

STUDY OF THE LONG-TERM BEHAVIOUR OF ^{137}Cs ATMOSPHERIC FALLOUTS IN FRENCH FORESTS

#Oral

D. Okhrimchuk^{1*}, P. Hurtevent¹, M.-A. Gonze¹, A. Probst², M. Simon Cornu¹

(1) Institut de radioprotection et de sûreté nucléaire (IRSN), Centre de Cadarache, 13115 Saint Paul lez Durance, France

(2) EcoLab, Université de Toulouse, CNRS, 31400 Toulouse, France

*dina.okhrimchuk@irsn.fr

Atmospheric releases of radionuclides (RN) led to the contamination of various ecosystems. Radiocaesium (^{137}Cs) is the most common long-lived RN in the affected areas. Forests are sinks of pollutants due to the high capture efficiency of their canopies and their ability to recycle chemical elements or RNs on long-term [1,2,3]. The TREE4 model was parametrized, tested and validated for short to medium-term relying on datasets from Japanese forests stands contaminated by the ^{137}Cs released by the Fukushima accident [4,5]. The objective of this PhD is transposing TREE4 to the French forests and assessing the ^{137}Cs behaviour on long term.

To address this issue, recovering knowledge on behaviour, distribution and biogeochemical cycle (BGC) of ^{137}Cs and its chemical analogues (K, ^{133}Cs) is a prerequisite and a literature review was performed [1,2,3,6,7]. This task led to establishing a methodology to estimate biological fluxes of K in the forest (root uptake vs. immobilization vs. internal translocations). Sampling campaigns on 5 RENECOFOR (ONF) monitored stands (European beech, Norway spruce, Scots pine, English and Sessile oaks) began in January 2021 to provide datasets according to the BGC flux calculation methodology and determining the distribution of Cs isotopes and K.



Sampling campaign in January 2021
(European beech)

Characterization of forest stand dynamics at the studied sites based on RENECOFOR data and review of allometric biomass models published in the literature for the tree species under investigation was started but is still

underway. Modelling the biomass growth of the forest stand over the study period (1950-2020) is a challenging issue due to the great variability observed between tree individuals and missing data or unknown conditions before RENECOFOR monitoring started (1992). Biometrics from sampled trees will complete this work.

For 2021, in parallel with data acquisition from sampled stands (See figure), determination of ^{137}Cs respective contributions of Global fallouts vs. Chernobyl deposits and hydrologic data analysis on investigated sites will complete data acquisition for TREE4 transposition purpose.

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