

PROJECT INFORMATION

Project title: Using multi-sensor remote sensing data and deep learning methods to disentangle causes of forest vitality loss

Project ID: 224

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PROJECT DESCRIPTION

Forest ecosystems cover almost one third of the territories of Germany and of Luxembourg and provide a wide range of economic benefits and ecosystem services. Forests are expected to suffer from regional impacts of climate change, such as increasing tree mortality, tree growth reduction, and wood quality degradation and reduction of amenity value. For this reason, monitoring forest vitality has become a long-term goal for most countries. Nevertheless, the continuously operating networks for monitoring forests are stand-based which highly limits their effectiveness. The large availability of satellite and spatial data offers the possibility to overcome this limitation by providing dense time series from a variety of sensors operating in different spectral domains. Deep4Vit introduces a multi-temporal, multi-sensor data fusion approach along with deep learning methods and geostatistical modelling to understand how different triggers and their interactions are reducing the vitality of forests under a changing climate. The methodology will be developed and validated in the crown condition assessment from the ICP Forests plots located in the Greater Region. Expected outcomes of Deep4Vit are:

- i) a better understanding of the causes of forest vitality loss with an explicit consideration of possible interlinkages between different biotic and abiotic factors,
- ii) a methodology for improved forest vitality assessment, including modification of existing algorithms for multi-sensor data fusion, spectral and temporal analysis of EO data archives and an evaluation of deep learning approaches for forest vitality assessment, and
- iii) provision of spatial information on cause and severity of FVL to forest management institutions.