Modelling mortality drivers of tree species under changing climatic conditions RCP 2.6 and RCP 8.5 at a regional scale using the CARAIB dynamic vegetation model

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In recent years, rising tree mortality rates have been identified in various biomes. It is presumed that, along with an increase in the frequency of drought and heatwave events, climate-induced tree mortality will increase across many regions of the world in the near future. However, because of the intricate interactions between the processes and the drivers, the mechanisms underlying such mortality are still up for debate. The potential of forests to capture atmospheric CO_2 in the present and future is fraught with uncertainty. Here, we are focusing on entangling the effects of climate change on the temporal increase in temperature which is resulting in an exponential increase in vapors pressure deficit (VPD), transpiration, and decrease in soil water, which may lead to tree mortality.

In this study, we choose a new approach to study the impact of climate change on forest trees. It combines the dynamic vegetation model CARAIB and satellite (Landsat) data at a high resolution of 1 km over the Wallonia region for the period of 1985-2070. Using remote sensing LANDSAT (5, 7, 8) satellite data, we extracted the land use and land cover (LULC), which insight the precise estimation of spatial and temporal change of forest dynamic over the year 1985-2020.For the future land use we will construct several scenarios (no forest management (Business as usual), deforestation, and reforestation) for the period 2021-2070. We will simulate our model under two climatic scenarios RCP 2.6 and RCP 8.5 to analyse which drivers are impacting on forest tree species. In conclusion, by using a modeling approach at high resolution we will be able to quantify the linking of mortality with the drivers of the current climate change and insight into the future forest vulnerability that will be useful for adapting forest management according to future conditions.