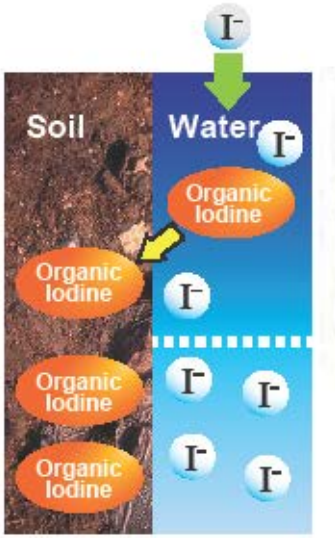
Radionuclide adsorption to surface soil, and subsequent transfer in river system (catchment, environment)

●Clarify chemical form of radionuclides during its adsorption to soil particles, subsequent behavior in soil layer, and form of translocation to river system.

●Investigate the effect of different cultivation practices (e.g., scraping surface soil layer from paddy field) on sediment and radionuclide discharges from agricultural fields.

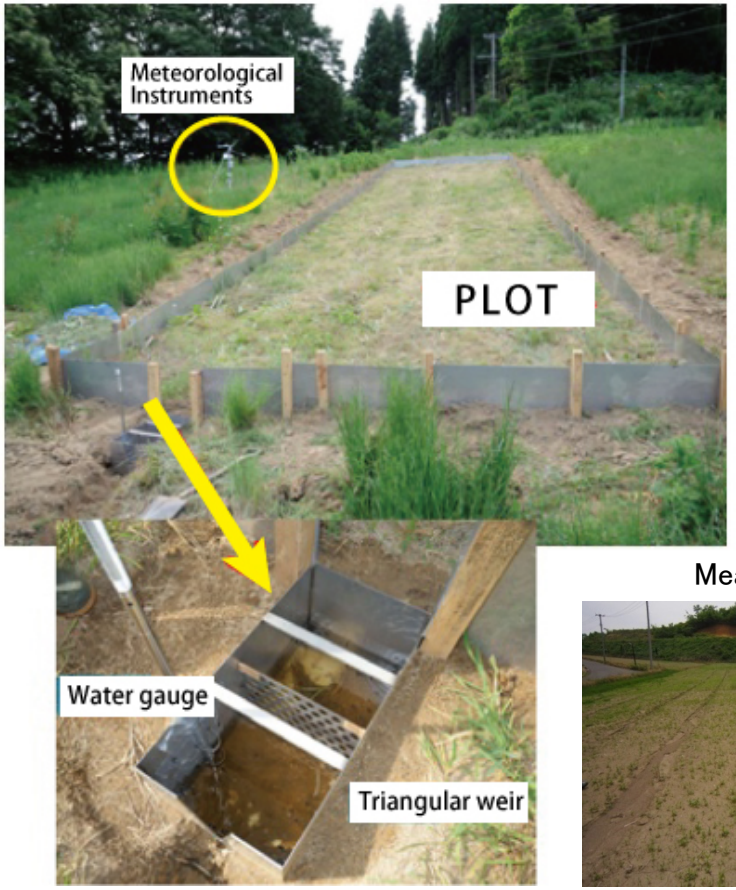


Water-Soil :
Behavior of radioactive material

【Downward migration】
Measurement of radionuclides by the scraper plate at intervals of 5mm.
(already collected in eight places)

River runoff and soil lateral migration of radionuclides associated with soil erosion

●Measure water and suspended solids from trickles of surface flow and stream water at plot scale, headwater scale and catchment scale（USLE standard plot at 5 locations）



Measuring the precipitation and throughfall at multi-points.

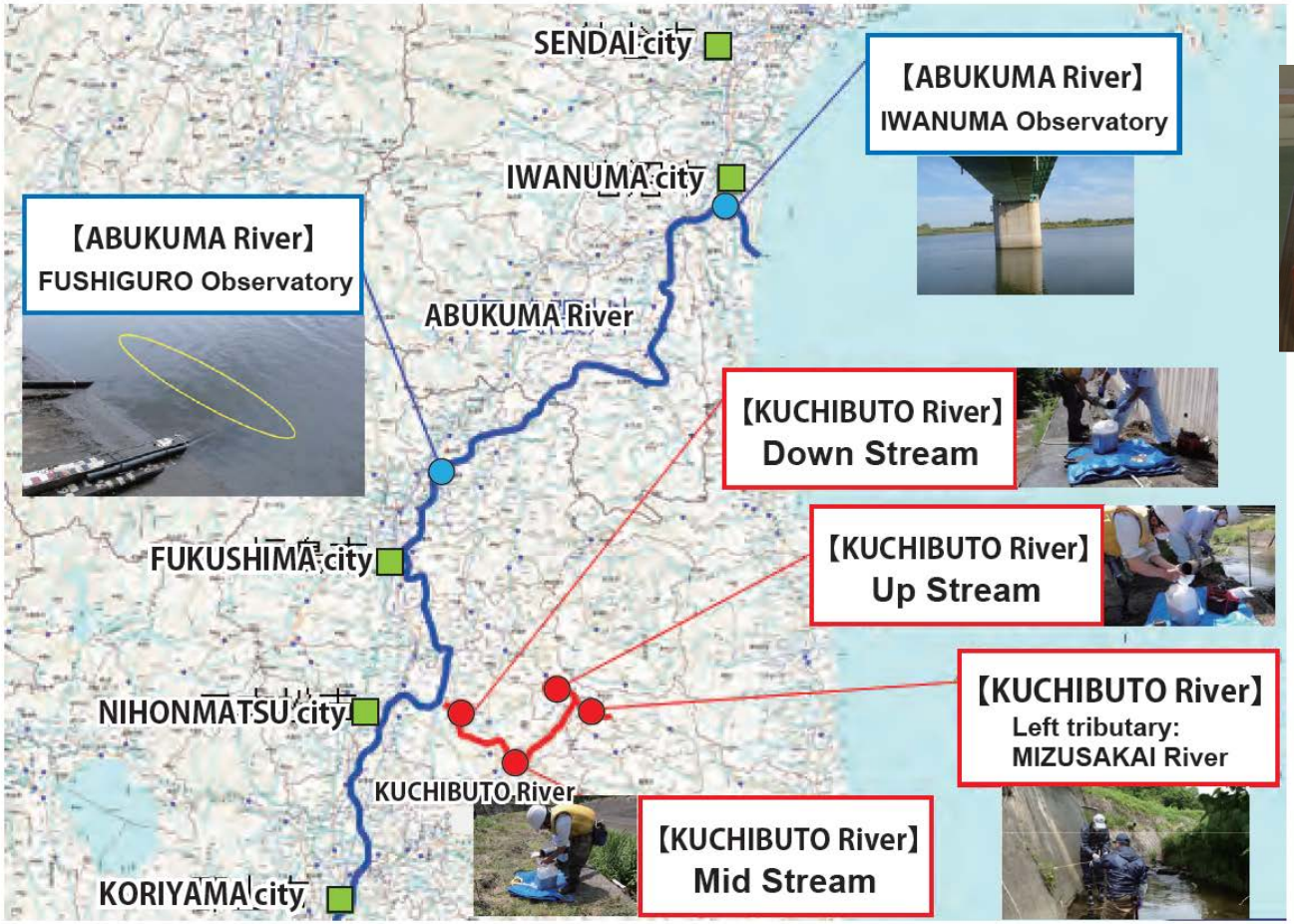
Modeling soil migration associated with soil erosion and heavy rain.

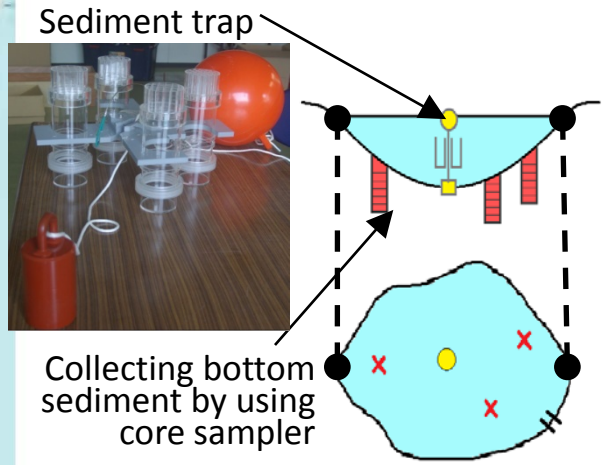
MEXT Special Coordination Funds for Promoting Science and Technology 2012
Establishment of a method understanding the long-term effects of radioactive materials due to the accident at the Fukushima Daiichi Nuclear Power Plant
FMWSE 3rd stage
FUKUSHIMA RADIATION MONITORING OF WATER, SOIL, AND ENTRAINMENT

Research Work

Migration and deposition of radionuclides to the river and reservoir

● Estimate the amount of radionuclides associated with sediment in the basin by analysis of sediment outflow.





Collecting sediment (at Nihonmatsu)

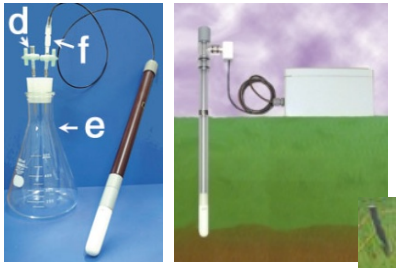
Migration of radionuclides associated with water movement in soil

●Clarify the amount of radionuclides and their migration behavior from rainfall to soil water, ground water, spring water and river water in the forest headwater catchment.

Spring water sampling

Temperature and
Volume of water
PH
EC（Electric Conductivity）
Cs134,Cs137 measured once a week

Well
Well water sampling



Soil water sampling at 3 depth.

Grassland

Mowing pasture to investigate radionuclide migration to the grass.

River water sampling

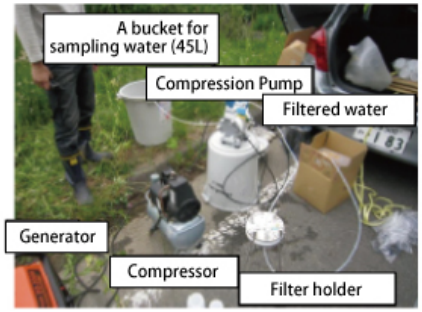
woodland

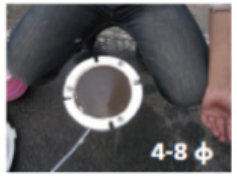
Analysis and deposition of radionuclides / Analysis of the migration process

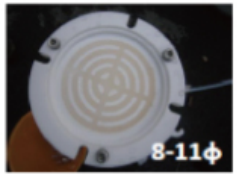
●Examine the iodine and cesium distribution by analysis of suspended sediment in the rivers and the actual soil and estimate the chemical form, then make a comparison with the distribution of suspended sediment and soil.
●Clarify the migration of radionuclides from forests to soil.

Photo 1 : Sampling point

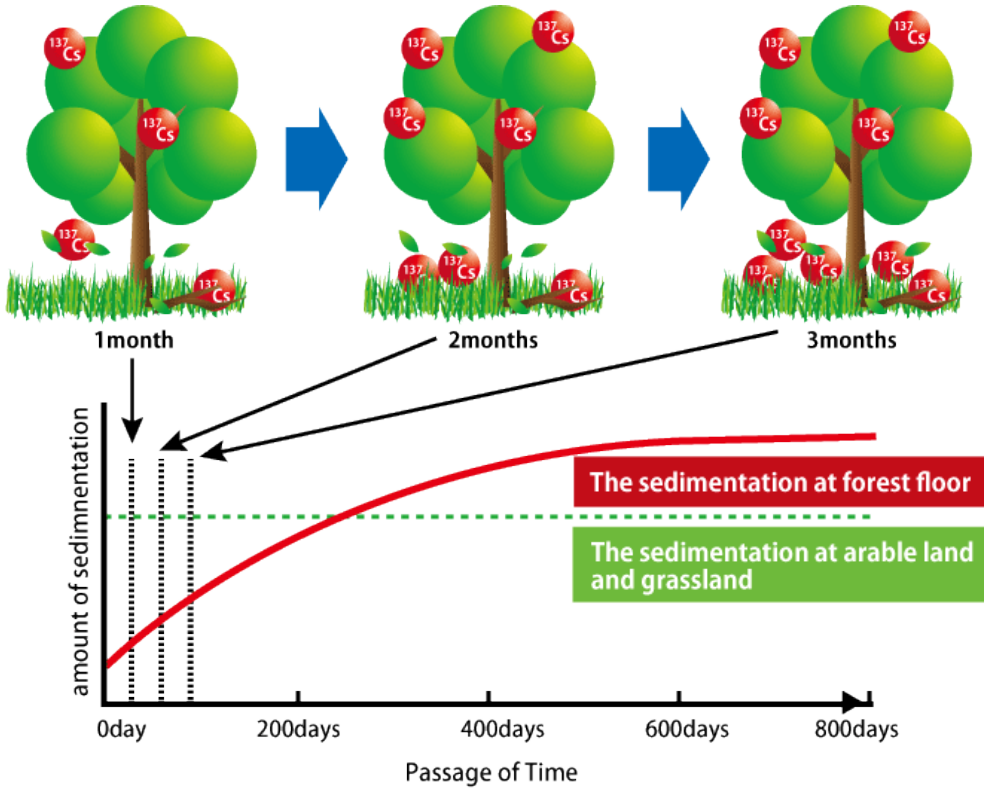
Photo2 : The looks of sampling works







Classified by sediment particle size.
Cs-137 concentration measurements for each weight and each fraction and identify the mineral.



Analysis of radionuclide distribution and migration process in the forest

● Clarify the actual condition of radionuclide migration from forest to soil.

Radiation measurements using a portable Ge detector at forest tower

Monitoring of the forest floor

Measurement of stemflow, throughfall, and litter

Broad-leaved mixed forest

Mature cedar forest

Young cedar forest

Collecting soil water

Measure the entrainment of fine particles containing radioactive material

●Clarify the process of entrainment (re-entrainment) of radionuclides adhered to soil particles from soil and forests, and create the basis for prediction and measures of future re-entrainment.

Measurement of friction velocity by AWS and continuous measurement of atmospheric aerosols by HV.

cascade impactor (sampling size-segregated aerosol)

↓

Fine particles High Volume Sampler (Power supply required)

Observation Tower in Broad-leaved forest

Observation Tower in cedar forest

Low-Volume sampler

AWS(wind speed and direction)

Collected airborne particles →analyzed by University of Tsukuba

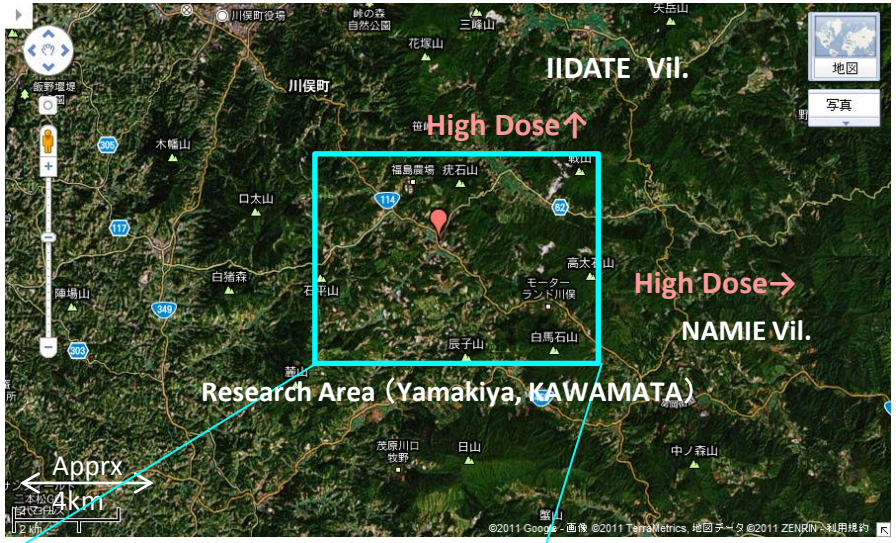
Sampling 3 times a week

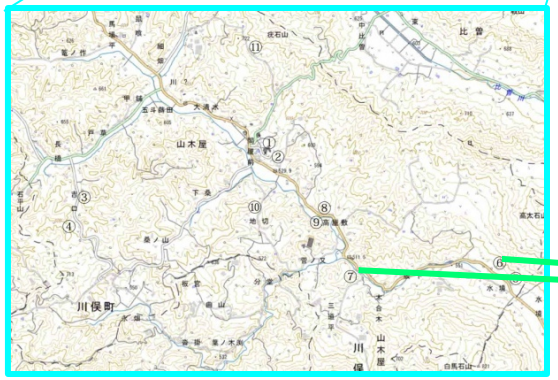
↓

Concentration of radioactive material in the atmosphere will be shown by following empirical formula.

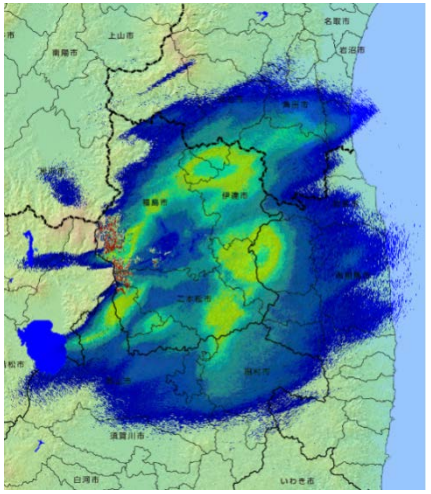
Wind speed (friction velocity)/ Soil moisture / Land uses

Fallout of radioactive material and Spatial inhomogeneity





●Understanding and analysis of the atmospheric state, rainfall, condition of soil surface (snow / vegetation), and landforms which caused the spatial inhomogeneity on and after the accident outbreak (t=0) .



Radar image by Fukushima Univ.

Analyze JMA meso-scale meteorological model analytic value, analytic precipitation by radar AMeDAS, condition of surface soil, local meteorological data, data of radiation dose.

Clarify the spatial nonuniformity of dose distribution.