Geophysical Research Abstracts, Vol. 9, 06081, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06081

Circadian clock regulation in poplar complicates isoprene emission modelling.

S. Louis, M. Loivamäki, S. Mayrhofer, M. Teuber, I. Zimmer, G. Cinege, J.P. Schnitzler

Institute for Meteorology and Climate Research, Research Center Karlsruhe, Garmisch-Partenkirchen, Germany (sandrine.louis@imk.fzk.de).

Many plant species emit volatile terpenoids whose diverse functions are not always well characterized. To understand their physiological role and to better predict their release into the atmosphere where they are highly reactive, studies are conducted on different species, including poplars which are strong emitters of isoprene.

Here we show that in Grey poplars (*Populus x canescens*) isoprene emission (measured through a proton transfer reaction mass spectrometer) and its synthesizing enzyme (isoprene synthase: ISPS) gene expression (measured by quantitative PCR) follow seasonal and diurnal variations in relation to light and temperature. Moreover, on cell cultured poplars, we show that the diurnal pattern is conserved under continuous light. This testifies for a circadian element of regulation for both phenomenons. A promoter analysis of the *ISPS* gene confirms the potential clock dependent regulation of its expression. Other genes involved in the metabolic pathways of isoprene (*DXR*) and higher terpenoids (carotenoids, *PSYS*) were also tested for similar pattern of expression. Complementary analysis of ISP protein concentration and enzyme activity indicates transcriptional, posttranslational and metabolic level of regulation of isoprene emission in Grey poplar