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Daily work with stable isotope spectroscopy instruments in Hesse forest

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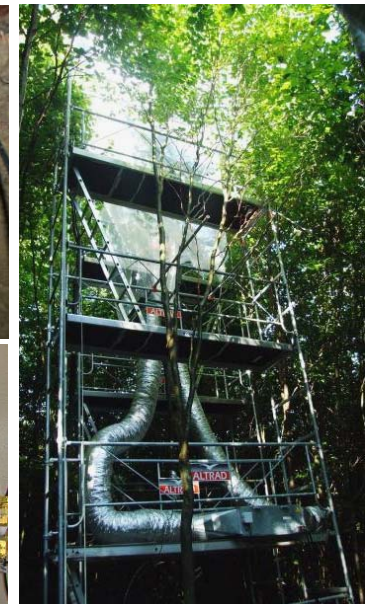
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Calibration



$^{12}\text{CO}_2$	$^{13}\text{CO}_2$
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 cm^{-1} ($\approx 4.33 \mu$)

→ Working standards

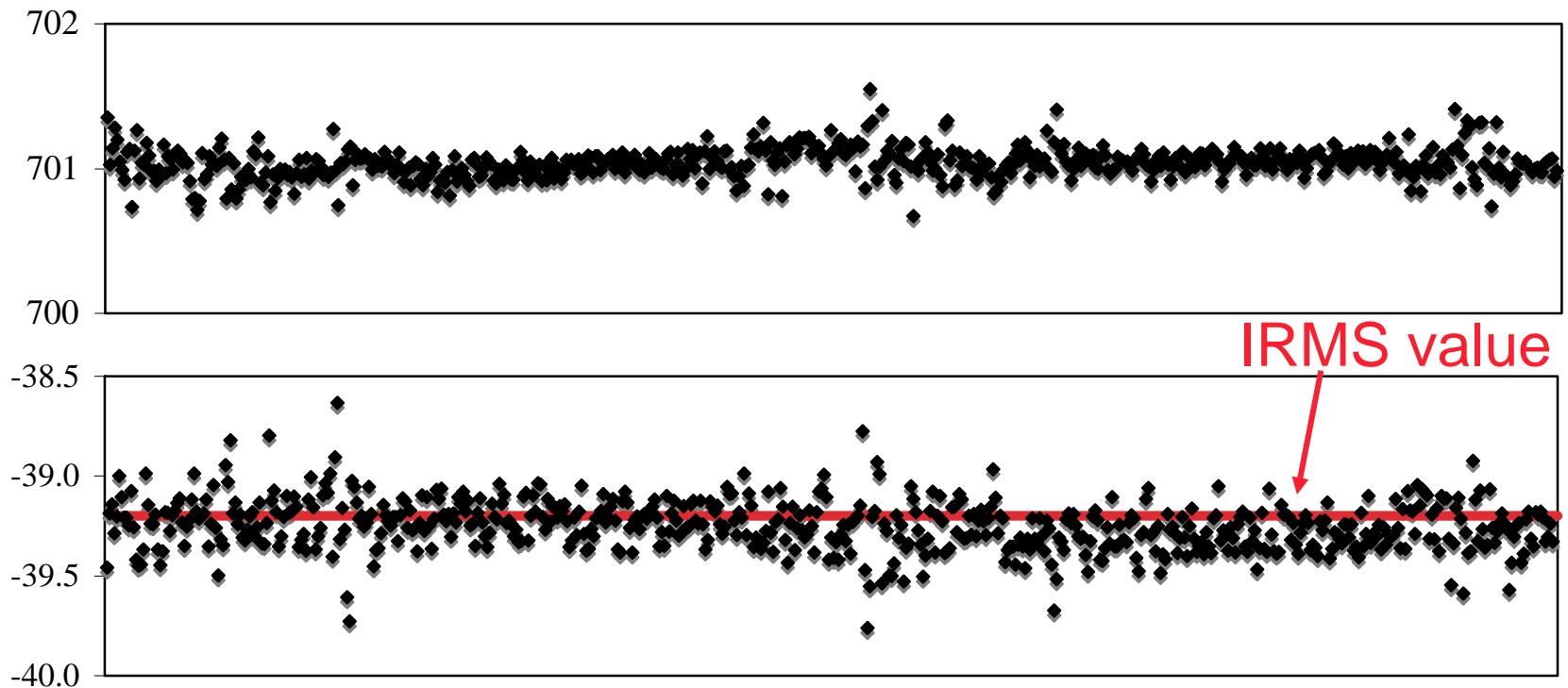
- ✓ CO_2 in synthetic air (N_2 , O_2 , Ar)
- ✓ 0.5% certified for $[\text{CO}_2]$
- ✓ Analysed every 2-6 months by IRMS (calibrated against IAEA reference materials)
- ✓ 3 standards are measured prior each sample for 50 s (first 30 s are discarded)



Data quality

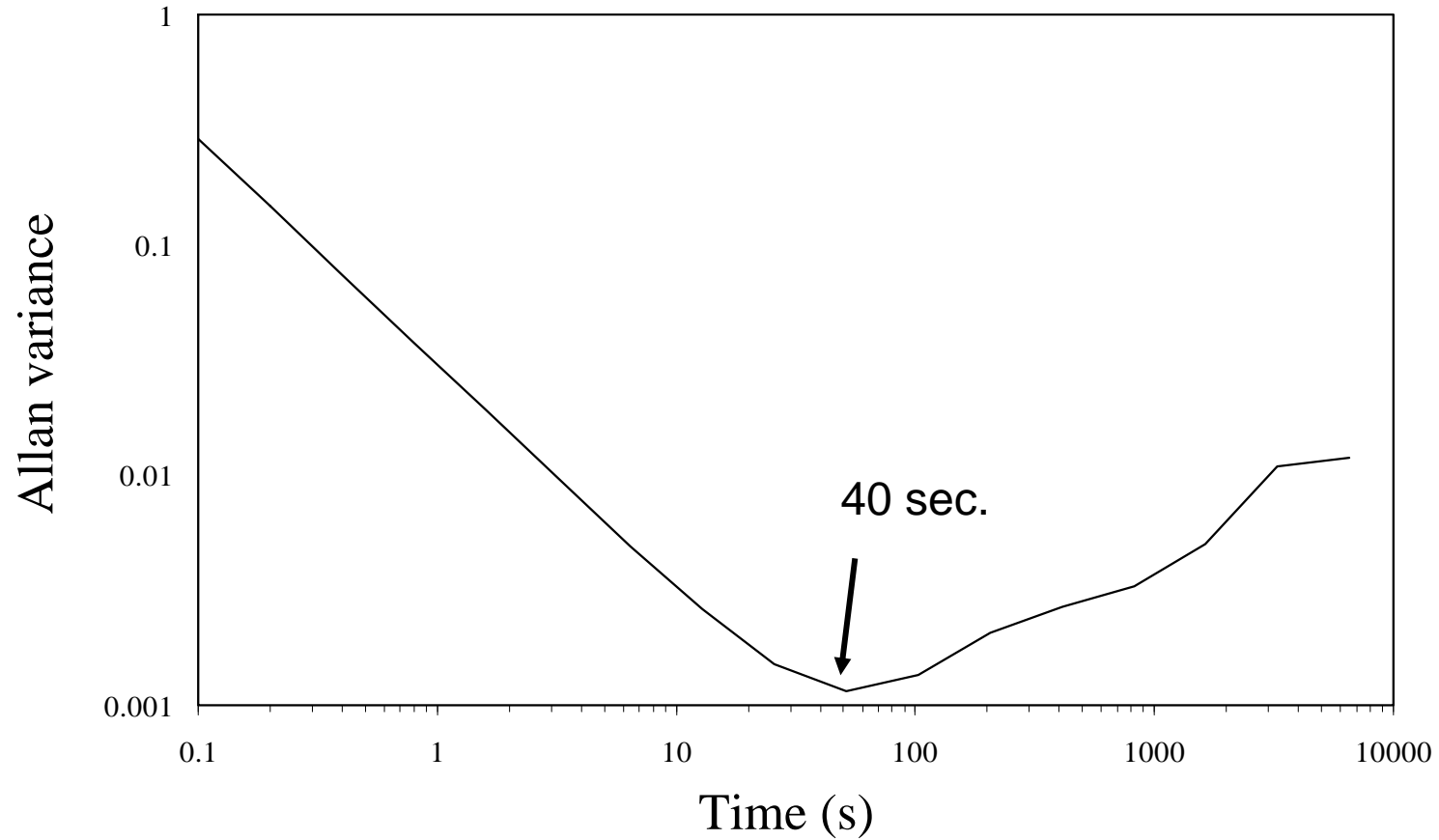
→ One 'unused' standard measured for 48 h hours every 5 minutes after measuring 2 calibration standards

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



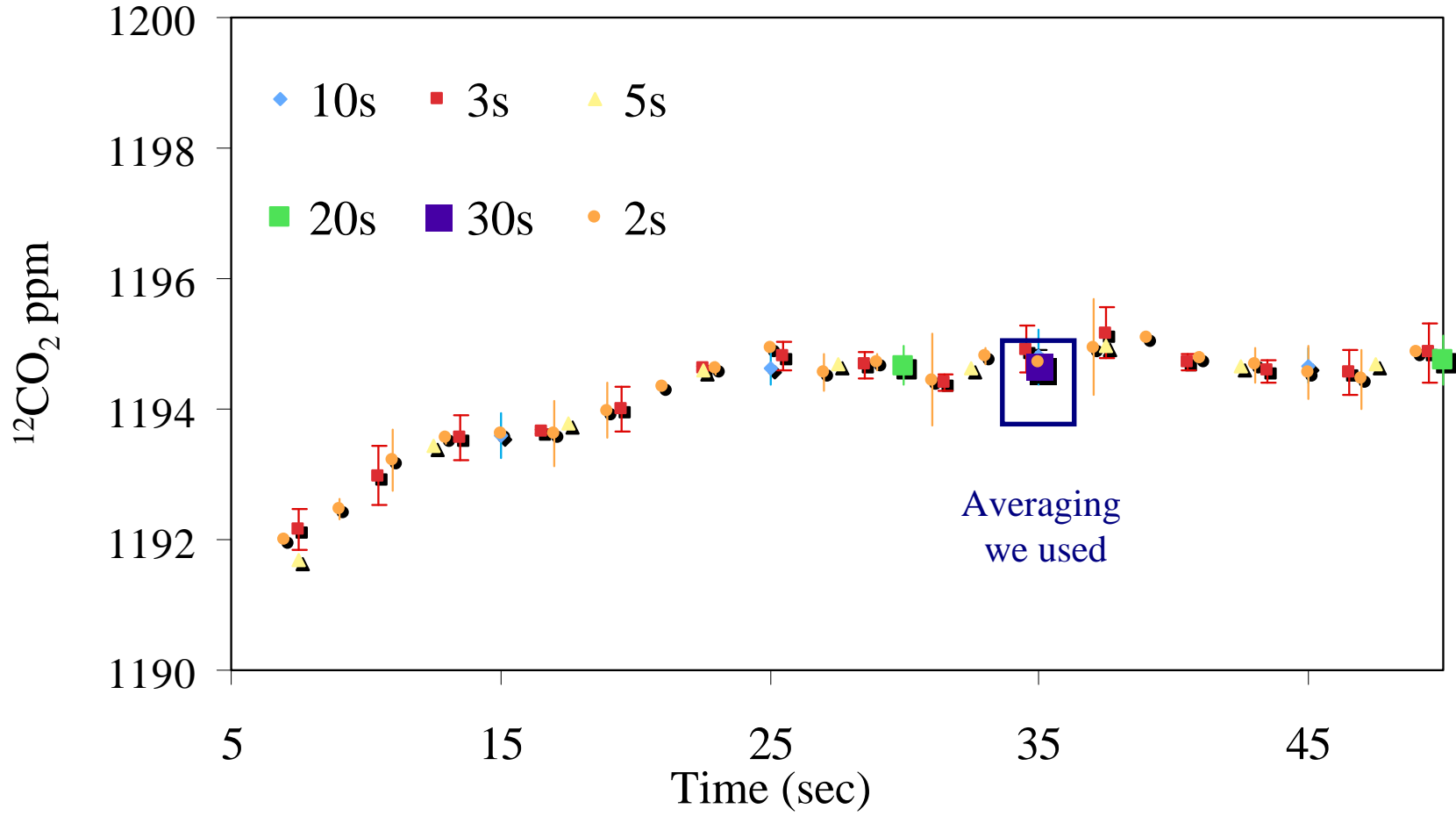


Allan variance



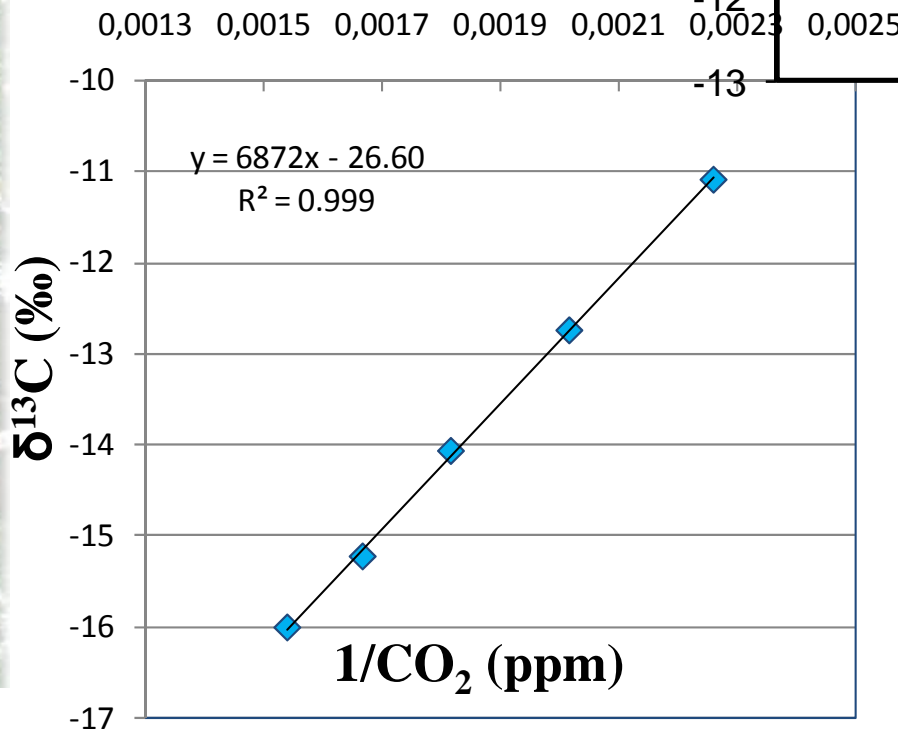
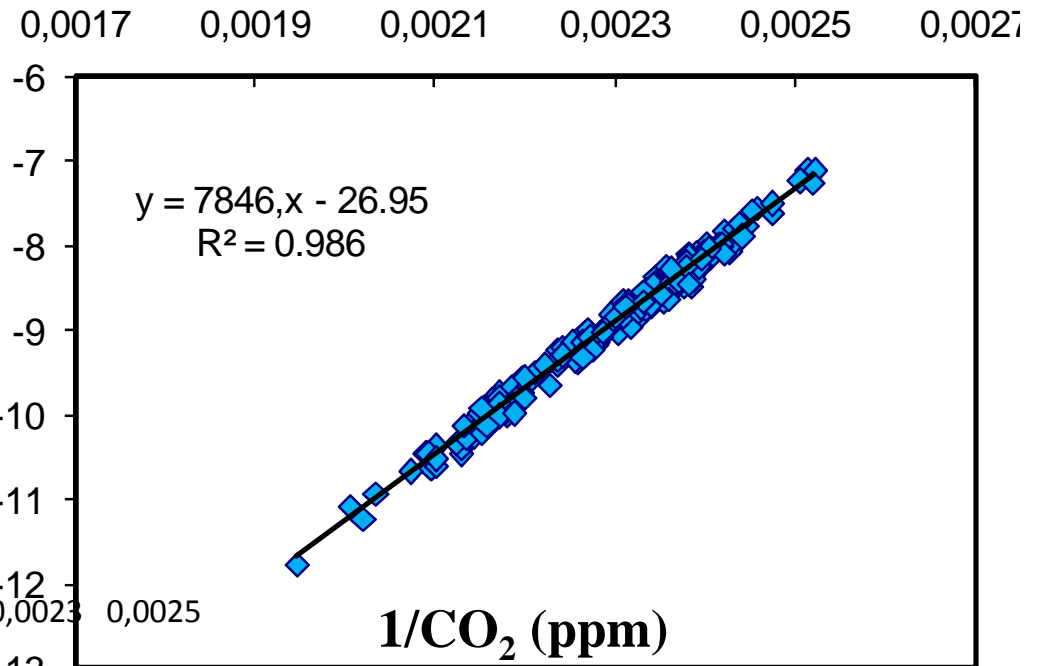


Averaging time





Comparison



➔ Keeling plots after passive accumulation of 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)

