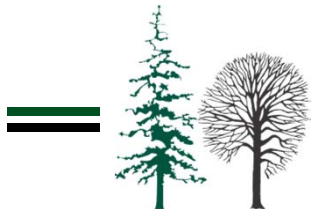


Decline of *Fagus sylvatica* on Trnovo plateau in southwest Slovenia

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Why beech on Trnovo plateau?

- Heavily industrialised areas in the vicinity
- Site is exposed to air masses coming from Mediterranean area (e.g. Genova cyclone)
- Large amount of precipitation
- High productivity site, yield should be high
- We observed decline of beech growth in the last years, we wanted to know reasons for that.

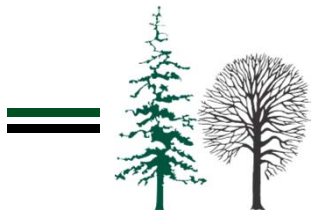


Main goals

The main goal of long-term monitoring of forest ecosystems is to document the current status and changes of the forest ecosystems.

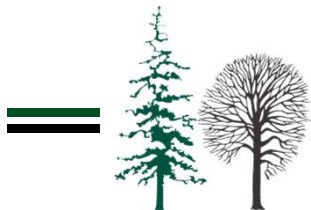
In this particular study we want to include different aspects of **Level II monitoring network**, with the aim to:

- Study causes and trends of *Fagus sylvatica* dieback and
- to evaluate if currently available time series of different parameters are long enough and sufficient to recognise causes and trends of identified *Fagus sylvatica* dieback.



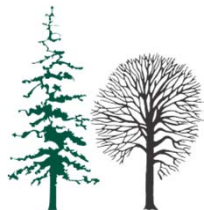
Material and methods

- Crown condition assessment of more than 100 beech trees; yearly from 2003 onwards
- Foliar samples; bi-yearly from 2005
- Deposition measurements (bulk, throughfall and stemflow deposition); since 2003, every 28-days
- Ozone injuries on vegetation were monitored
- Ozone measurements; during the growing season since 2005 with passive samplers
- Radial increment measured with manual girth bands; monthly, since 2009

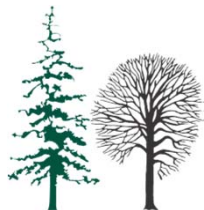
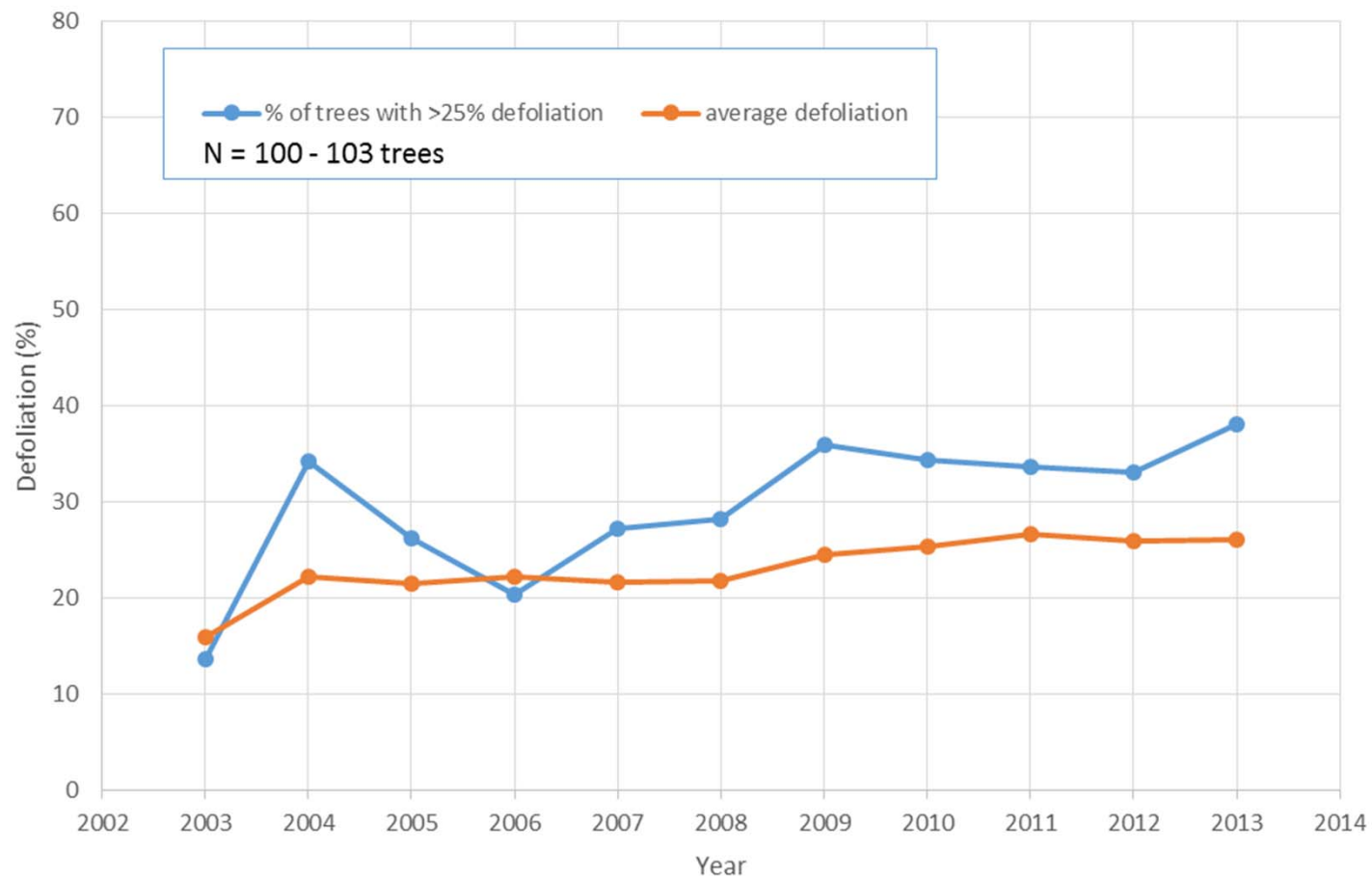


Results

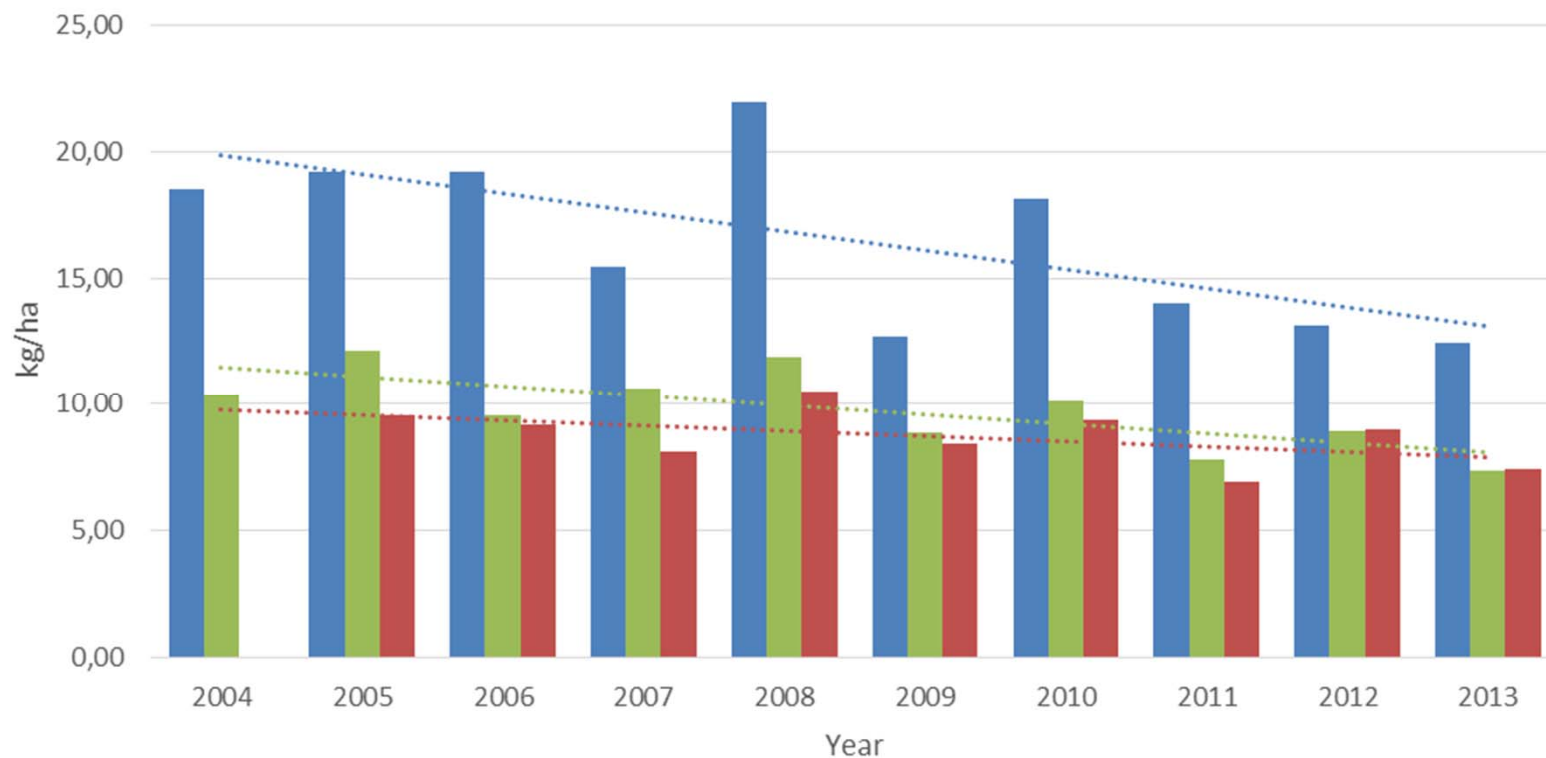
- Defoliation of beech trees in Level II plot Trnovo is slowly increasing since 2004
- Since 2004 the rate of nitrogen bulk deposition is decreasing for a quarter of the value in 2004, but is still very high - 15 kg of N/ha.
- Both sulphur and nitrogen throughfall deposition is in stagnation.
- Comparing to other four *Fagus sylvatica* Level II plots the yearly increment is half of the value.
- The mass of the leaves decreased from 10 to 50 % in ten years.
- The passively measured ozone concentration was in the year 2013 in the range of 50 to 95 $\mu\text{g}/\text{m}^3$ and indeed the ozone injuries on vegetation were detected.



Defoliation on plot Fonddek

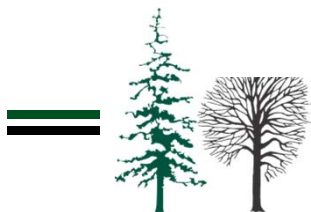


Nitrogen bulk deposition



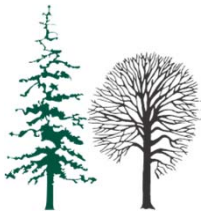
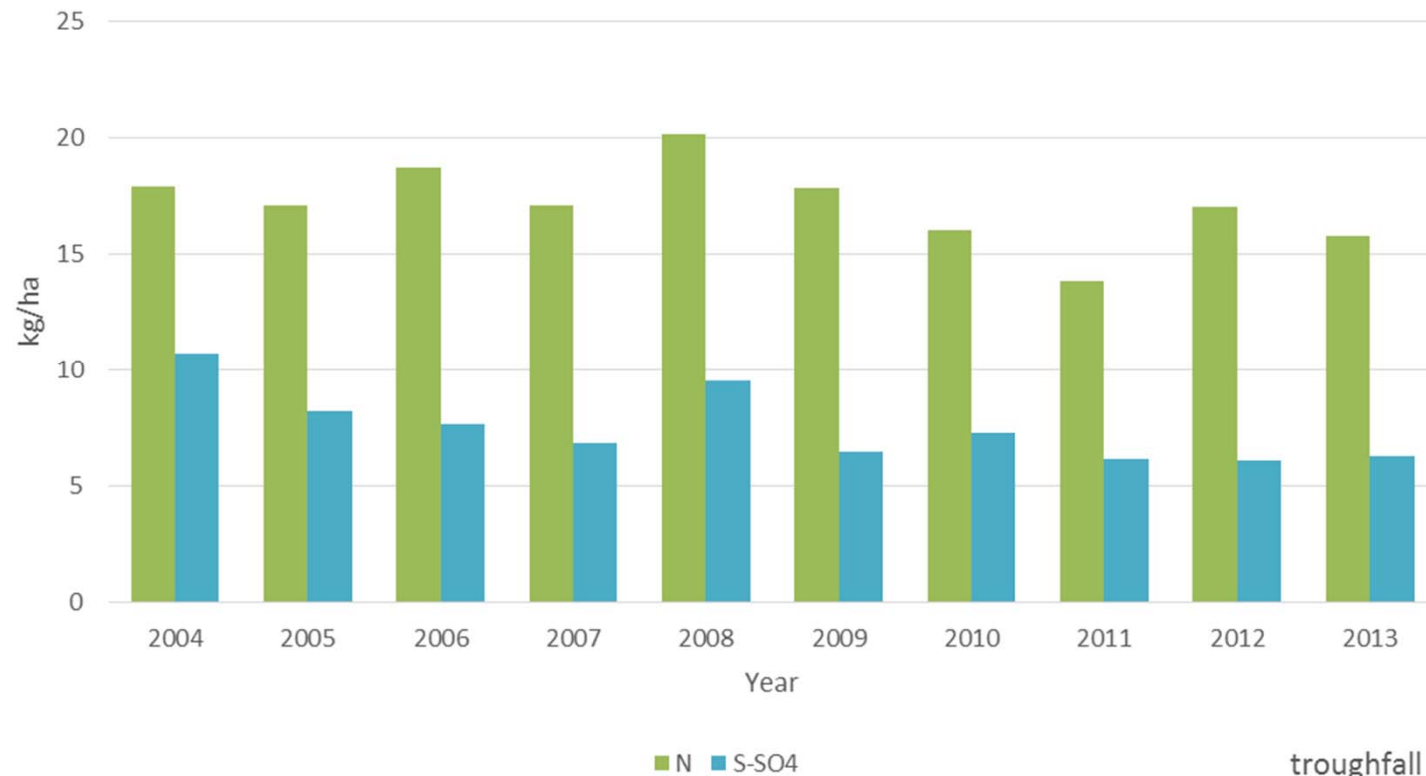
■ Fondek ■ Borovec ■ SFI-Rožnik

bulk

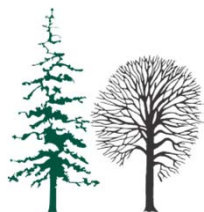
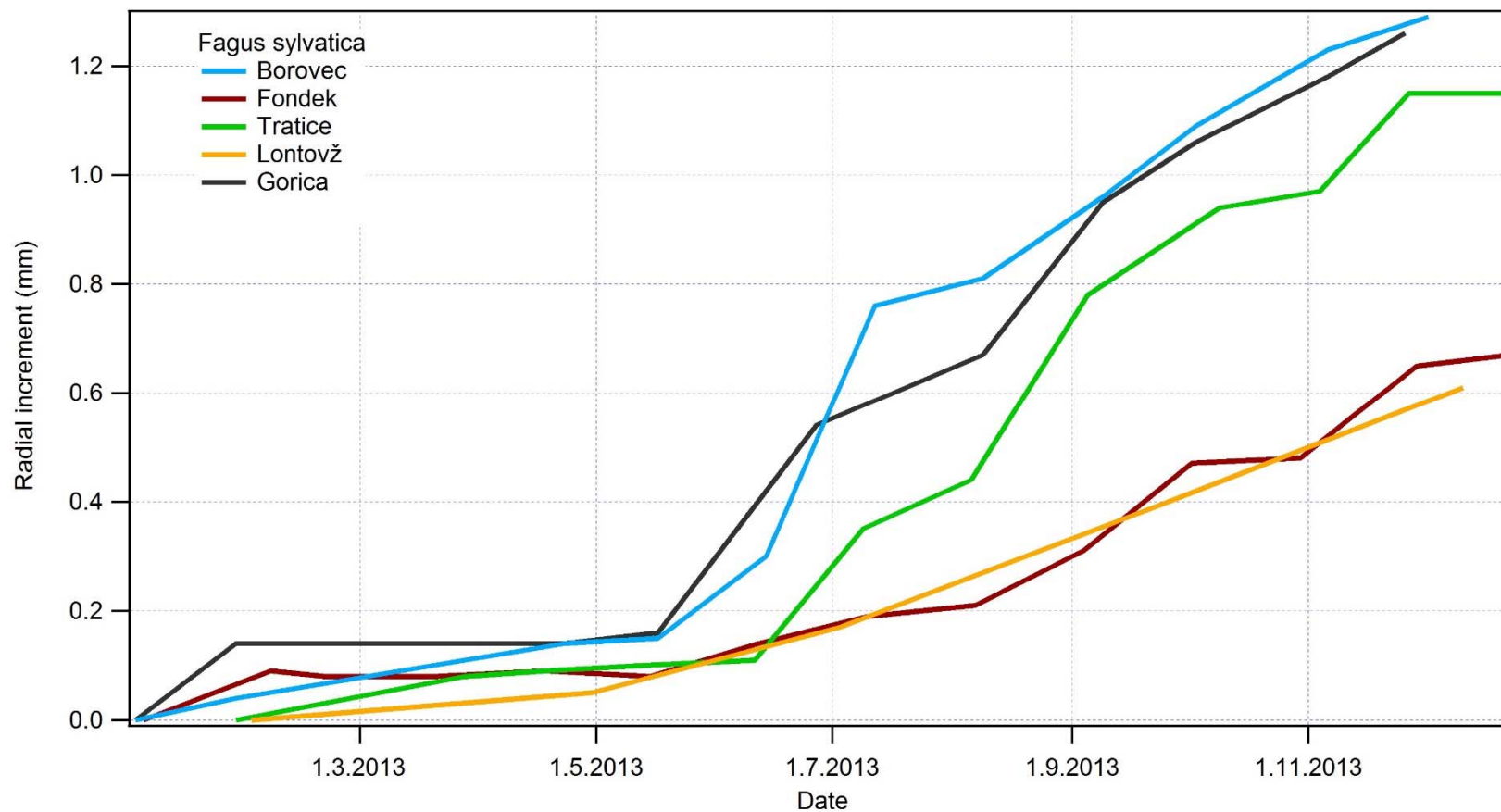


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Sulphur and nitrogen throughfall deposition

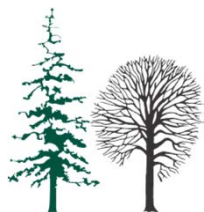
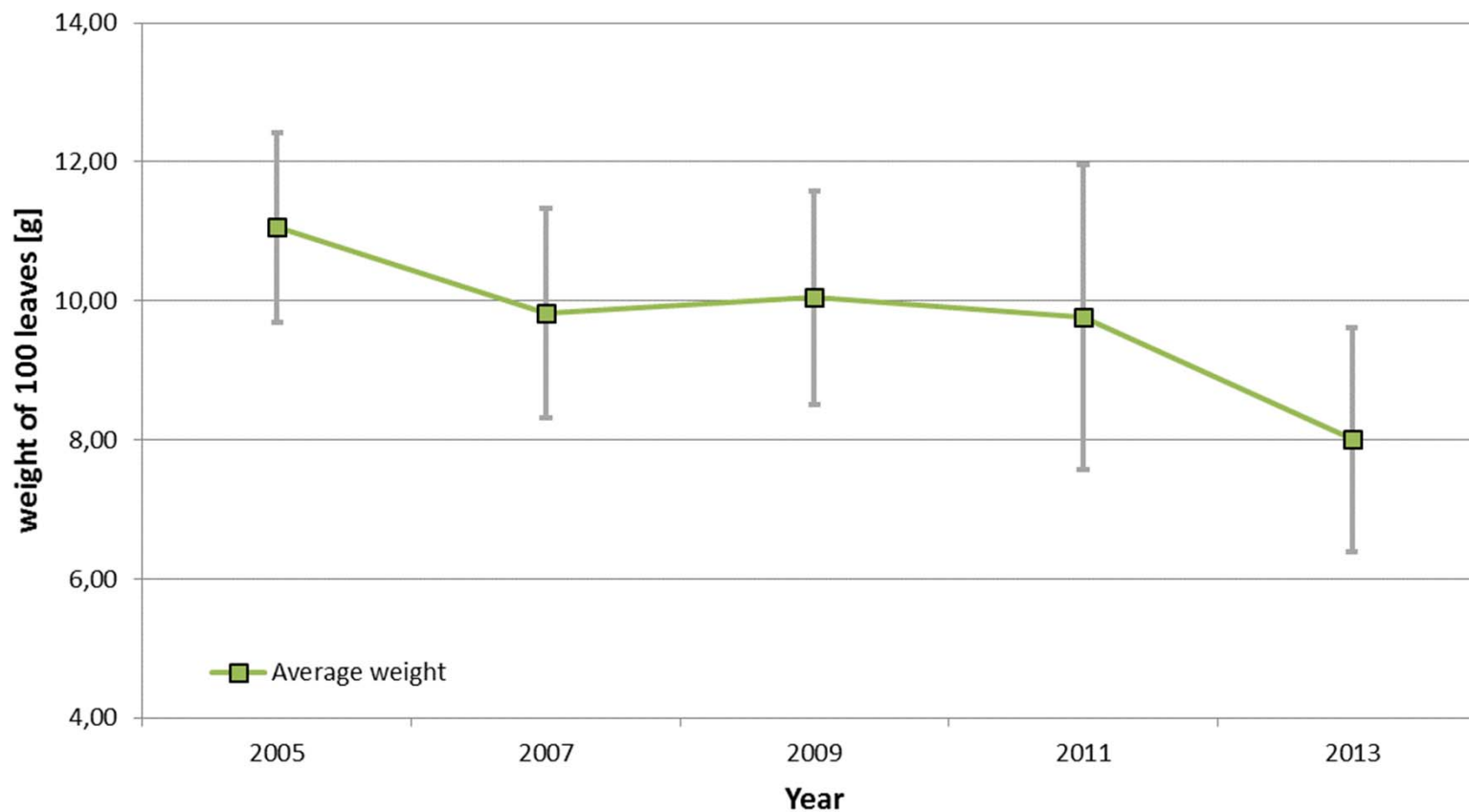


Radial increment



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Mass of the leaves

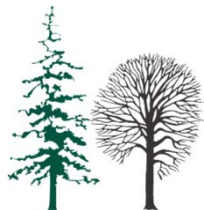


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Ozone concentrations and injuries



Photo: Matej Rupel, SFI



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Conclusions

- Defoliation of beech trees in Level II plot Trnovo is slowly increasing since 2004
- Nitrogen bulk deposition is decreasing for a quarter of the value in 2004 per year, but is still very high - 15 kg of N/ha.
- Sulphur and nitrogen throughfall deposition is slowly decreasing.
- Comparing to other four *Fagus sylvatica* Level II plots the yearly increment is half of the value.
- The mass of the leaves decreased from 10 to 50 % in ten years.
- Ozone concentrations are relatively high and in 2013 we observed ozone injuries on vegetation for the first time

