Project: **1370**

Project title: **OptFor-EU: Optimising forest management decisions for a low-carbon, climate resilient future in Europe**

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Report period: **2025-07-01 to 2026-04-30**

Maximum of 2 pages including figures. 9 pt minimum font size.

Project overview

The European Horizon Project OptFor-EU "OPTimising FORest management decisions for a low-carbon, climate-resilient future in Europe" develops ready-to-use products, services and guidelines for the forest sector. OptFor-EU builds on state-of-the-art datasets, modelling and integrated solutions to develop a decision support system that provides appropriate climate adaptation and mitigation options to optimize forest ecosystem services and strengthen the resilience of forests and their capacity to mitigate climate change across Europe.

Model simulations tackle the integration of European forests, including forest management practices, in a scalable modelling framework that extends from local case study areas to the European domain. Models will be enhanced to improve the representation of forest land cover and forest management practices across Europe, and simulations will be designed to improve understanding of the individual and combined impacts of forest management practices, socio-economic and climatic changes on forest processes and forest ecosystem services across Europe.

We implement forest management into regional earth system modelling and evaluate the simulated effects and feedbacks of land use changes and climate-resilient forest management measures in Europe under present and potential future climate conditions. The scenarios will be developed according to user priorities and the results will be tailored to forest stakeholders and support suitable climate adaptation and mitigation options for enhancing forest resilience and its capacities to mitigate climate change across Europe.

Within OptFor-EU, the simulations conducted with REMO2020-iMOVE are part of larger ensembles of regional climate model simulations conducted by the partners using regional climate models (e.g. MeteoRomania, RegCMv4.5).

Planned work, performed simulations, preliminary results

In the first phase of OptFor-EU, continent-wide simulations on 0.11° horizontal resolution for Europe following the CORDEX Flagship Pilot study LUCAS (Land Use Across Scales) Phase II experiment protocol were performed.

The LUCAS Phase II experiment protocol aims for the representation of realistic land use and land cover changes (LULCC) by implementing the LUCAS LUC dataset (Hoffmann et al., 2023). LUCAS LUC includes transient LULCC for different SSP scenarios and for the historical period 1950 - 2014 on high-resolution (0.11°). During this reporting period, we succesfully conducted the GCM-driven simulations for the historical period as well as for the SSP126 scenario.

The GCM-driven Europe-wide simulations on 0.11° (~12,5 km) spatial resolution with the regional climate model REMO2020-iMOVE for the historical period as well as for the SSP126 scenario including land use and forest cover change and the reference simulation with constant land use and forest cover have just been completed. The data will now be processed and evaluated, and we will calculate and analyse the climate-related Essential Ecosystem Forest Indicators (EFMIs)

which have been developed within the OptFor-EU project in collaboration with project partners and prioritised with stakeholders (Linser et al. 2025)

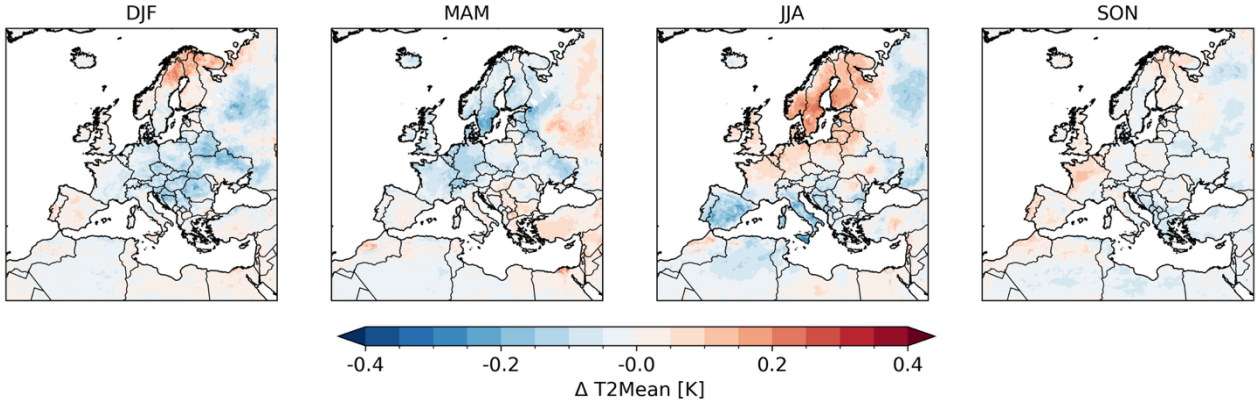

Fig.1: Simulations results as mean over 1950 – 2015 for 2 m temperature (T2Mean) as difference between the simulations results from the transient LULCC and static LULCC (REMO-iMOVE_LUC vs. REMO-iMOVE_LU2015)

In addition, forest cover changes as a selected forest management practice (FMP) have been implemented into the convection-permitting regional climate model (CP-RCM) REMO-iMOVE on 0.0275° (~3 km) resolution over the OptFor-EU CSAs Romania and Germany. The simulation period covers the years 2015 – 2024, including exceptionally dry years as well as wet and average years in both CSA4 (Knutzen et al. 2025) and CSA6 (Bădăluță et al., 2024, Ionita et al., 2025). According to discussions with project partners in OptFor-EU, thinning and afforestation have been selected as FMP due to its relevance in forest management, and its employment in the forest models applied within OptFor-EU.

Two simulations for the two CSAs (CEU-3 and SROM) with REMO-iMOVE on convection permitting scales have recently been successfully completed, and the data processing and evaluation will start soon. The REMO-iMOVE data is archived at DKRZ and cmorized data will be published on longterm DKRZ HPC storage systems to provide longterm open access to the data.

Delays, deviations and new allocation of resources

During the reporting period, we conducted the GCM-driven simulations with static and transient LULCC according to our plan. We need to process and evaluate the data, and to calculate and analyse the climate related Essential Ecosystem Forest Indicators (EFMIs), thus we just require disk space on work and some on archive for the next allocation period. We also successfully completed the REMO-iMOVE simulations on convection permitting scale (~3 km), for the two CSAs CEU-3 and SROM, which will be processed and analysed in the next allocation period.

Hoffmann, P., Reinhart, V., Rechid, D., de Noblet-Ducoudré, N., Davin, E. L., Asmus, C., Bechtel, B., Böhner, J., Katragkou, E., and Luyssaert, S.: High-resolution land use and land cover dataset for regional climate modelling: historical and future changes in Europe, Earth Syst. Sci. Data, 15, 3819–3852, https://doi.org/10.5194/essd-15-3819-2023, 2023.

Linser S et al. (2025) Report on a novel set of Essential Forest Mitigation Indicators (EFMIs), OptFor-EU D1.2 https://optforeu.eu/wp-content/uploads/2025/04/OptFor-EU_D1.2_-EFMIs-_v02_20250314_BOKU.pdf