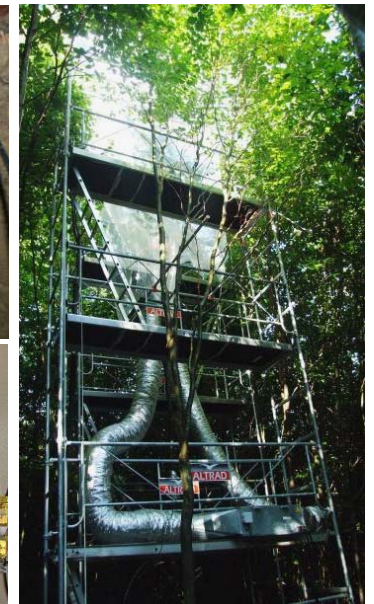




# Daily work with stable isotope spectroscopy instruments in Hesse forest

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## Calibration



$^{12}\text{CO}_2$	$^{13}\text{CO}_2$
293.2	3.2
392.9	4.2
395.3	4.3
494.7	5.3
681.6	7.3
886.2	9.5
1183.6	12.7



### → TGA 100 (Campbell)

- ✓ lead salt laser diode, LN2 cooled
- ✓ wave numbers between 2280 and 2310  $\text{cm}^{-1}$  ( $\approx 4.33 \mu$ )

### → Working standards

- ✓  $\text{CO}_2$  in synthetic air ( $\text{N}_2$ ,  $\text{O}_2$ , Ar)
- ✓ 0.5% certified for  $[\text{CO}_2]$
- ✓ Analysed every 2-6 months by IRMS (calibrated against IAEA reference materials)
- ✓ 3 standards are measured prior each sample for 50 s (first 30 s are discarded)

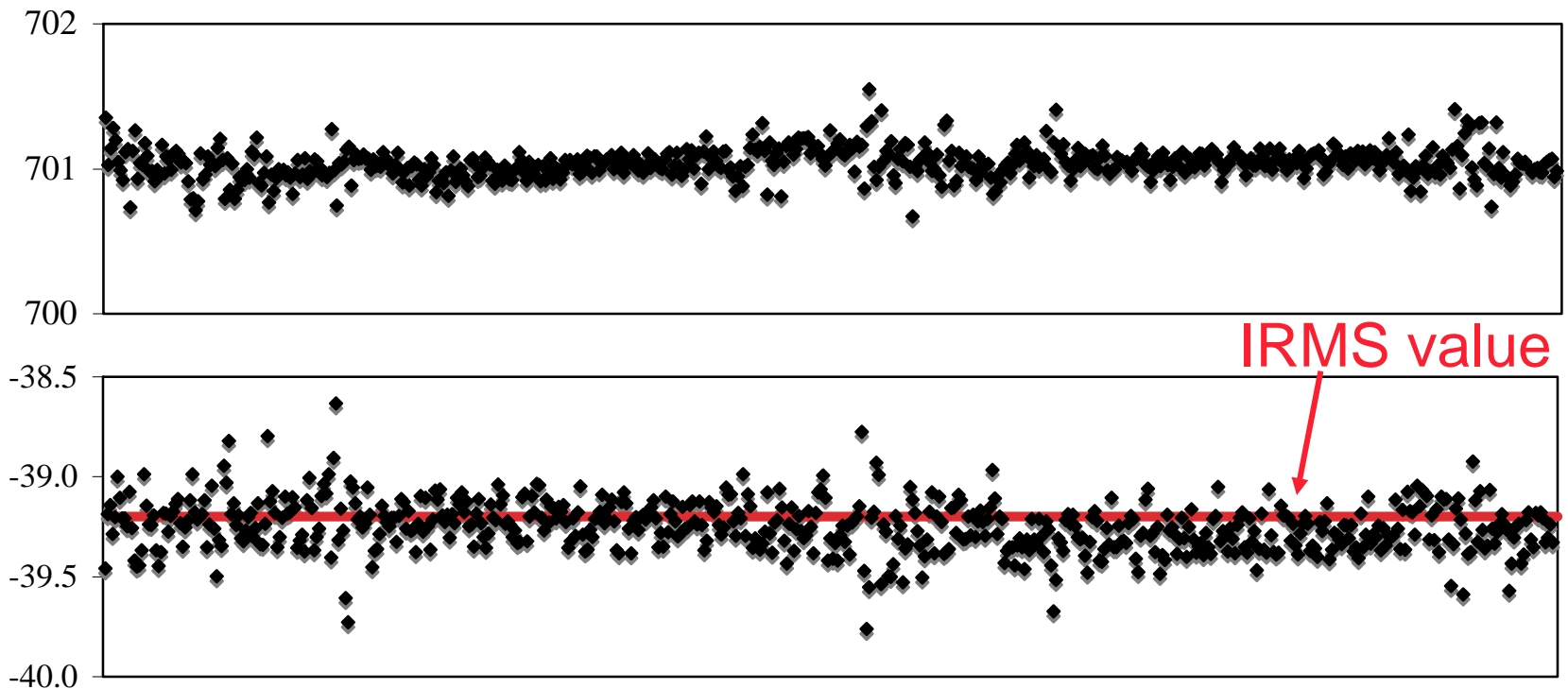




## Data quality

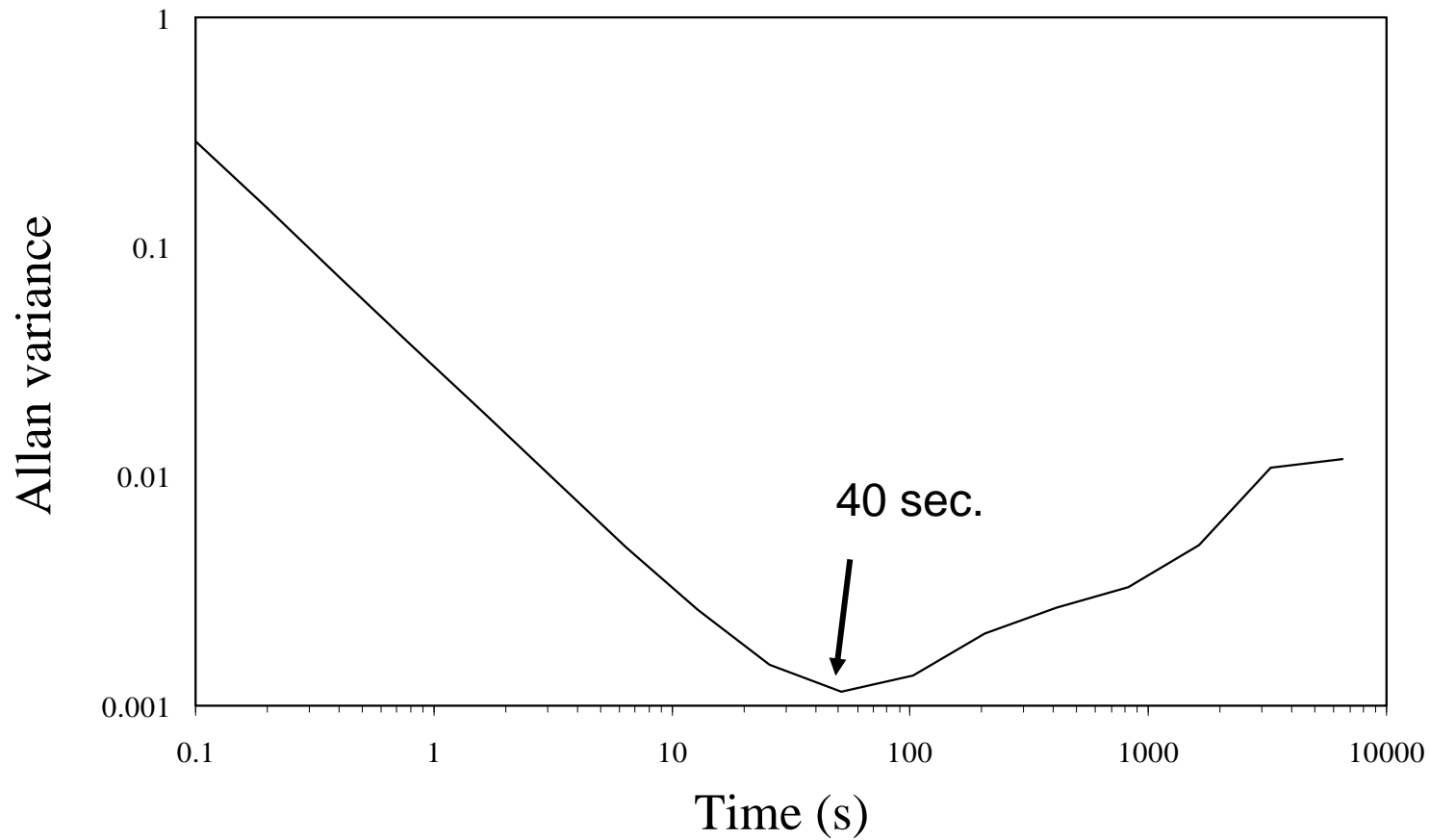
→ One 'unused' standard measured for 48 h hours every 5 minutes after measuring 2 calibration standards

$^{12}\text{CO}_2$	$^{13}\text{CO}_2$
693.59	7.450
0.10	0.001



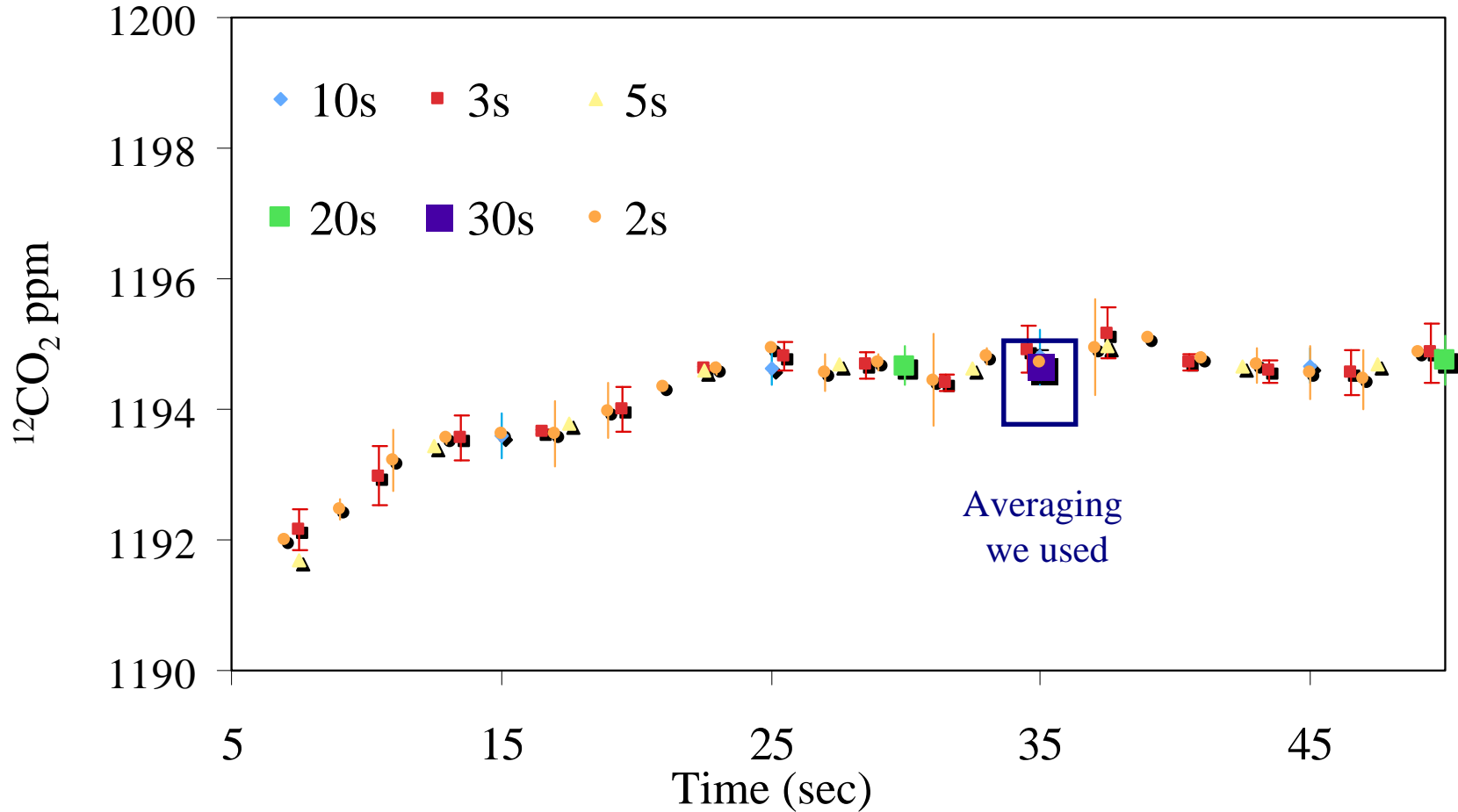


# Allan variance



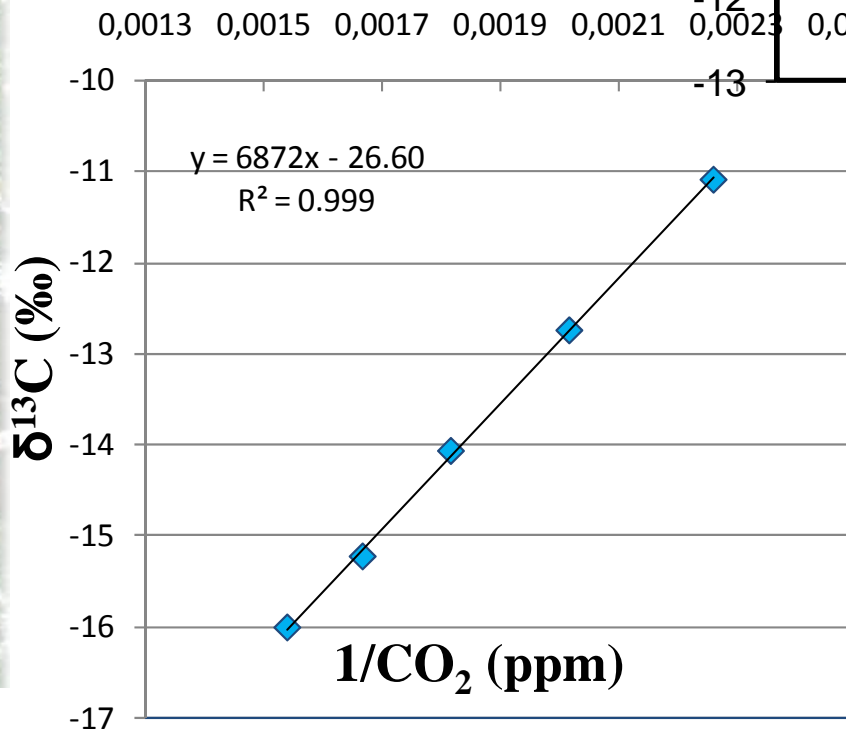
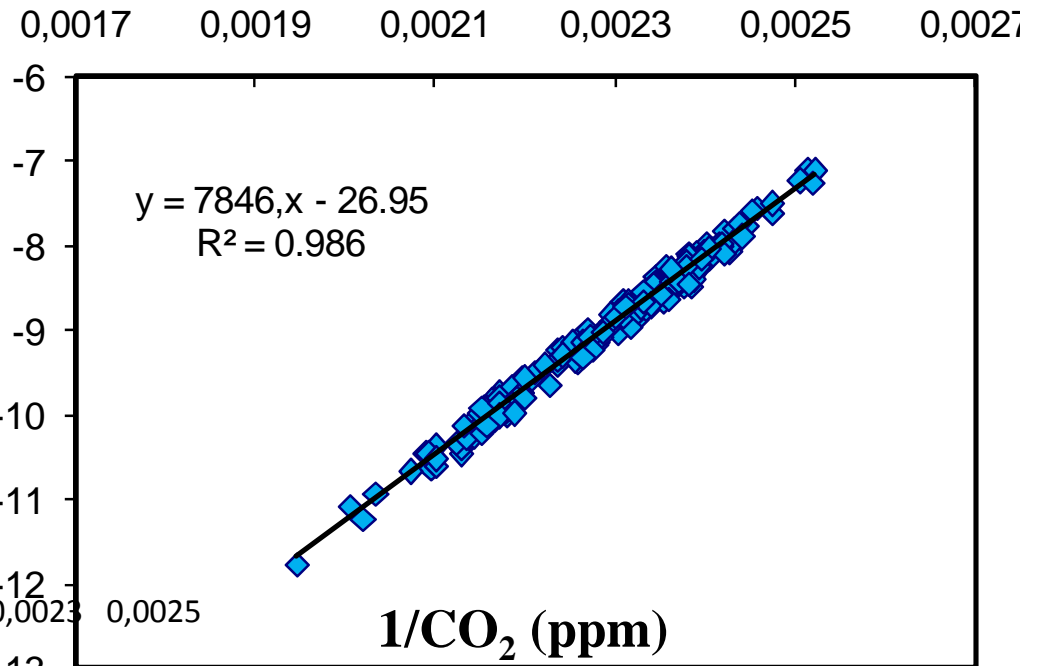


# Averaging time





# Comparison



➔ Keeling plots after passive accumulation of  $\text{CO}_2$  in the respiration chamber (IRMS) compared to Keeling plot at the inlet of the chamber at night (TDLAS)



## Comparison

→ Comparison of soil gases measured by IRMS and by TDLAS (TGA100)

