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FLORES: Mechanistically tracking forest photosynthesis and transpiration through multiscale chlorophyll fluorescence signals

Research Project

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belspo
Submitted, awaiting confirmation

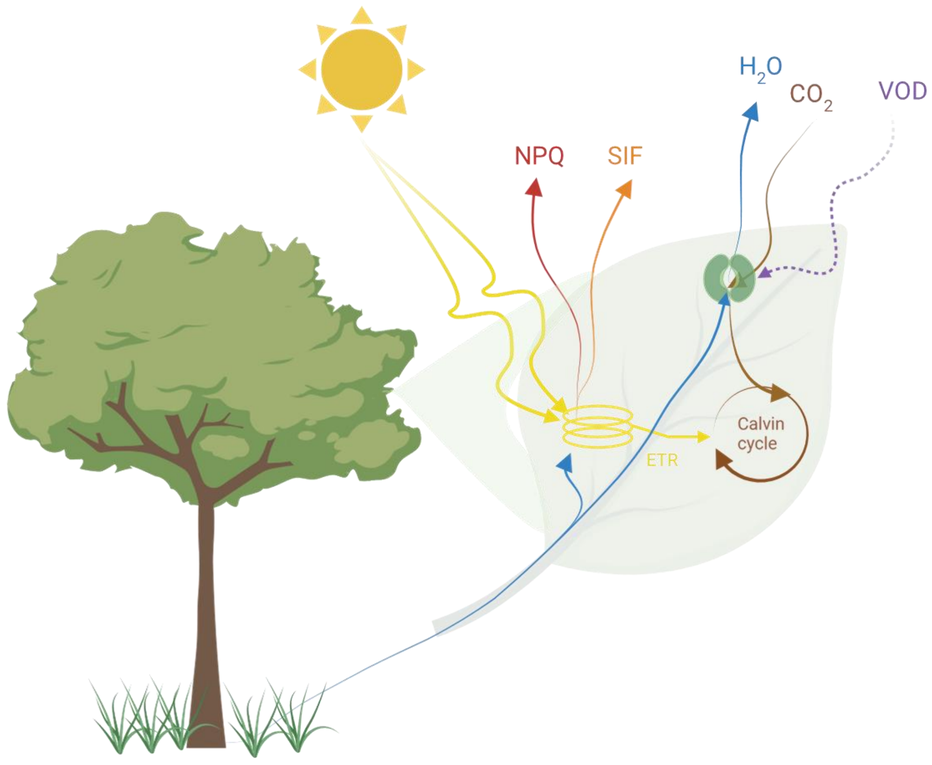
FLORES

Tracking Forest Fluxes with Advanced Remote Sensing

Hyperspectral satellite observations of Sun-Induced Chlorophyll Fluorescence (SIF) provide information on plant photosynthetic activity, and therefore the functioning of terrestrial ecosystems.

Microwave satellite observations of Vegetation Optical Depth (VOD) provides insights on plant water status.

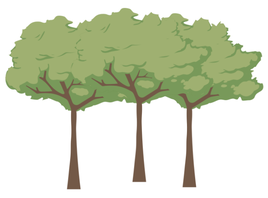
Monitoring **carbon assimilation** and **transpiration of forests** helps to:
- Reveal forest **resilience**
- Assess **carbon sink strength**
- Support **climate forecasting models**



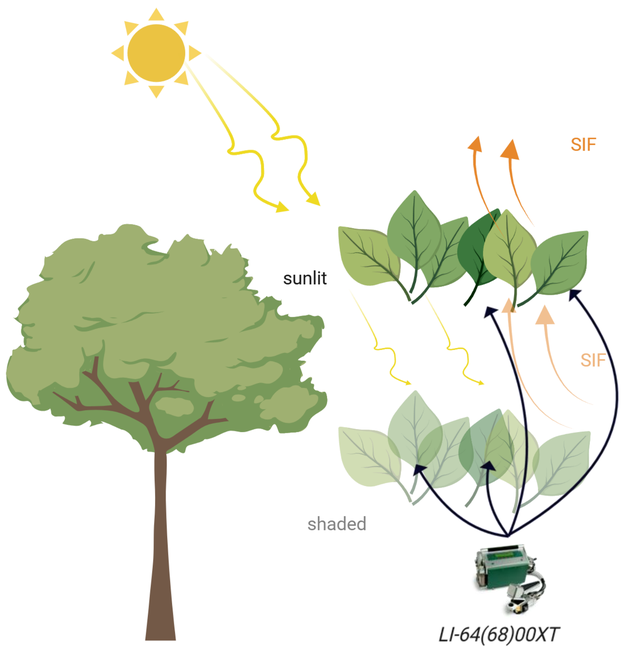
Overall Goal

Develop a novel mechanistic framework for **monitoring photosynthesis and transpiration** in European forests using **multiscale SIF** observations, to improve our **understanding of forest resilience** under climate extremes.

Work Packages



WP1 : Leaf-level measurement to support model development



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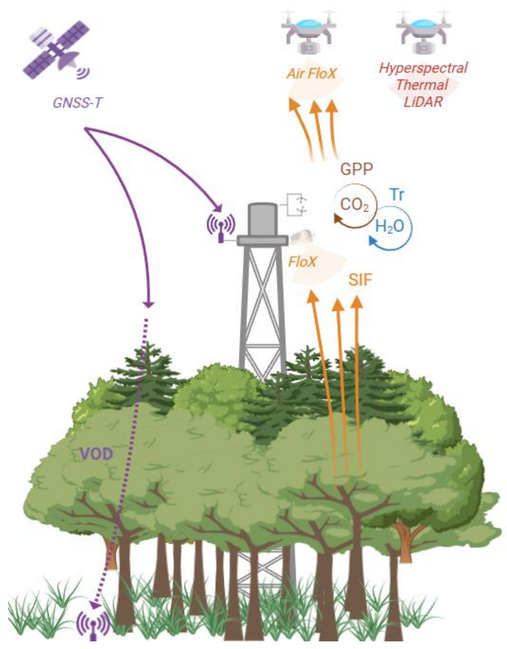
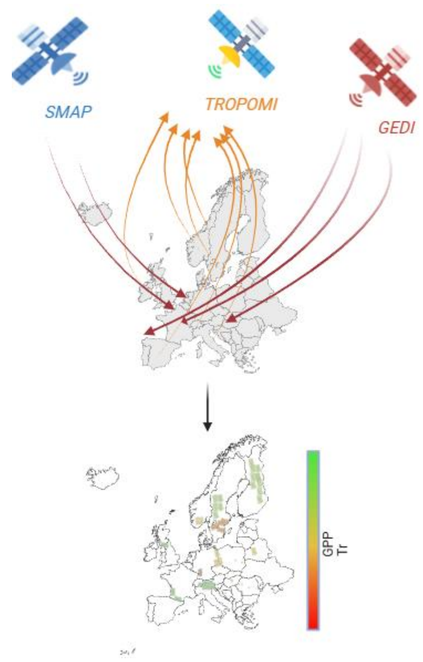
WP2 : UAV data collection and modelling at the stand scale



WP3: Mapping forest fluxes with TROPOMI



Study Sites

BE-Bra
(*Scots pine*)

FR-Hes
(*beech*)

ICOS INTEGRATED CARBON OBSERVATION SYSTEM

Perspectives

Short-term perspectives with **TROPOMI** :
- **Early detection** of physiological changes in vegetation
- Support evidence-based forest policies across Europe (by identification of **vulnerable** species-soil type association)

Long-term perspectives with **FLEX** :
- **Higher-resolution monitoring** for detecting stress through photosynthetic activity decrease
- Regional implementation in **Belgium** for localized climate impact assessments