# TREENET

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Forest ecosystems represent globally the largest stock of terrestrial ecosystem carbon. Changes in this storage can be estimated with several methods, i.e. with: 1) **Dendrometers** or 2) with the **Eddy Covariance** method (EC). Dendrometers are a very cost-efficient method measuring a fraction of the forest C-budget (wood growth, DR). EC is a relatively expensive approach to measuring net CO_2-fluxes (net ecosystem productivity, NEP) over forests.

By combining the methods in the Davos forest, Zweifel et al. 2010 found that the relationship between NEP and DR is positive and linear ($R^2=0.85$) on an annual to monthly time scale. **We hypothesize that this relationship is valid for all European forests.**

EUROPEAN PROJECT

We are collaborating with PIs from several research sites within Europe to prove the mentioned hypothesis. More PIs should be included in this unique European project. Participation will continue to be open to any European site wishing to become part of this activity.
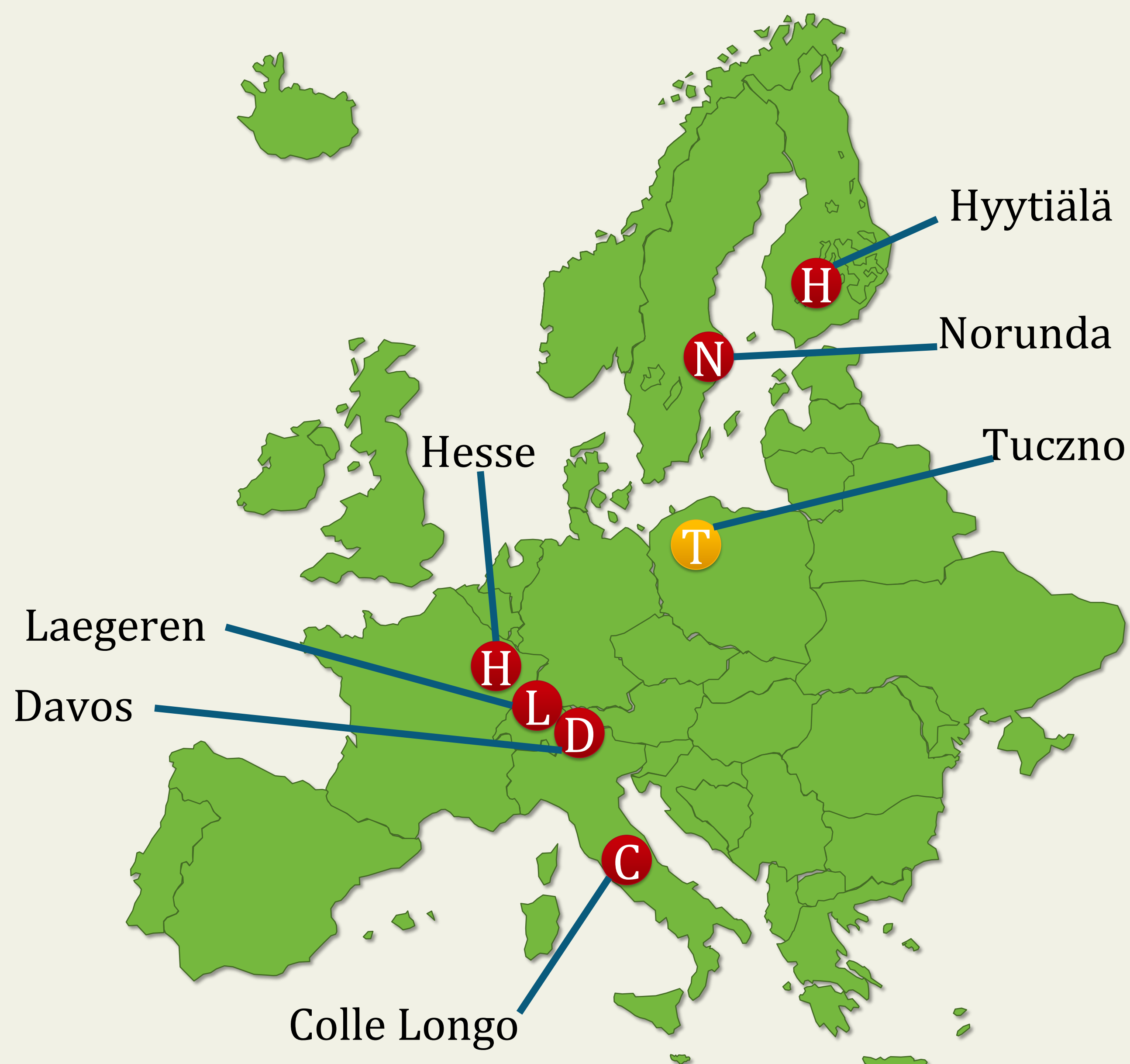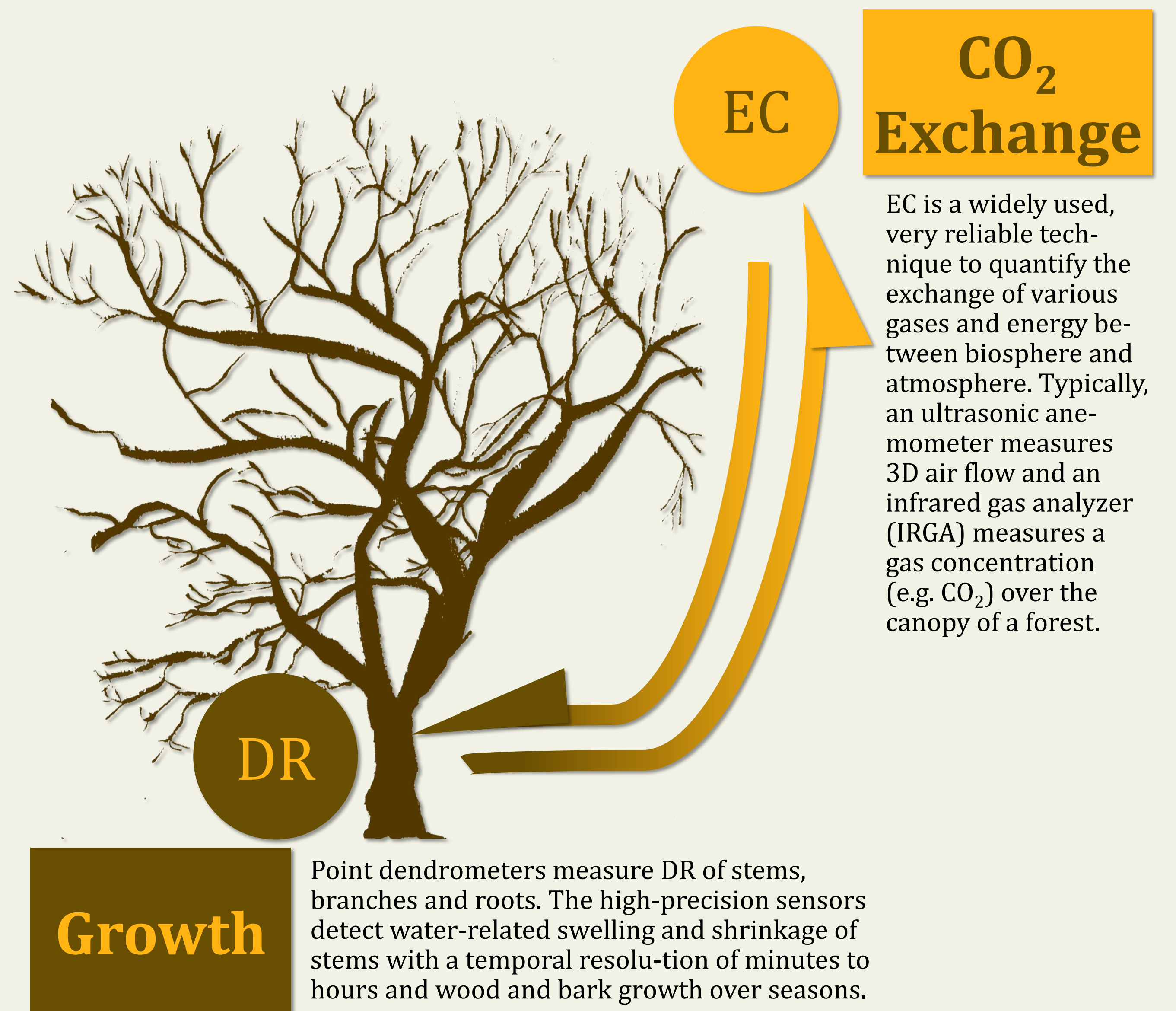

THIS POSTER

This poster shows preliminary results from the Tuczno forest in Poland, including meteorological data below. The following Fig. shows average 14-d temperature with 14-d minimum and maximum polygon (lines and shaded area), precipitation in monthly sums (bars)
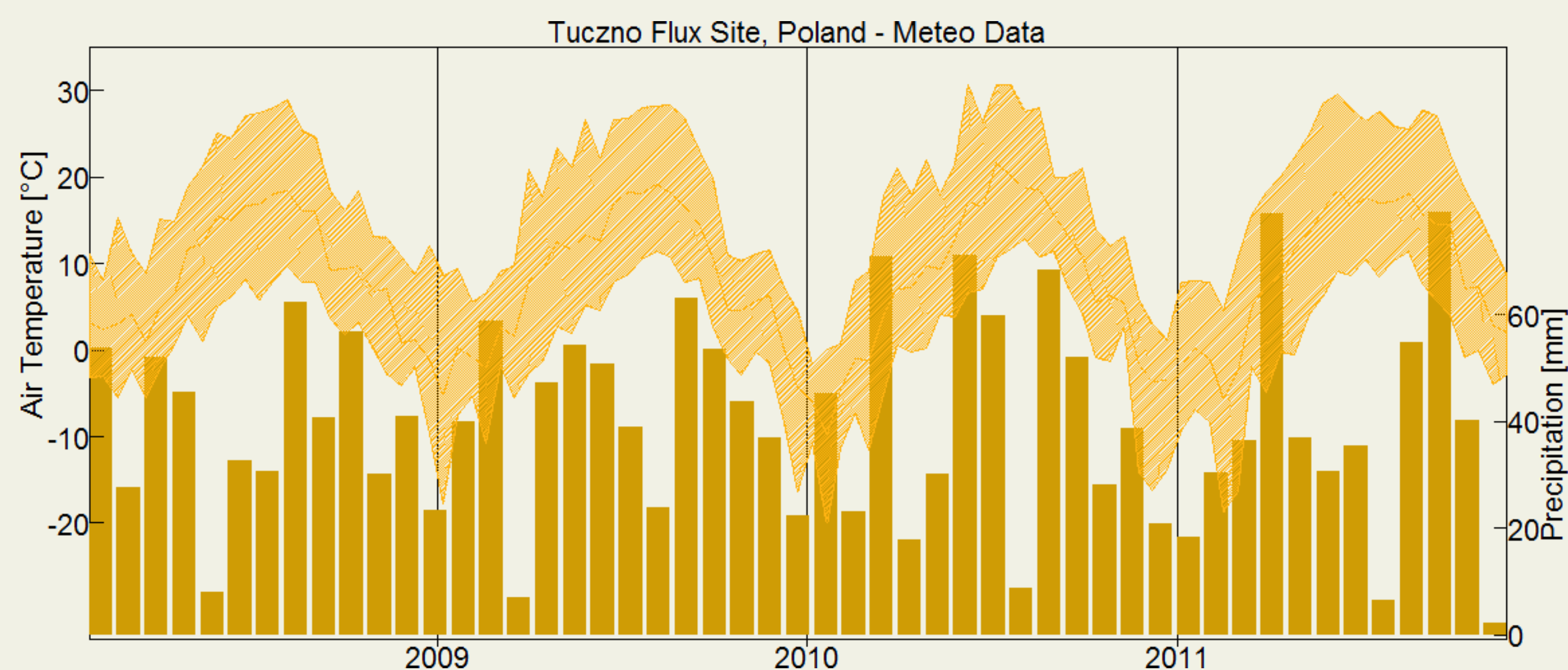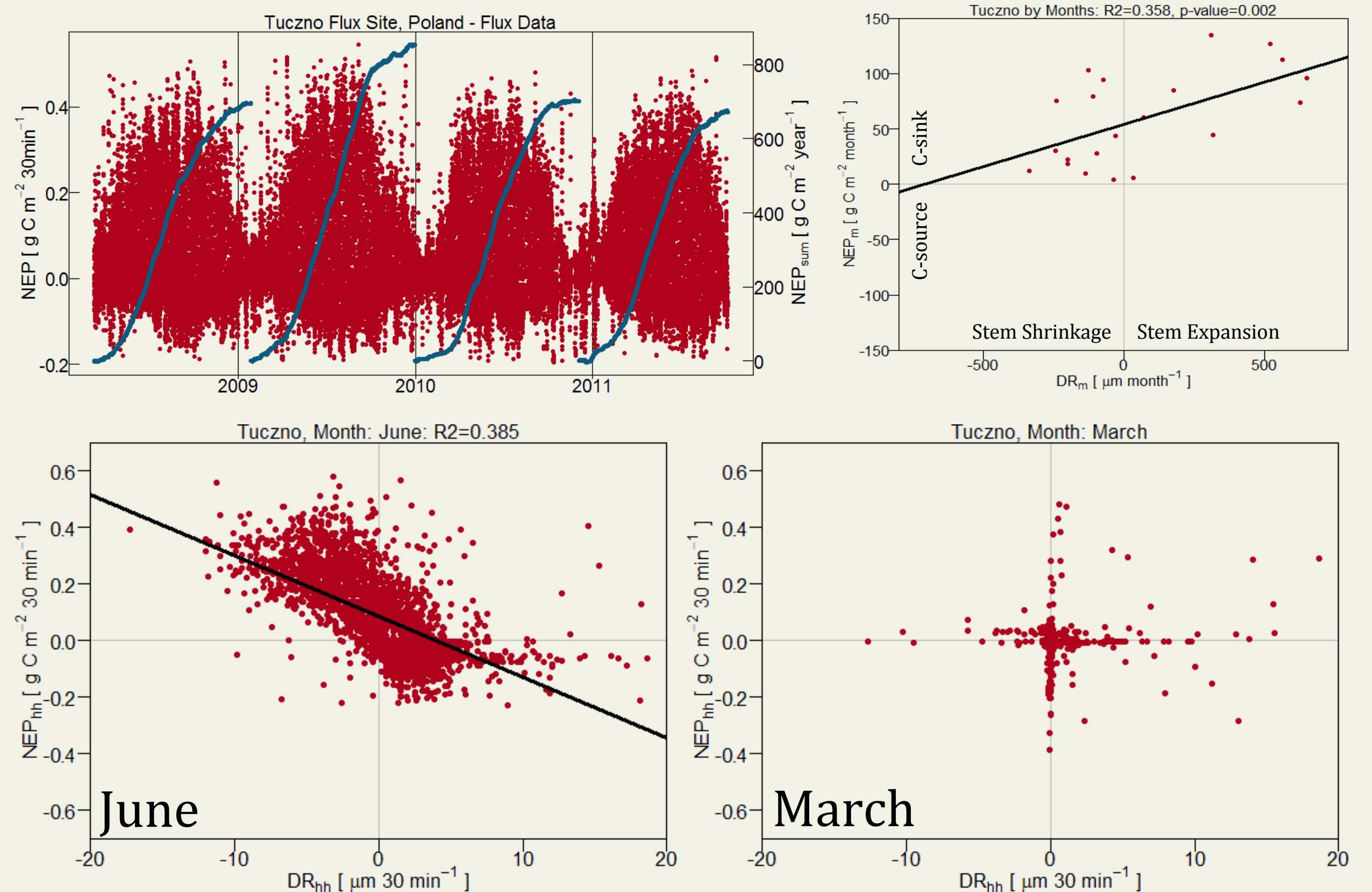

TWO METHODS – ONE LINK

Eddy Covariance (EC) measures net ecosystem productivity (NEP) and dendrometers measure individual tree's stem growth (DR):

CO$_2$ Exchange

EC is a widely used, very reliable technique to quantify the exchange of various gases and energy between biosphere and atmosphere. Typically, an ultrasonic anemometer measures 3D air flow and an infrared gas analyzer (IRGA) measures a gas concentration (e.g. CO_2) over the canopy of a forest.

Growth

Point dendrometers measure DR of stems, branches and roots. The high-precision sensors detect water-related swelling and shrinkage of stems with a temporal resolu-tion of minutes to hours and wood and bark growth over seasons.

FIRST RESULTS

The productive forest of Tuczno shows promising and conceptual similarities to what has been found at the Seehornwald, Davos. However, the regression qualities do not reflect the same good agreement. Top left: NEP [g C m^{-2} 30min^{-1}] and NEP$_{sum}$ [g C m^{-2} year^{-1}]. Top right: Comparison of NEP and stem radius changes in months, one month time shift. Bottom left and right: half hourly values in comparison (June/March).

CONCLUSIONS, NEXT STEPS

The preliminary results from Tuczno look very promising and go in a similar direction as the results from the Seehornwald, Davos. These results are preliminary only and are yet to be discussed and challenged. Next steps:

- Get in touch with responsible people to discuss collaboration from the following sites: Hesse, Hainich, Colle Longo
- Discuss and challenge the high productivity (>600 g C m^{-1} a^{-1})
- Continue analyses of received data (Norunda, Hyytiälä)
- Setup key figures to communicate first results from Laegeren