03-06: Chemical signature in xylem cell wall of *Salix glauca* L. due to *Eurois occulta* L. outbreaks

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Insects are one of the major agents of natural disturbances in high-latitude ecosystems. Their outbreaks can cause severe canopy defoliation, which leads to reduced biomass and carbon (C) investments with potential cascade effects in species composition, functioning and productivity of tundra ecosystems. Recent studies have quantified the decrease in cell-wall thickness during the outbreak and the unexpected increase in primary production the following years. However, it is still unclear how the outbreaks affect carbon assimilation and vegetation productivity.

To shed light on the survival strategy of the woody plants under attack, a novel approach combining dendro-anatomical analysis with confocal Raman imaging was used to study outbreak events of the moth *Eurois occulta* in *Salix glauca* L. trees collected at Iffiarterfik, Nuuk Fjord, West Greenland during the summer of 2016. The survival strategy of the woody plant is not clear from the anatomical modifications of the xylem formed in the stem, which is why the biopolymer composition of the cell walls was also studied.

Wood samples were cross-dated and anatomical analysis identified two pointer years in the growth seasons 2003 and 2010, i.e. years of insect attack. These two annual rings had a clear reduction in C investment by reduction in cell wall thickness and width of the annual growth but also a markedly lighter colour of the growth ring, suggesting an altered biopolymer mark-up. For each outbreak event, seven growth rings were analysed: three years before, three years after plus the outbreak year. The outbreak years were followed by a significant growth release the two following years, i.e. wider rings were formed. The chemical composition of the xylem cell wall material was analysed using confocal Raman imaging on cross sections of fibers, vessels, and parenchyma cells. Possible differences in chemical composition between cell types and between growth years were explored using chemical imaging based on cluster analysis of integrated Raman band intensities as well as on more advanced chemometric approaches.