

## Foliar isoprene emission during autumn senescence in aspen (*Populus tremula*)

ZHIHONG SUN, ÜLO NIINEMETS\*  
AND LUCIAN COPOLOVICI

Estonian University of Life Sciences, Kreutzwaldi 1, Tartu  
51014, Estonia

(\*correspondence: Ylo.Niinemets@emu.ee)

### Introduction

Isoprene emission is a complex process that depends on plant phenological stage and environmental factors [1,2]. In this study, leaf photosynthesis and isoprene emissions were analyzed during autumn leaf senescence in *Populus tremula* to gain insight into the emission controls by environment (temperature) and senescence.

### Results and discussion

Our investigation indicated that isoprene emissions were uncoupled from photosynthetic modifications in senescent leaves. The percentage of carbon lost due to isoprene emission gradually raised throughout leaf senescence. Isoprene emissions were present even leaves just before abscission, even though the rate of photosynthesis had totally dropped. The emission rate was negatively associated with intraday minimum temperature and air temperature at sampling, in contrast to the observations of isoprene emission potentials in fully active leaves in mid-season.

Autumn senescence in *Populus tremula* leaves is associated with intensive break-up of cellular architecture and dissolution of organelles through programmed cell death [3]. These changes were faster in carbon metabolism enzymes than in enzymes responsible for isoprene synthesis. We conclude that the key factors controlling isoprene emission from senescing leaves is the internal physiological rhythm, and to lesser extent the ambient environmental conditions.

- [1] Sharkey *et al.* (2008) *Annals of Botany* **101**:5–18.
- [2] Mayrhofer *et al.* (2005) *Plant Physiology* **139**: 474–484.
- [3] Keskitalo *et al.* (2005) *Plant Physiology*. **139**:1635–1648.

## The sedimentary environment – A biogeochemical mosaic

BJØRN SUNDBY

Institut des Sciences de la Mer de Rimouski, Université du  
Québec à Rimouski, Canada

Earth & Planetary Sciences, McGill University, Canada  
(bjorn\_sundby@uqar.qc.ca)

Subaqueous sedimentary environments are inhabited by a variety of macro- and micro-organisms distributed according to life habits, availability of food and space, and, in the case of micro-organisms, availability and types of organic matter and electron acceptors. The heterogeneous distribution of organisms and their various activities create a dynamic, three-dimensional mosaic of environments with distinctly different chemical properties among which fluxes are driven by ever changing concentration gradients. In such a dynamic environment the transient state prevails at all scales: burrows are excavated and refilled; burrows are irrigated periodically by their inhabitants; food is captured and stored; the speciation of bacteria changes as the available electron acceptors change; the local redox potential changes and with it the oxidation state of several elements; complexes are formed with ligands produced by bacteria; solutes diffuse or are advected. This talk will illustrate the rich complexity of the sedimentary environment with data on the effects of functional group species of benthos on fluxes of nutrients; direct visual observation of the dynamics of burrow excavation; and data on the fine scale distribution of metal species in different sedimentary environments obtained with a voltammetric microelectrode.