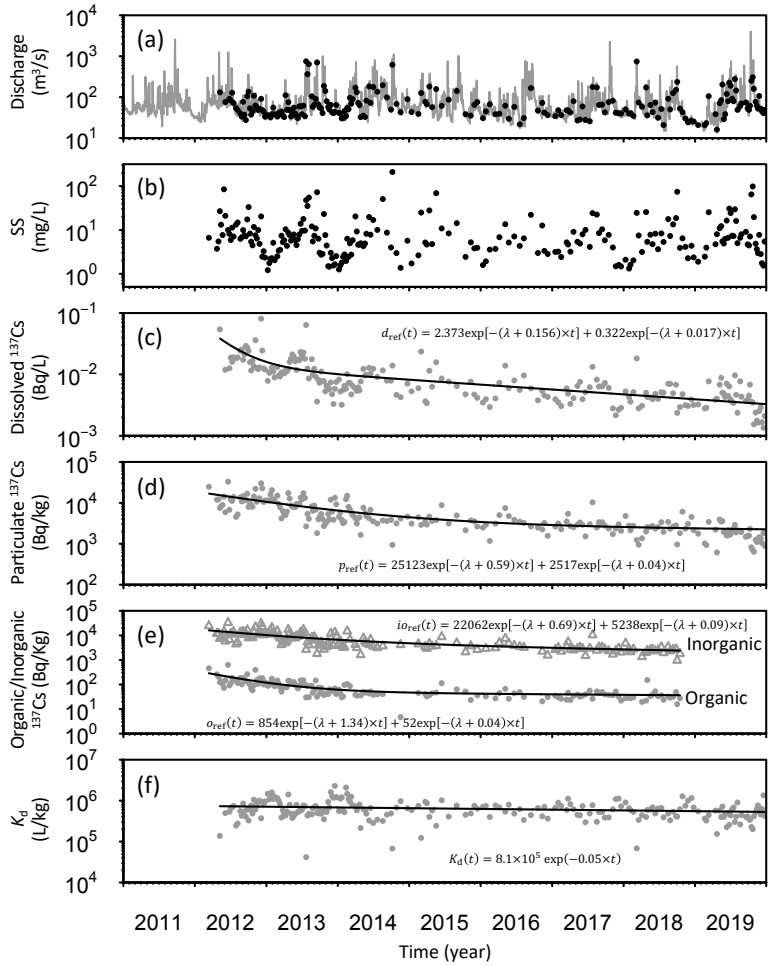

Figure 2. Long-term trends of (a) river discharge*, (b) dissolved ^{137}Cs activity concentration, (c) particulate ^{137}Cs activity concentration, (d) inorganic ^{137}Cs (triangles) and organic ^{137}Cs activity concentration (solid circles), (e) solid-liquid distribution coefficient (K_d). *The gray line and solid circles indicate the observed river discharge rate at the Kuroiwa Point and the river discharge rate on the sampling day, respectively.

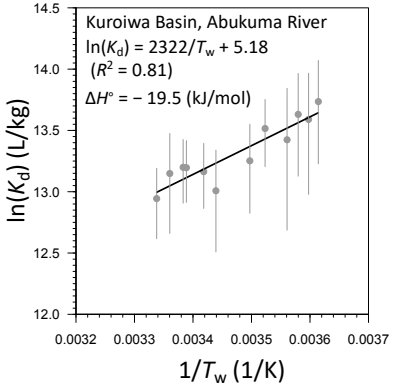

Figure 3. Relationship of the log-scale solid-liquid distribution coefficient (K_d) to inverse water temperature ($1/T_w$). Gray dots indicate the observed values. Black dots and bars represent the averages and the standard deviation for monthly K_d. The solid line ($\ln(K_d)$ = 2,322/ T_w + 5.18; R^2 = 0.81) expresses the linear regression line of best fit.

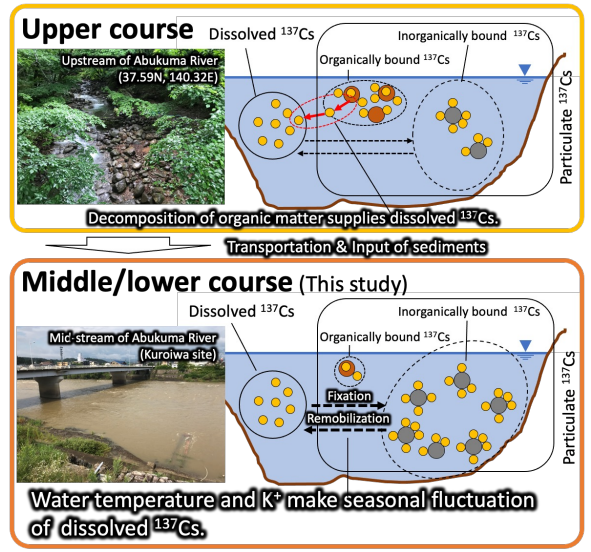

Figure 4. Schematic diagram of ^{137}Cs dynamics and factors controlling seasonal fluctuations in the middle course of the Abukuma River.

Details are available.
Igarashi et al. (2021)
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- Dissolved ^{137}Cs in the Abukuma River displays significant seasonal fluctuations.
- The main factors determining the seasonality of dissolved ^{137}Cs activity concentrations are water temperature and K$^+$.
- The standard enthalpy of ^{137}Cs desorption from sediments was determined to be approximately −19.3 kJ/mol .