



FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY



HNE
Eberswalde

Hochschule für nachhaltige Entwicklung (FH)

The Emissions of CO₂ in a Energy Wood Plantation compared to Grassland

- Introduction to Short Rotation Coppice
- How to measure CO₂ soil effluxes?
- Results
- Data Analysis with SPSS
- Outcome
- Outlook

What is Short Rotation Coppice?

Agricultural production of wooden biomass

What is Short Rotation Coppice?



Short Rotation Coppice

- Pellets, Woodchips, Biofuels (still in progress)
- Rotation cycles of 2 to 10 years
- Threshold for rentability ca. 8 tons/ha/a
- Willow and Poplar are common in Europe
- Agricultural harvesting methods

CO₂ Soil Effluxes

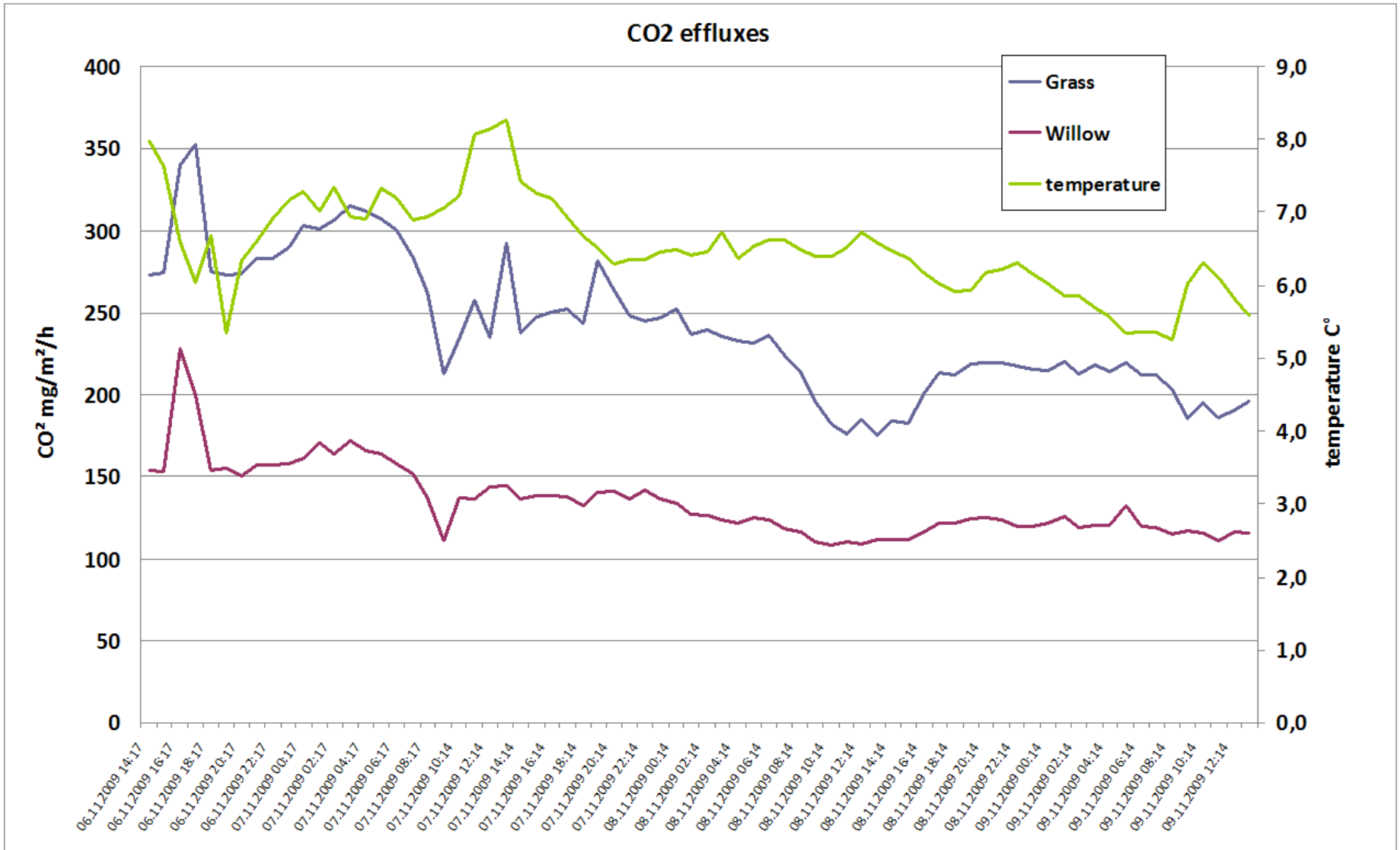
- Big scale climate control
- 98 billion t/a*
- How to measure?

*Bond-Lamberty, Ben; Thomson, Allison (2010): Temperature-associated increases in the global soil respiration record. In *Nature* 464 (7288), pp. 579–582.

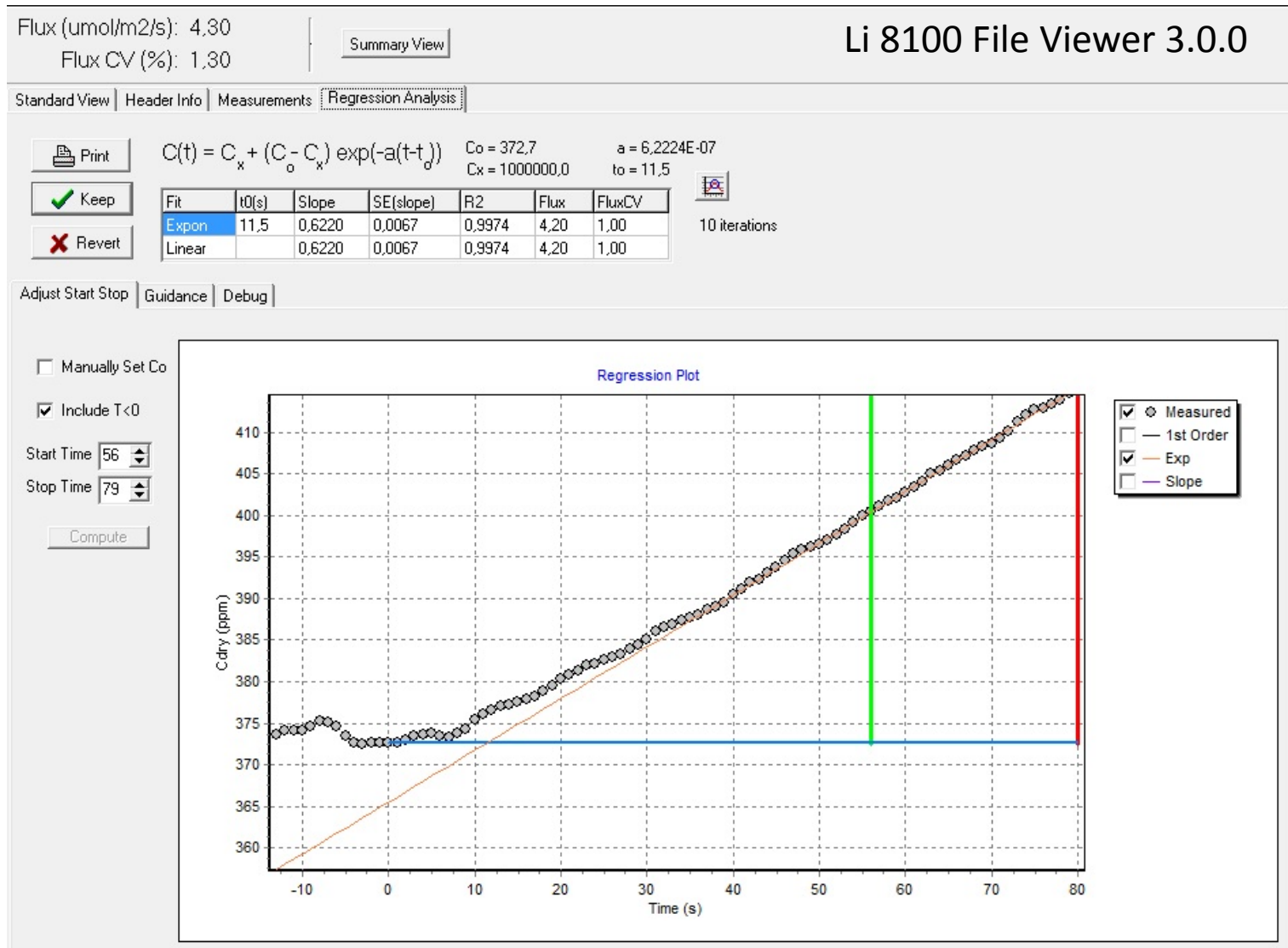
Measuring CO₂ Soil Effluxes



Results



Results from Li-cor Software



Data analysis with SPSS

- Sort and filter
- Description of the data
- Environmental data – should be normal distributed
- ANOVA
- Applied-test: LSD, Tukey's, Student-Newman-Keuls

Data analysis with SPSS - post-hoc tests

- LSD – least square distance of two group means
which could be significant
- Tukey's test - compares the means of every
treatment to the means of every other
treatment
- Student-Newman-Keuls-test – stepwise
significance testing

Data analysis with SPSS - Outcome

- data of grass plots is normally distributed
- ANOVA used anyway – close to ND
- all post-hoc tests gave same result

Data analysis with SPSS - Outcome

Multiple Comparisons

Dependent Variable: Exp_Flux

	(I) Port#	(J) Port#	Mean Difference (I-J)	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
LSD	1	3	,23889*	,000	,1657	,3121
		5	,82319*	,000	,7500	,8964
		7	,75417*	,000	,6809	,8274
	3	1	-,23889*	,000	-,3121	-,1657
		5	,58431*	,000	,5111	,6575
		7	,51528*	,000	,4421	,5885
	5	1	-,82319*	,000	-,8964	-,7500
		3	-,58431*	,000	-,6575	-,5111
		7	-,06903	,065	-,1423	,0042
	7	1	-,75417*	,000	-,8274	-,6809
		3	-,51528*	,000	-,5885	-,4421
		5	,06903	,065	-,0042	,1423

*. The mean difference is significant at the 0.05 level.

IBM SPSS 20

Outlook

- Contribution to further research
- more data – more statistics
- development of optimal measurement pattern