Geophysical Research Abstracts
Vol. 18, EGU2016-2620, 2016
EGU General Assembly 2016

Implications of altered phenology on the carbon dynamics of deciduous oak woodland

Matthew Wilkinson (1), Edward Eaton (1), Ewan Pinnington (2), and James Morison (1)

(1) Centre for Sustainable Forestry & Climate Change, Forest Research, United Kingdom, (2) Department of Meteorology, University of Reading, United Kingdom

The widely observed advance in spring budburst across a range of temperate forest species due to climatic warming has received considerable attention. Such changes in phenology have important implications not only for the choice of species and provenances currently being planted, which need to be suited to both current and future climatic conditions, but also for the carbon dynamics of forest ecosystems. Using a combination of phenology observations and carbon balance modelling, this study examines the influence of tree phenology and growing season length on carbon sequestration. Tree phenology and seasonal carbon dynamics were measured using phenocam images and Eddy Covariance (EC) at a deciduous oak plantation in the south-east of England (Alice Holt, Hampshire, UK). Manual phenology observations of spring budburst were also recorded in a range of European oak provenances over seven years (2004 – 2009 and again in 2013) at a trial site nearby. The EC and manual observation sites were exposed to very similar meteorological conditions. At the manual observation site there was a strong correlation between mean spring air temperature and the date of budburst in all provenances. The order in which budburst occurred was largely conserved between years and was strongly linked to source latitude, provenances that originated from southerly locations consistently reached budburst prior to those from more northerly locations. The timing of budburst in the local provenance at the manual observation site was synchronous with budburst at the EC site. The Data Assimilation Linked Ecosystem Carbon (DALEC) model was optimised for the Alice Holt site. By altering the timing of budburst within the model to reflect the observed variation in the European provenances, we assessed the implications of altered phenology on the carbon dynamics of deciduous oak in southern England.