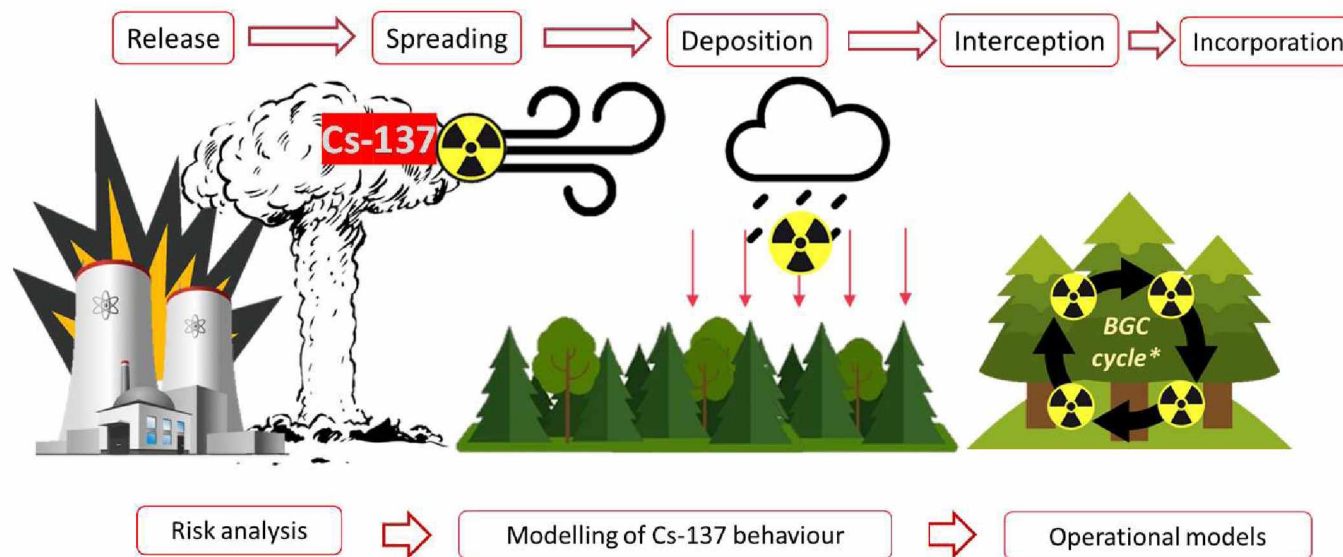


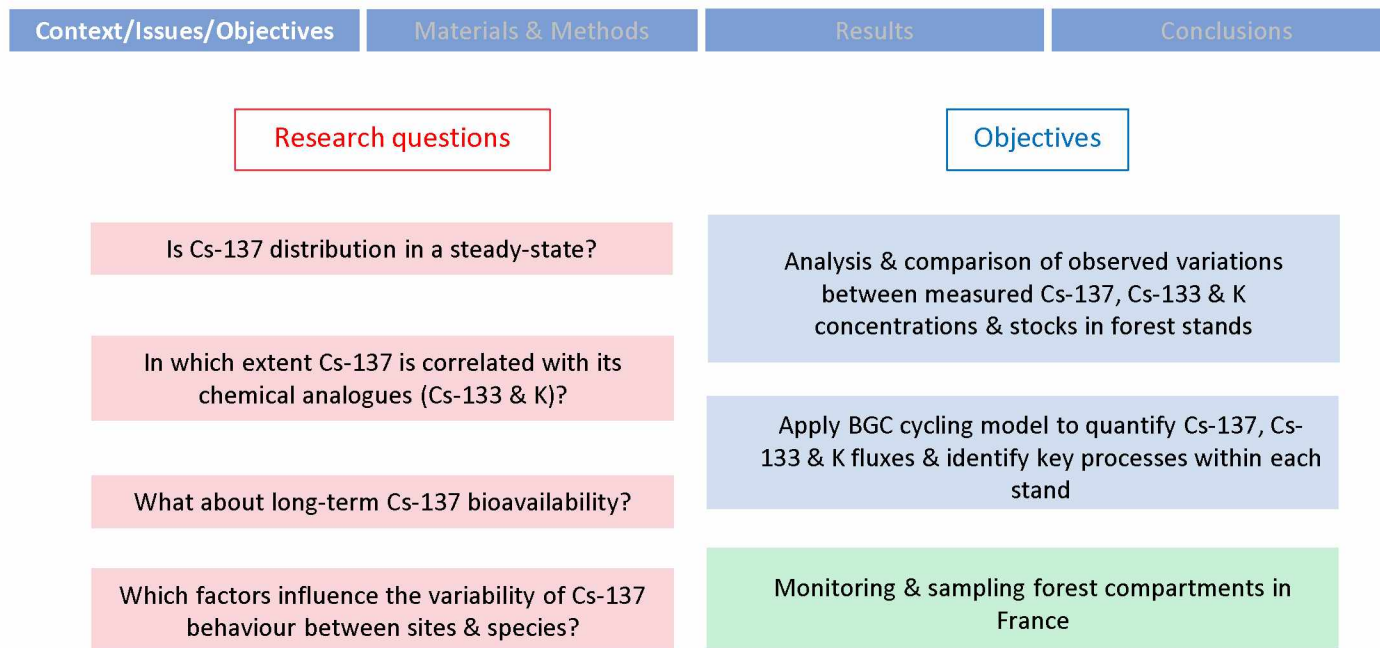


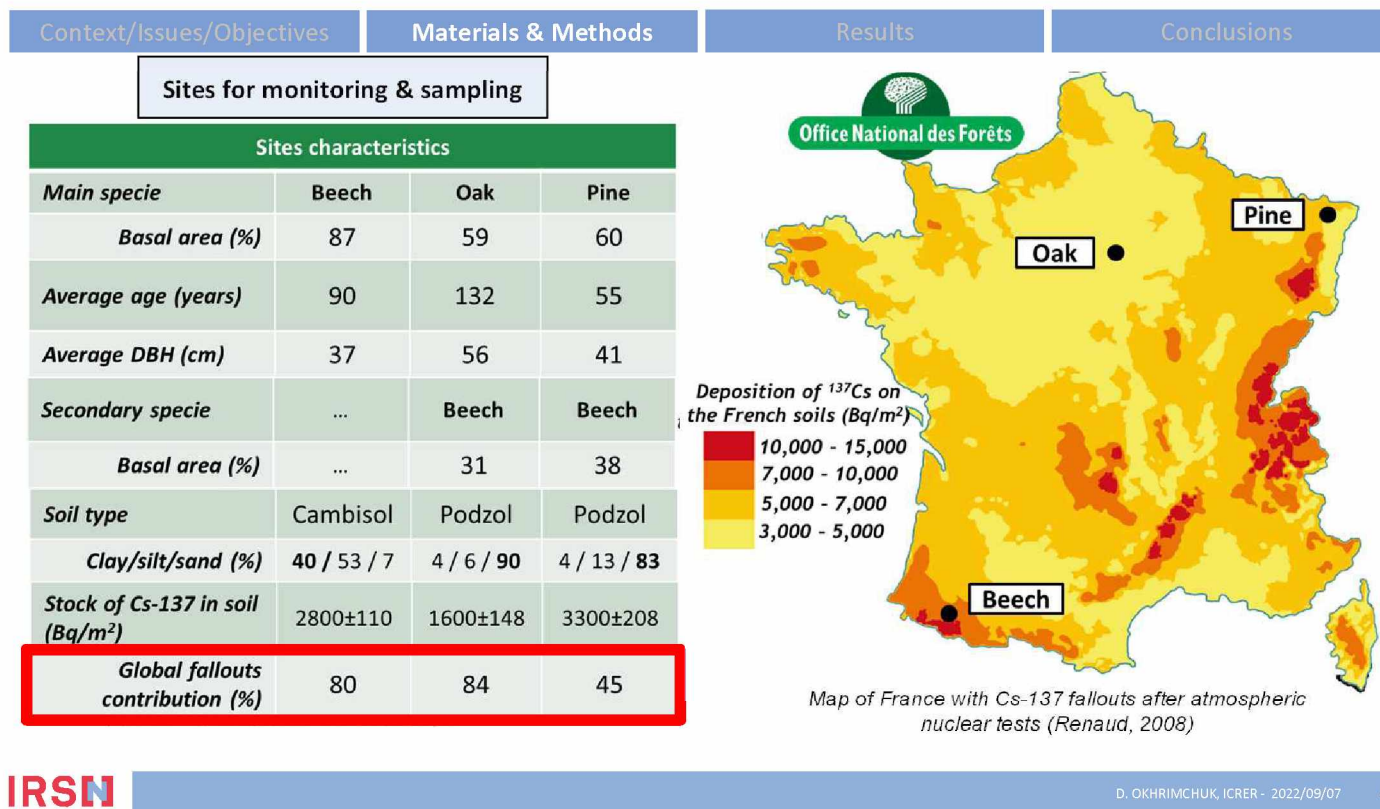
LONG-TERM BIOGEOCHEMICAL CYCLING OF RADIOCAESIUM IN FRENCH FORESTS: FIELD MONITORING AND MODELLING

OKHRIMCHUK D., HURTEVENT P., GONZE M.-A., ROULIER M., CARASCO L., SIMON-CORNU M., PROBST A.



(*) BGC – Biogeochemical cycle



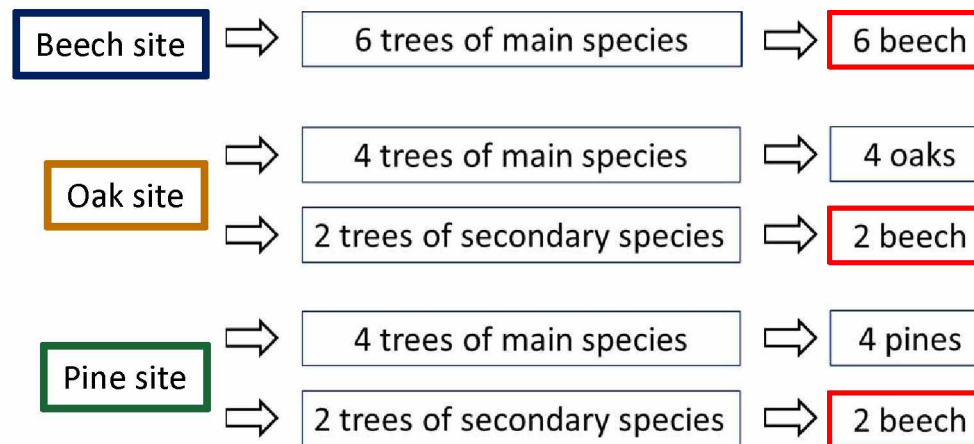


IRSN

D. OKHRIMCHUK, ICRER - 2022/09/07
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Context/Issues/Objectives	Materials & Methods	Results	Conclusions
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Trees sampling



2021

Sampling, treatment, analysis



Drying & ashing



Measure above DL

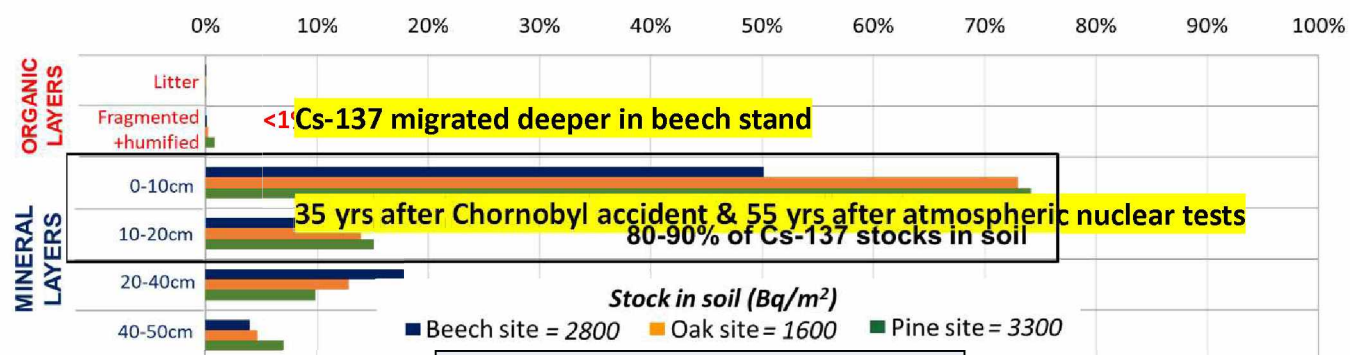
Low Cs-137 level

Gamma-spectrometry for Cs-137
ICP-MS for Cs-133 & K

Extraction of available Cs-137 from soil with
ammonium acetate

Biometrics => allocation factors => stand
biomass estimation with allometric equations

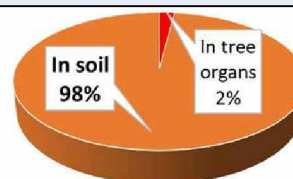
Typical long-term distribution of Cs-137 stocks in soil layers



Soil is the main reservoir for Cs-137



Beech site

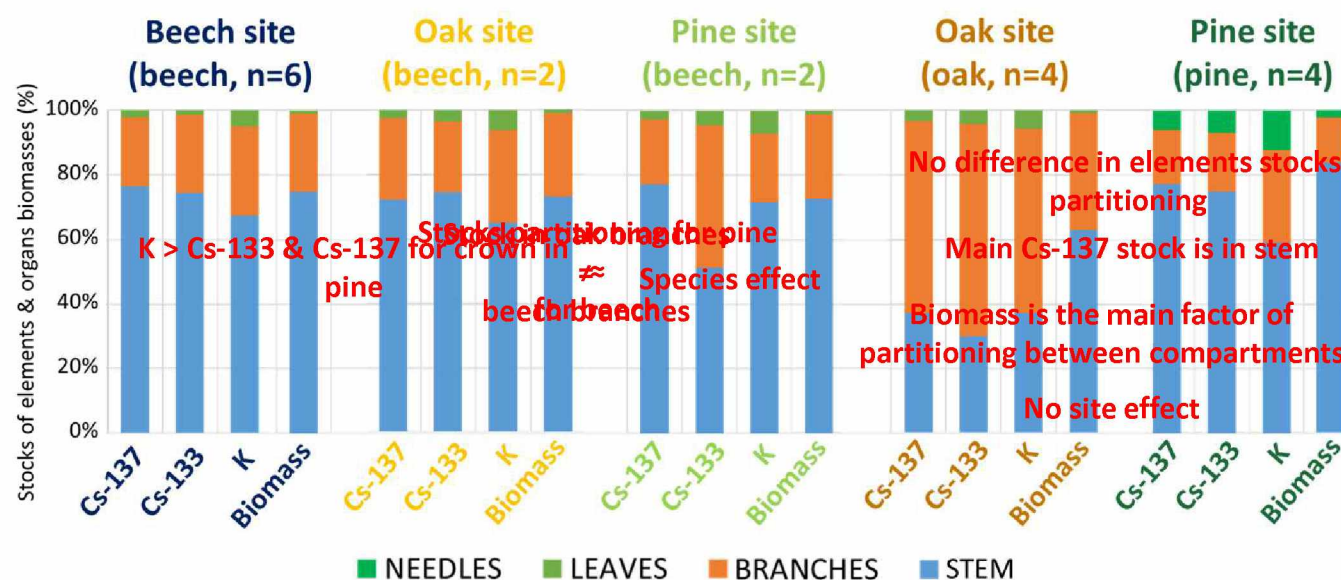


Oak site

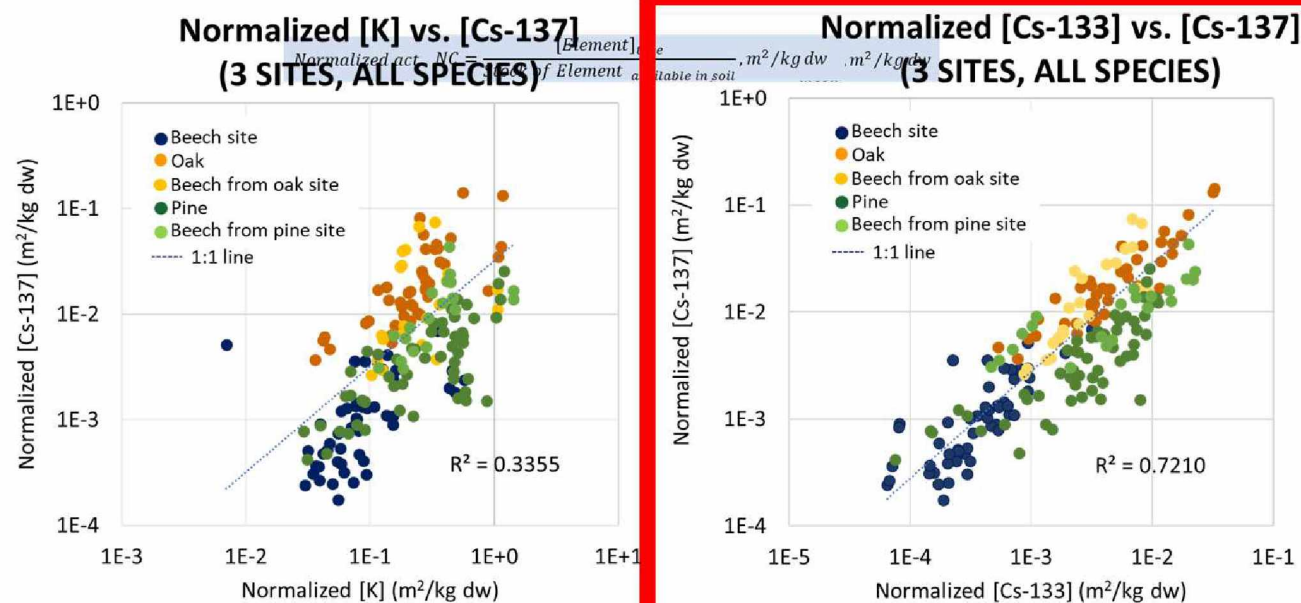


Pine site

Similar pattern of elements partitioning between trees compartments among sites & species

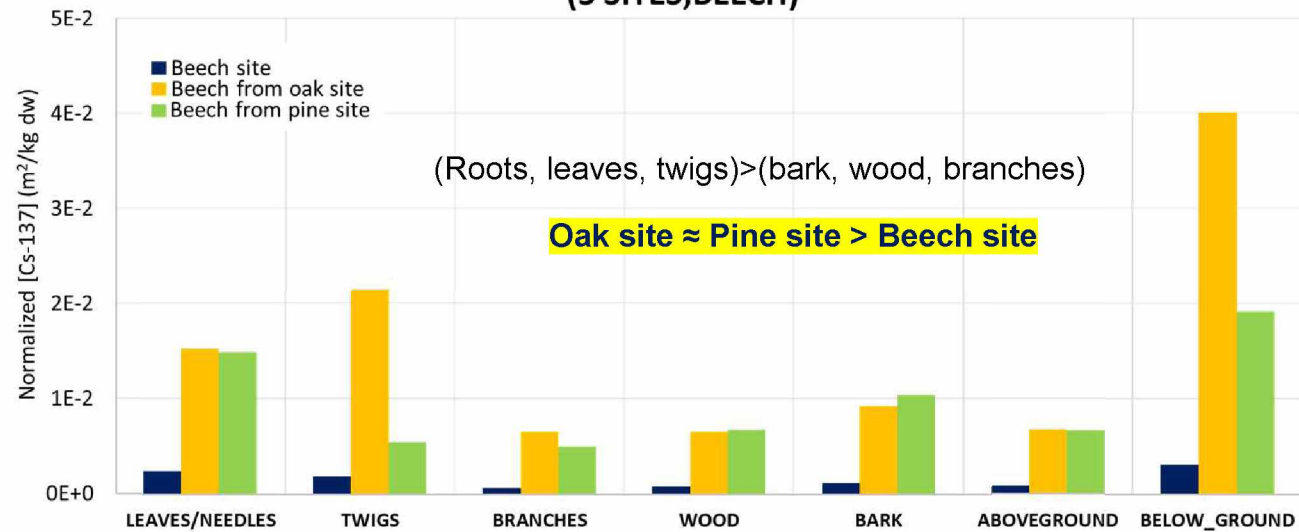


Correlation between Cs-133 & Cs-137 for all sites & species



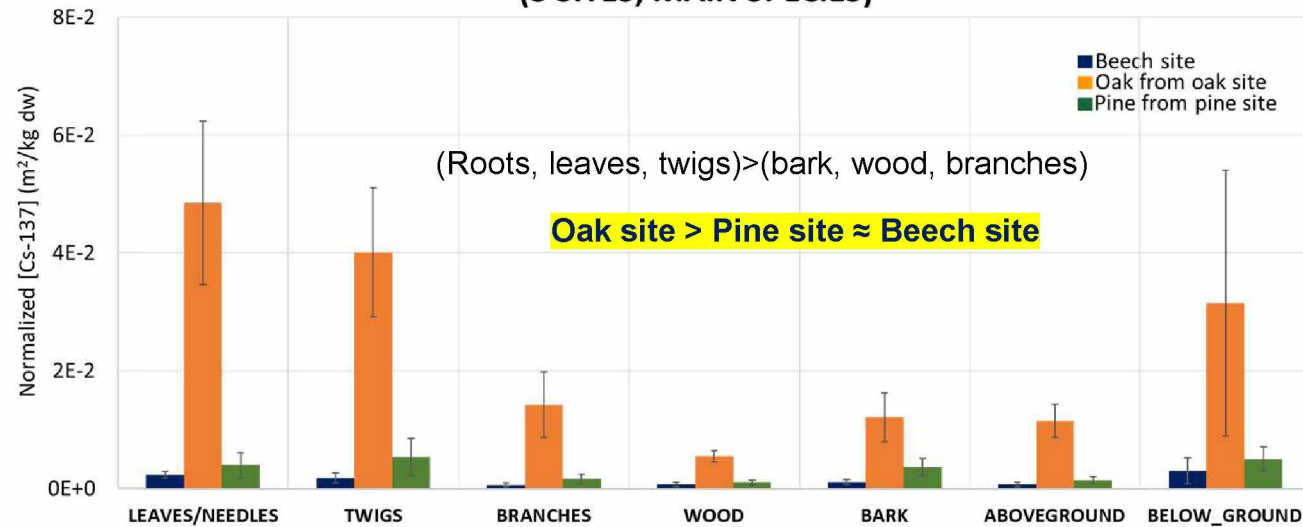
Common pattern for beech trees between sites

**Normalized [Cs-137] ($\text{m}^2/\text{kg dw}$) per compartment
(3 SITES, BEECH)**



Common pattern between species

**Normalized [Cs-137] ($\text{m}^2/\text{kg dw}$) per compartment
(3 SITES, MAIN SPECIES)**



Context/Issues/Objectives	Materials & Methods	Results	Conclusions
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The first results do not allow to identify all factors that are influencing observed variabilities

$$\frac{[^{137}\text{Cs}]_{\text{tree}}}{\text{Stock}^{137}\text{Cs}_{\text{available}}} \propto \frac{[K]_{\text{tree}}}{\text{Stock } K_{\text{available}}} \propto \frac{[^{133}\text{Cs}]_{\text{tree}}}{\text{Stock}^{133}\text{Cs}_{\text{available}}}$$

Cs-133 is the best proxy to address Cs-137 behaviour



Prospects

Estimate long-term BGC cycle processes (i.e. root uptake, internal translocation)

Obtained results will be used to parameterize process-based TREE4* model to predict Cs-137 behaviour

(*) TREE4 - Transfer of Radionuclides and External Exposure in FORest Systems, developed in IRSN

See presentation of Marc-André GONZE (05/09/22)

