



# Asa study – Ozone impacts on stem increment growth of Norway spruce

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A study using Norway spruce relative stem basal area increment growth from 10 plots around Asa 1993-2001

Wet

## Asa experimental forest

- 1 Weekly DBS, 10 plots, 5 trees/plot, Norway spruce.
- 2 Hourly instrument [ $O_3$ ], 5m.
- 3 Meteo measurements
- 4 air temp/RH, wind sp./dir, radiation
- 5 Soil moisture at plots, weekly (gypsum blocks)
- 6 Plots in a soil moisture gradient, within 3 km from the ozone/ meteo monitoring

6

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Young

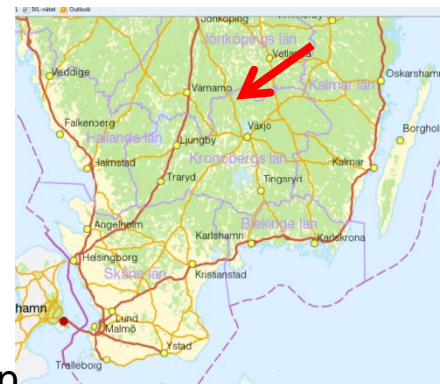
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Young, irrigation

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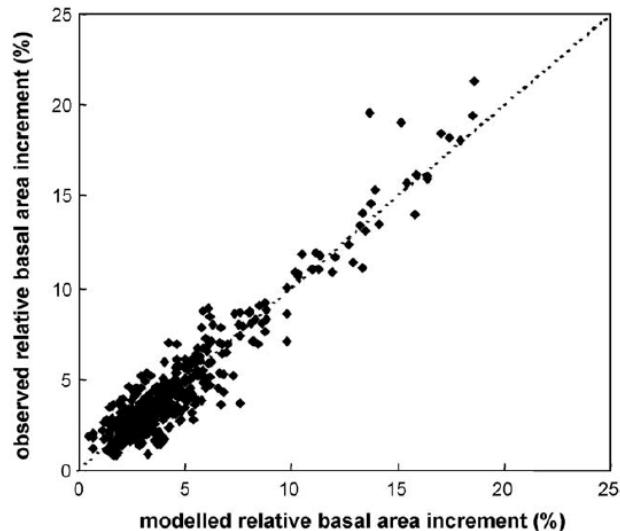
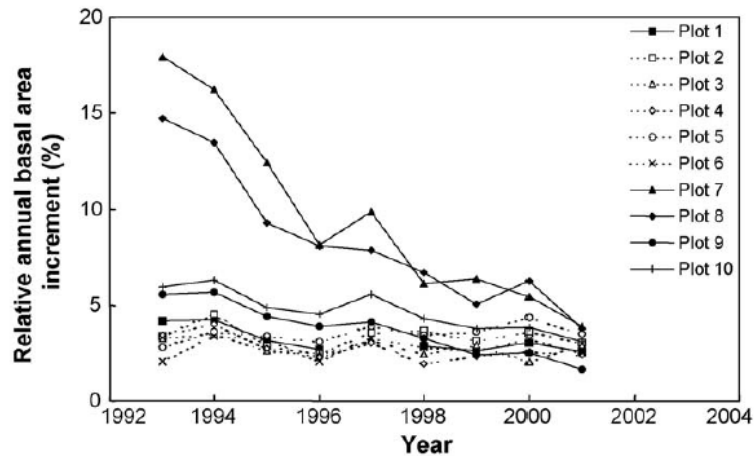
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Limed





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Multiple regression analysis with a special consideration of co-linearities

Variable	Estimate	S.E.	DF	<i>t</i> -Value	<i>p</i> -Value
Intercept	-3.9408	1.4038	365	-2.81	0.0053
Stand_BA	1.1608	0.04462	365	26.02	<0.0001
Temp_Sum	0.004715	0.000760	365	6.20	<0.0001
SWP_<1	-0.04589	0.008846	365	-5.19	<0.0001
AOT40	-0.00012	0.000039	365	-3.06	0.0024
VPD	5.8213	2.5270	365	2.30	0.0218
Prec_Sum	-0.00310	0.002931	365	-1.06	0.2914
Radiation_Sum	-0.00092	0.000637	365	-1.44	0.1508

The relative annual basal area increment was used as the response variable. The  $r^2$  for the total model was 0.91. Variables are explained in Table 2.

## Overall conclusions:

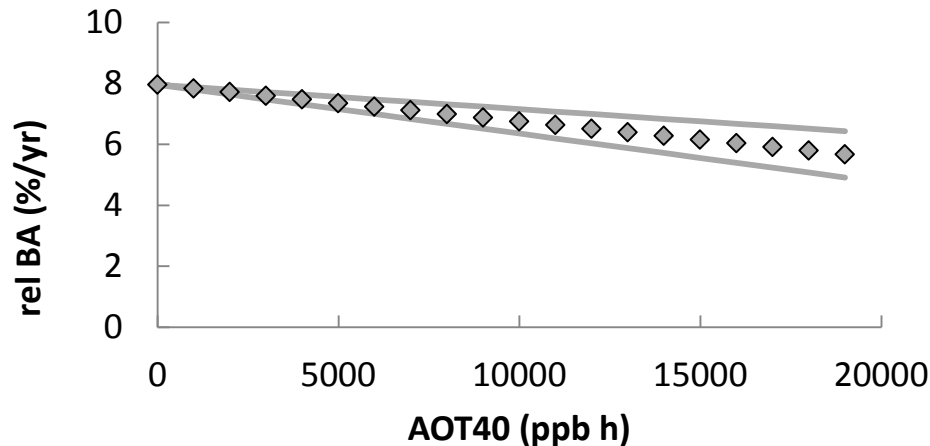
**Yes**, there is a significant, negative impact of ozone on stem growth.

**No**, these results should not be used for quantitative assessments. However ....



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Asa stem increment growth

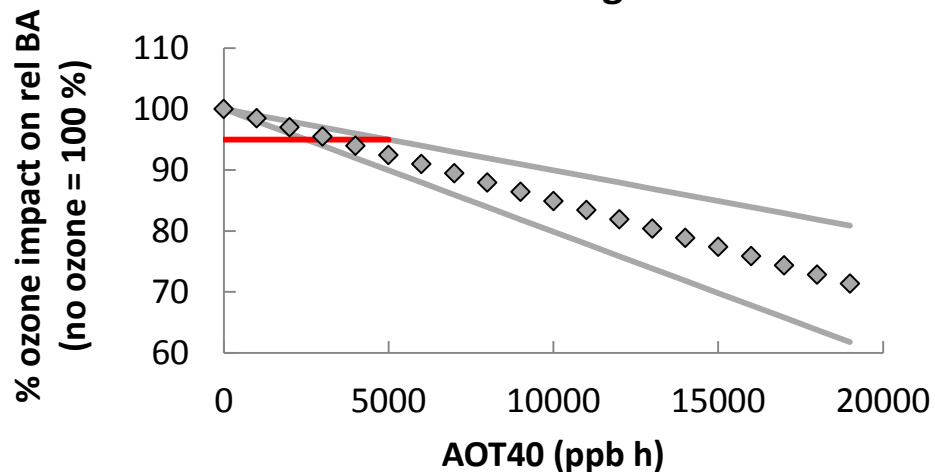


## Overall conclusions:

Low estimate 5 %  
growth reduction at  
5000 ppb h.

Ongoing extended  
study, analyzing data  
1993-2012

Asa stem increment growth



All other explanatory  
variables set at mean value.