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Impact of climate anomalies on CO2 and H2O fluxes of a temperate Scots pine forest.

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Climate anomalies can have a severe impact on the exchange of CO2 and H2O of forest ecosystems with the atmosphere. Previous studies have revealed that drought events and heat waves can significantly reduce carbon uptake and water use of forests and even lower leaf area if the drought period is persistent. Consequently, these effects can be a cause of the year to year variation in the carbon and water balance of forest ecosystems.
This study focuses on the effect of climate anomalies on total stand scale evapotranspiration, gross primary productivity, ecosystem respiration, soil respiration and net ecosystem exchange of a Scots pine (Pinus sylvestris L.) forest. The study site is located 20 km NE of Antwerp, near Brasschaat (Belgium) and consists of an 80-year-old even aged Scots pine stand, which belongs to a larger mixed coniferous/deciduous forest and is part of the ICP-II and Fluxnet/CarboEurope-IP networks since 1997. This analysis is based on a 13 year long eddy covariance dataset of ecosystem H2O and CO2 fluxes together with half hourly recorded temperature, VPD, precipitation and global radiation. Water stress is indentified by using continuous measurements of soil water content. In addition to climate anomalies we also looked at the effect of high ozone events which can significantly reduce carbon uptake of forest ecosystems.