



Sensitivity of bud burst in key tree species in the UK to recent climate variability and change

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Analysing the relationship between the changing climate of the UK and the spatial and temporal distribution of spring bud burst plays an important role in understanding ecosystem functionality and predicting future phenological trends. The location and timing of bud burst of eleven species of trees alongside climatic factors such as, temperature, precipitation and hours of sunshine (photoperiod) were used to investigate: i. which species' bud burst timing experiences the greatest impact from a changing climate, ii. which climatic factor has the greatest influence on the timing of bud burst, and iii. whether the location of bud burst is influenced by climate variability. Winter heatwave duration was also analysed as part of an investigation into the relationship between temperature trends of a specific winter period and the following spring events. Geographic Information Systems (GIS) and statistical analysis tools were used to visualise spatial patterns and to analyse the phenological and climate data through regression and analysis of variance (ANOVA) tests. Where there were areas that showed a strong positive or negative relationship between phenology and climate, satellite imagery was used to calculate a Normalised Difference Vegetation Index (NDVI) and a Leaf Area Index (LAI) to further investigate the relationships found. It was expected that in the north of the UK, where bud burst tends to occur later in the year than in the south, that the bud bursts would begin to occur earlier due to increasing temperatures and increased hours of sunshine. However, initial results show that for some species, the bud burst timing tends to remain or become later in the year. Interesting results will be found when investigating the statistical significance between the changing location of the bud bursts and each climatic factor.