14-years of tree-growth monitoring along a 1400 m elevation transect in the Lötschental

Patrick Fonti, Elisabet Martínez-Sancho, Richard Peters

Swiss Federal Research Institute WSL, Switzerland

Introduction

The Lötschental monitoring transect is an ensemble of 9 tree-growth monitoring sites distributed along an elevational gradient from 800 to 2200 m. a.s.l. The setting was installed in fall 2006 to investigate continuous stem growth of mature *Picea abies* and *Larix decidua* growing under natural conditions.

LÖTSCHENTAL TRANSECT

SETTING

Larix decidua   Picea abies

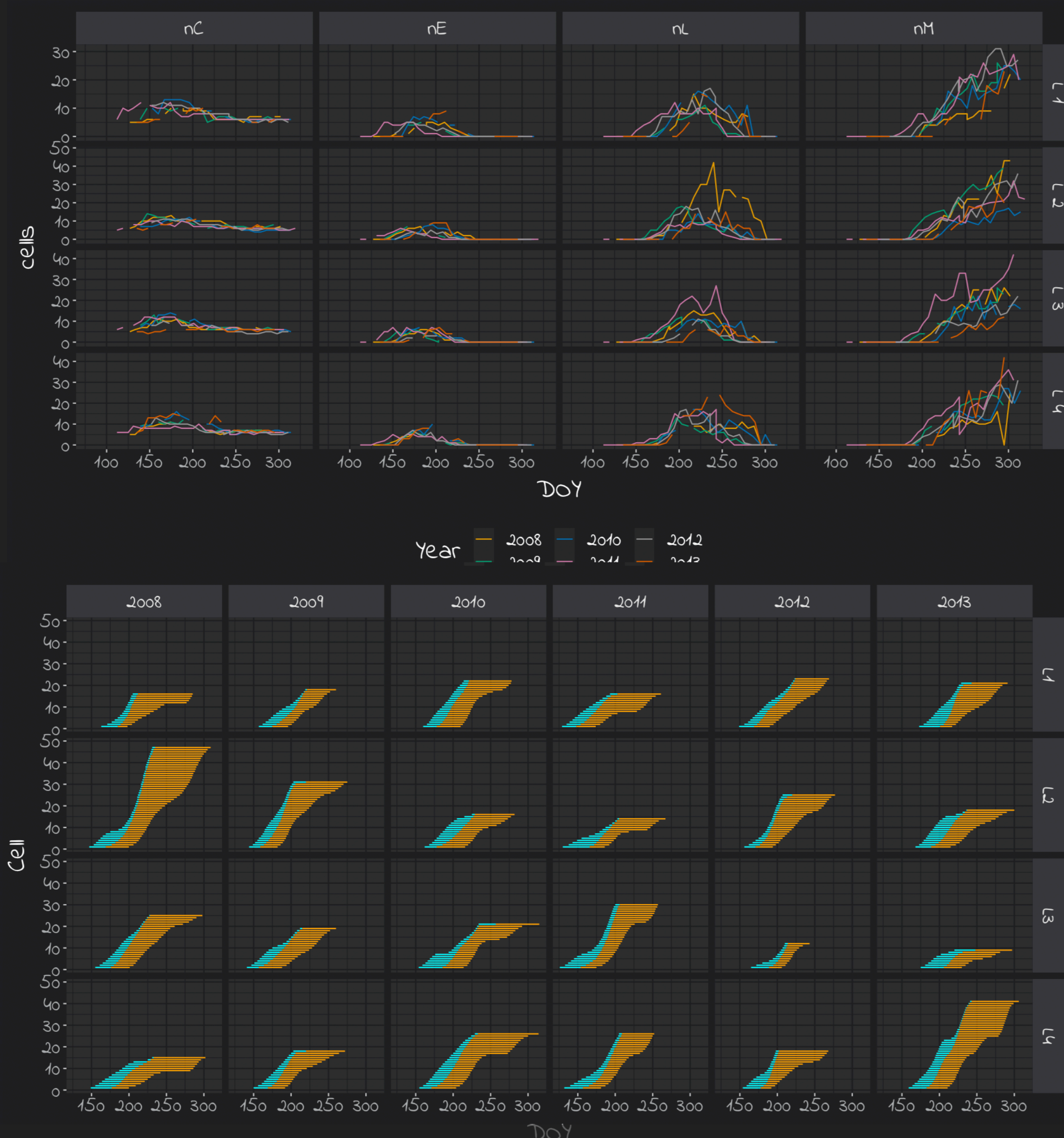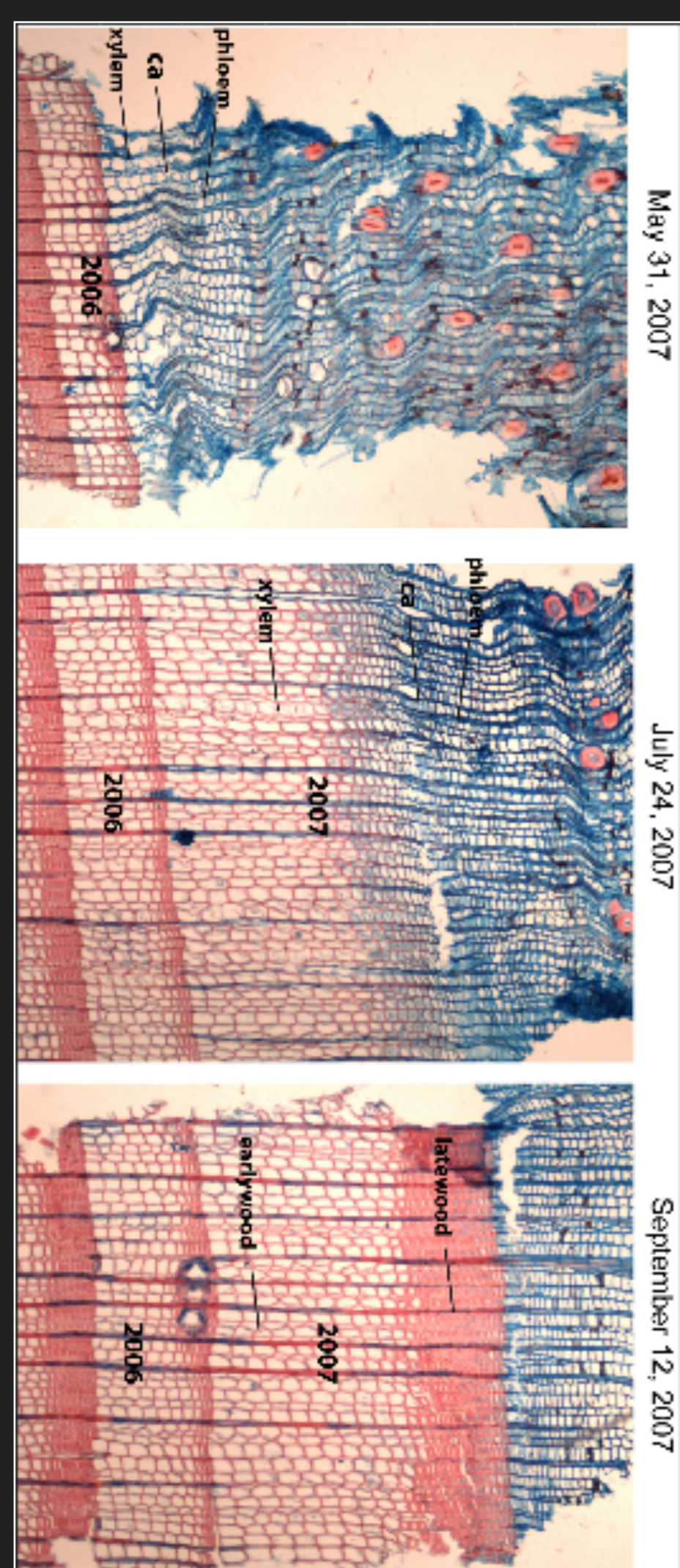4 trees per site and specie
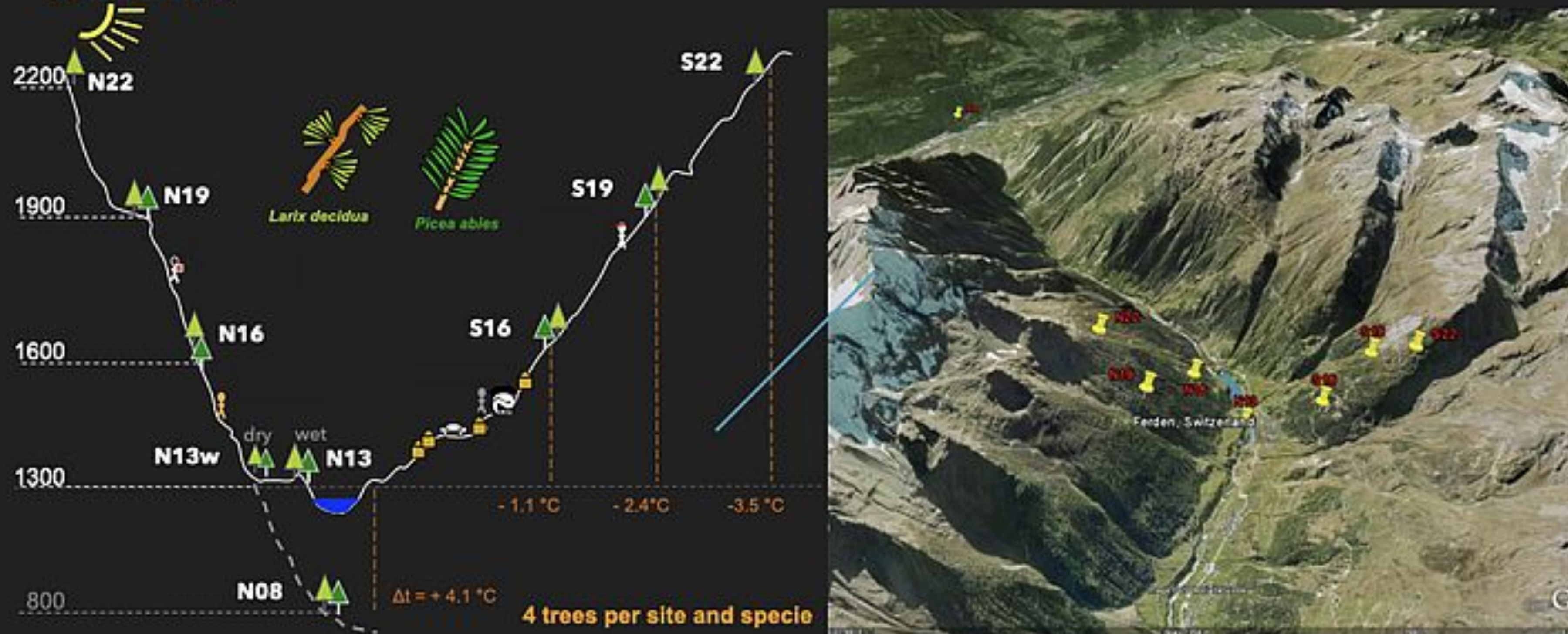
SITE COVERAGE

Site instrumentation

Example at the site S22. A Campbell CR1000 datalogger collect **sapflow** and **dendrometers** data a 15'-resolution from 4 larch. Additionally **temperature** and **moisture** of air (2 m height) and soil (10 and 60 cm deep), soil **matric potential** (10 and 60 cm deep) are collected. Data are sent to the WSL via modem. Logger and sensors are powered by a solar panel.
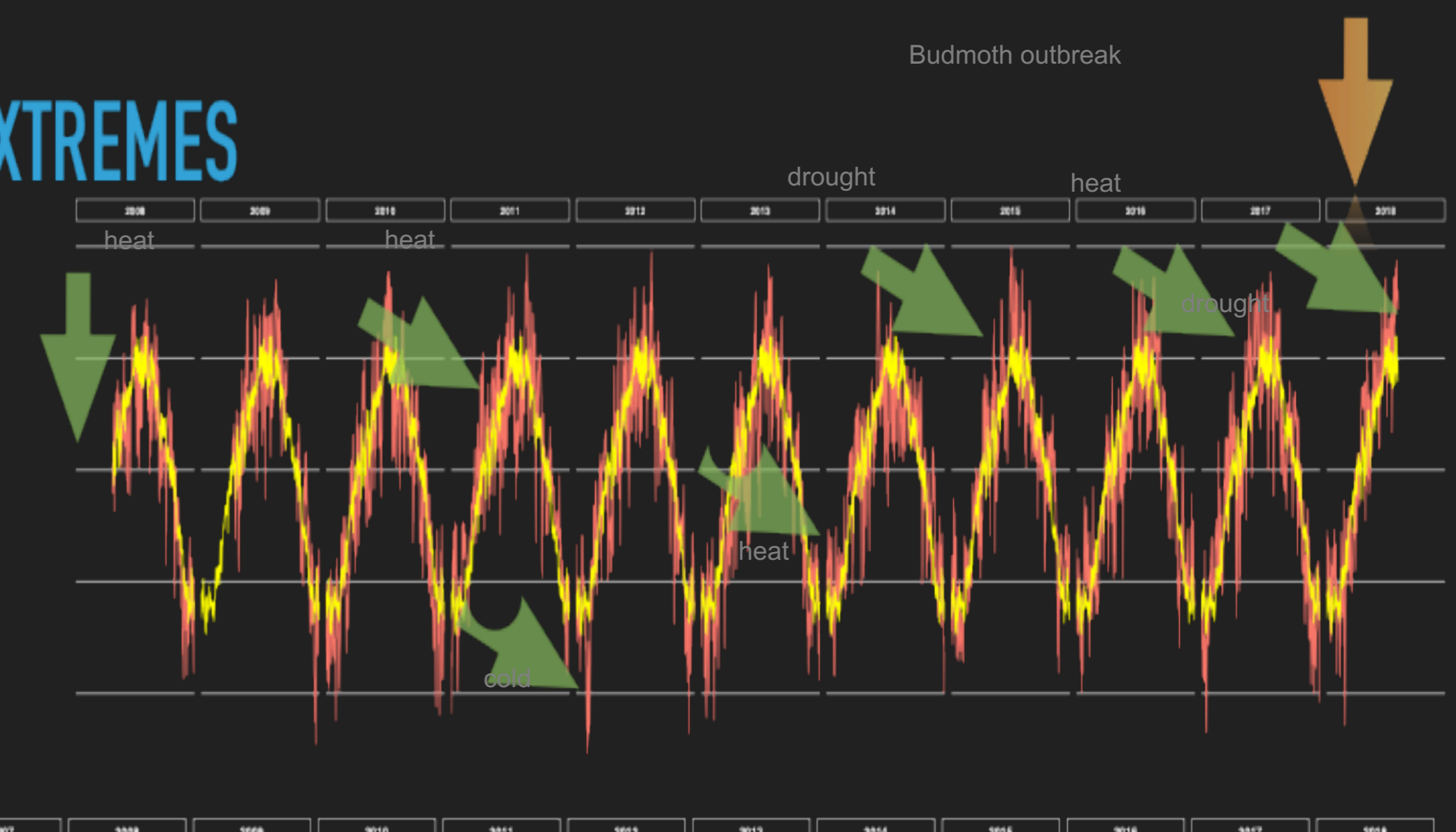

Timing wood formation

Weekly micro-coring uniquely allow to time wood formation processes (see below example for S22). This is fundamental to link environment to structure (see example on the left)
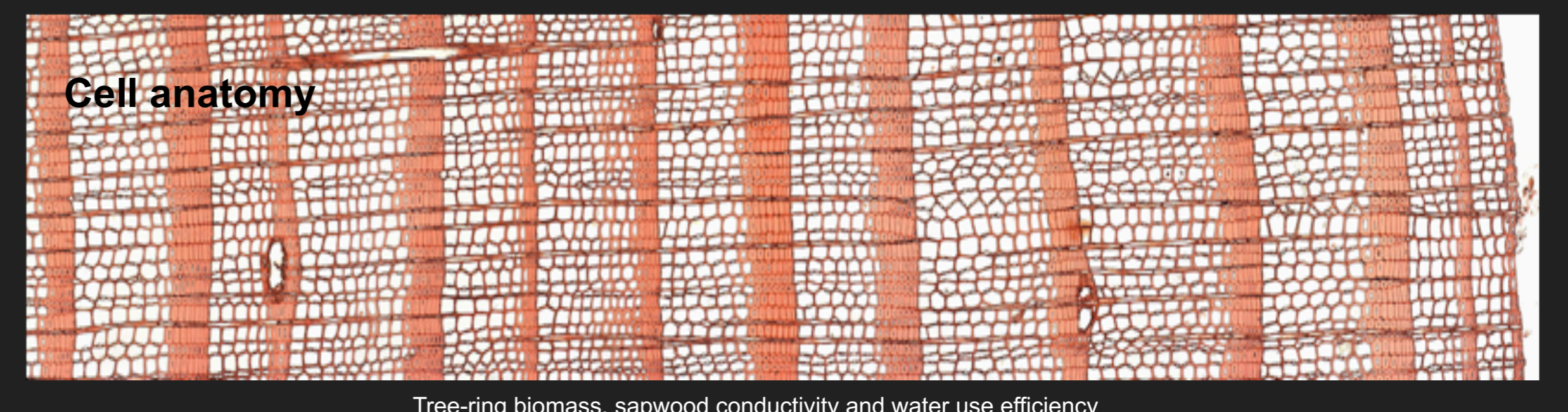

WEATHER & EXTREMES

Budmoth outbreak

drought   heat

heat

PHYSIOLOGY AND GROWTH

Stem size variations

STRUCTURE & FUNCTION PROPERTIES

Cell anatomy

Tree-ring biomass, sapwood conductivity and water use efficiency

Take-home message

The Lötschental monitoring transect, thanks to the elevational gradient, the weekly micro-coring, and the 14 years coverage, is a unique setting allowing to understand and investigate the impact of environmental change on high-resolution conifer tree growth. The collected dataset provide the basis to advance mechanistic understanding of growth sensitivity and provide relevant data to develop and/or test models.

We welcome collaboration! For more details on the setting and related outputs visit the Lötschental project website at
www.wsl.ch/en/tree-ring-research/the-loetschental-tree-growth-monitoring-transect.html