



## **Detecting changes in the timing of autumn phenology in response to climate change**

Astrid Wingler (1), Alison Donnelly (2), and Lingling Liu (3)

(1) School of Biological, Earth and Environmental Sciences, University College Cork, Ireland, (2) Department of Geography, University of Wisconsin-Milwaukee, United States, (3) Geospatial Sciences Center of Excellence (GSCE), South Dakota State University, Brookings, SD 57007, USA

Autumn phenophases such as leaf colour and leaf fall have received considerably less attention than their spring counterparts (bud burst and leaf unfolding) but are equally important determinants of the duration of the growing season in forests and thus have a controlling influence on the carbon uptake period. Observing and monitoring autumn phenophases has proven to be more challenging than spring phenophases resulting in less data being available from which to determine trends. Here we propose to examine trends in the timing of leaf colour and leaf fall from a suite of deciduous trees at a number of International Phenological Garden sites in Ireland. We will examine trends from direct field observations spanning the time period 1970-2016 and compare these with satellite derived measures (Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI)) of the end of the growing season from the MODIS product MOD13Q1 from the 1980s when data became available. In addition, we will investigate any influence of temperature on the timing of leaf colour and leaf fall. We hypothesize that there will be close agreement between the direct observations and the satellite measures of the timing of leaf colour and that changes in autumn temperature will be reflected in the corresponding phenology. Furthermore, we anticipate species specific trends in the timing of autumn phenophases.