Study of the long-term behaviour of 137cs atmospheric fallouts in french forests

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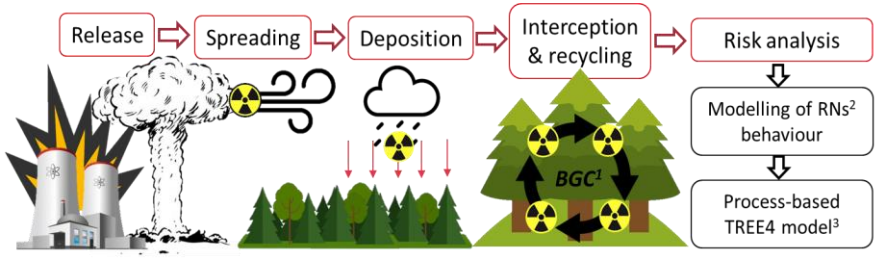
Context & Issues



1st issue
Is the TREE4 model valid for long-term dynamics of ^{137}Cs in French forests?

2nd issue
How to estimate long-term biogeochemical processes such as root uptake, immobilization in wood, fixation in soil?

3rd issue
To what extent are stable chemical analogues (K & ^{133}Cs) a good substitute for assessing ^{137}Cs biological transfer processes?

(1) BGC – Biogeochemical cycle; (2) RN – Radionuclide; (3) TREE4 model - Transfer of Radionuclides and External Exposure in FORest Systems.

Objectives

I) Better understand & quantify the long-term behaviour of ^{137}Cs in forests

II) Test & improve TREE4 model (Fig.1) for French forests

Materials & Methods

1) Literature review on the biogeochemical cycle (BGC) of K in forests

2) Analysis of RENECOFOR monitoring network data collected since 1992 (102 permanent forest sites all over France)

3) Data acquisition from field sampling campaigns (4 sites: 2 deciduous & 2 coniferous, flux measurement for BGC fluxes calculation)

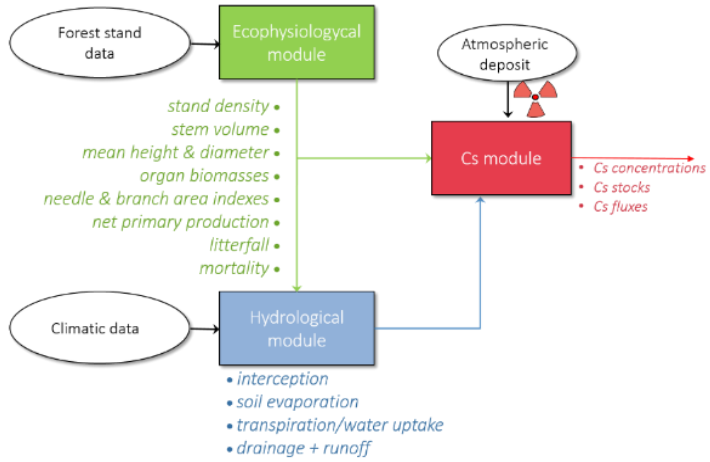


Fig.1: TREE4 model structure

Results

Literature review on the BCG of K

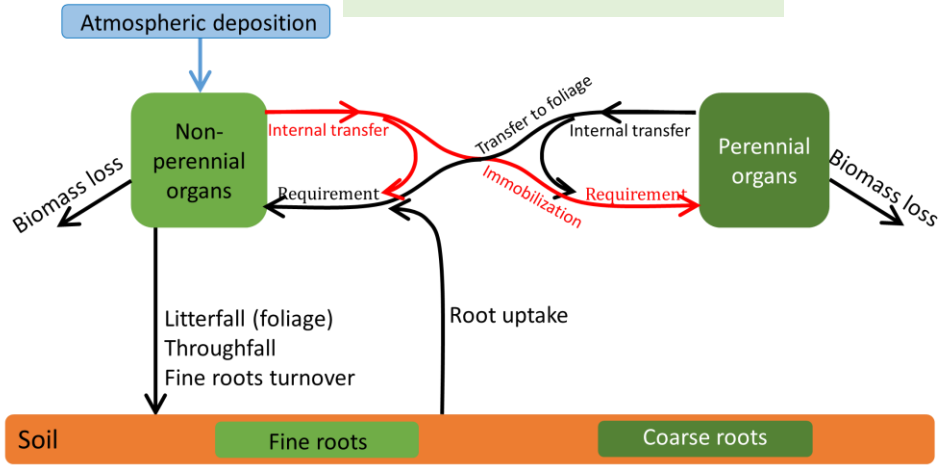


Fig.2: Simplified scheme of the biological sub-cycle

Forest stand dynamics (HET64)

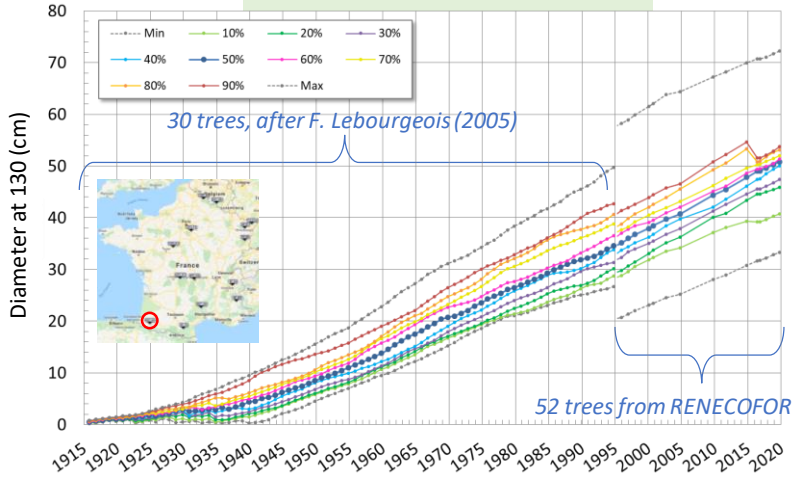
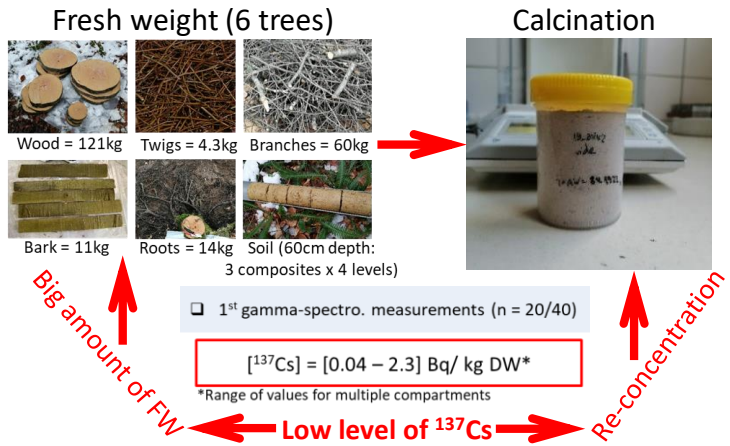


Fig.3: Time evolution of tree diameter growth

Forest compartments sampling & laboratory analysis



Upcoming research actions

2021> • Samples treatment, gamma-spectrometry & chemical analysis; • Calculations on the BGC fluxes; • Biomass growth dynamic estimations through allometric equations; • Publication; • Two sampling campaigns to Scots pine & Silver fir forests. **2022** >• TREE4 model parameterization.