



Multi-point Gas Calibration – Coupling of a GasMix with a 490 Micro GC

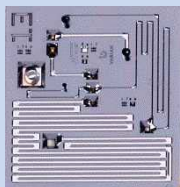
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Agilent 490 Micro GC

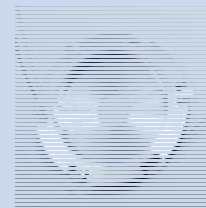
**Fast and portable
gas analysis
platform**

**One to four
independently
controlled, micro-
machined, plug
and play GC
channels**

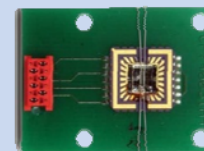
**Micro machined
injector**



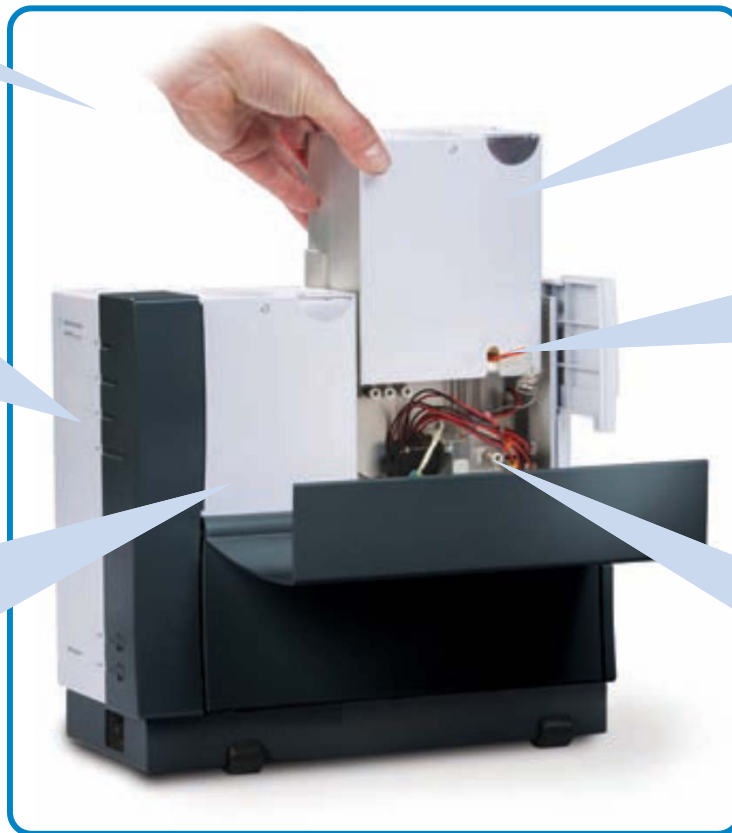
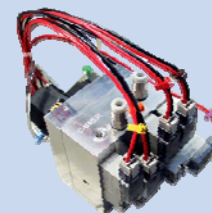
Narrow-bore column



**Micro Thermal
Conductivity Detector**

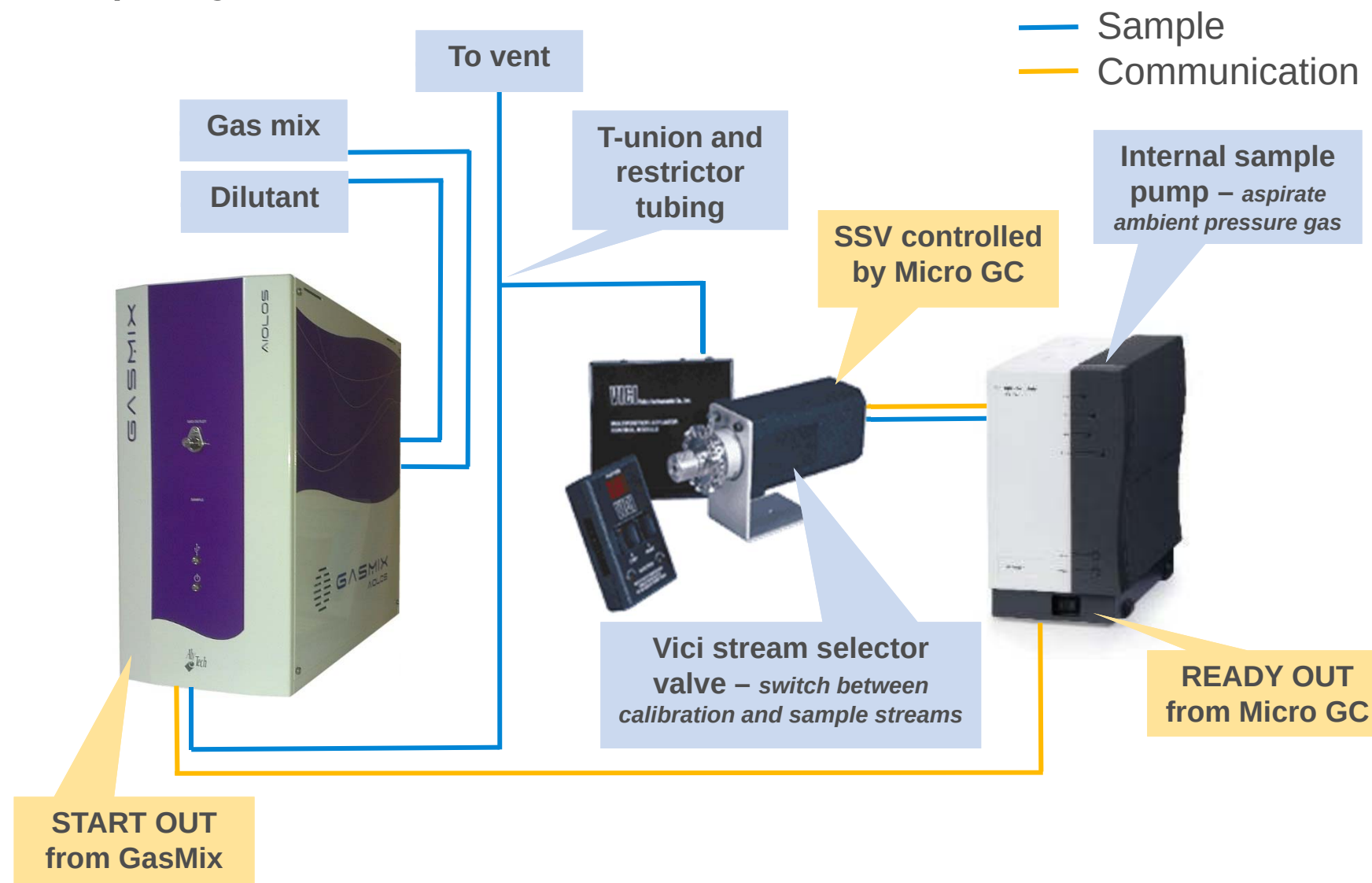


Electronic gas control



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Coupling GasMix with 490 Micro GC



Coupling GasMix with 490 Micro GC

Instrument Setup

Agilent 490 Micro GC | Trigger

Common | Channel 2 | Events

Stabilizing time: 0 s

Sample time: 20 s

Sample line temperature: 60 °C

Table: Used

Used	Range (Nml/min)
☒	1.900 .. 49.800
☒	11.300 .. 506.300

Table: Analyte

Analyte	Initial concentration	Desired concentration	Unit
CARBON DIOXIDE	Channel 1: 300.000 ppm	50.000	ppm
NEON	Channel 1: 20.000 ppm		ppm
NITROGEN	Channel 2: 100.000 %		ppm

Instrument Setup

Agilent 490 Micro GC | Trigger

Trigger Type: External

Micro GC start trigger EXTERNAL

Table: Calculated flow

Calculated flow
33.333
Channel 2: 166.667

Calculation

Total computed flow: 200.000

Table: Analyte

Analyte	Calc. concentr.	Uncertainty	Unit
CARBON D...	50.000	2.504	ppm
NEON	3.333		
NITROGEN	833333		

Cycle events:

☐ Pause + mixture ☒ Mixture only ☐ Mixture + pause

Relays

Relays	ON	OFF
1	00 : 00 : 30	00 : 00 : 35
	00 : 00 : 00	00 : 00 : 00
	00 : 00 : 00	00 : 00 : 00
	00 : 00 : 00	00 : 00 : 00

Pause time: 00 : 00 : 00

Mixture time: 00 : 1 : 00

Pause time: 00 : 01 : 05

GasMix uses a relay to START the Micro GC

Mixing time – user selectable for homogenous mixing and sample line/injector flushing

Sequence start

☐ From the beginning of sequence

☒ From line #

Immediately ☐

Date / Time: Today 14 : 14 : 53

UDP ☒ Input #1: ☐ 0V ☒ 5V

☒ At each line

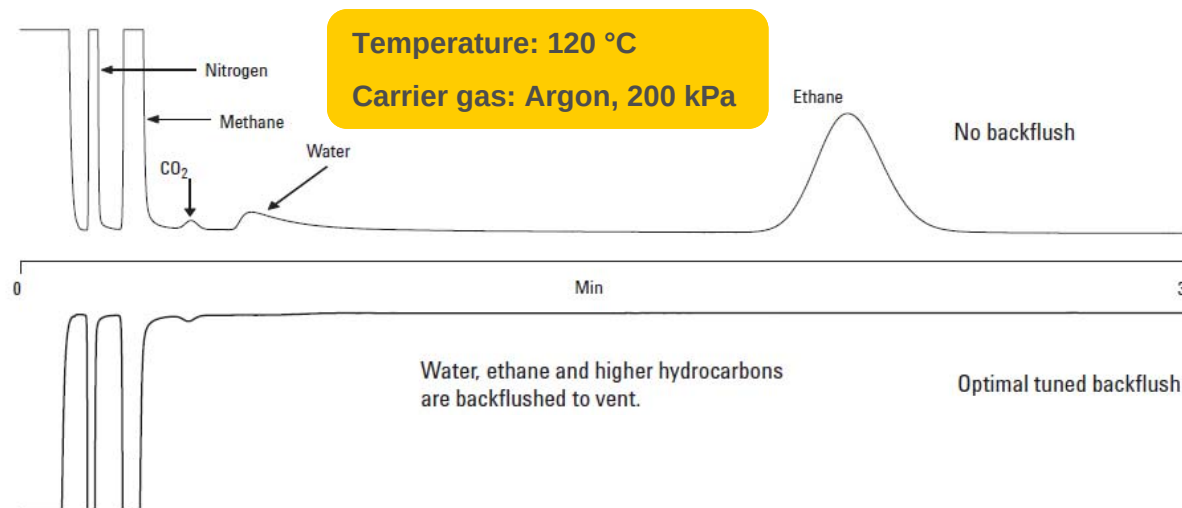
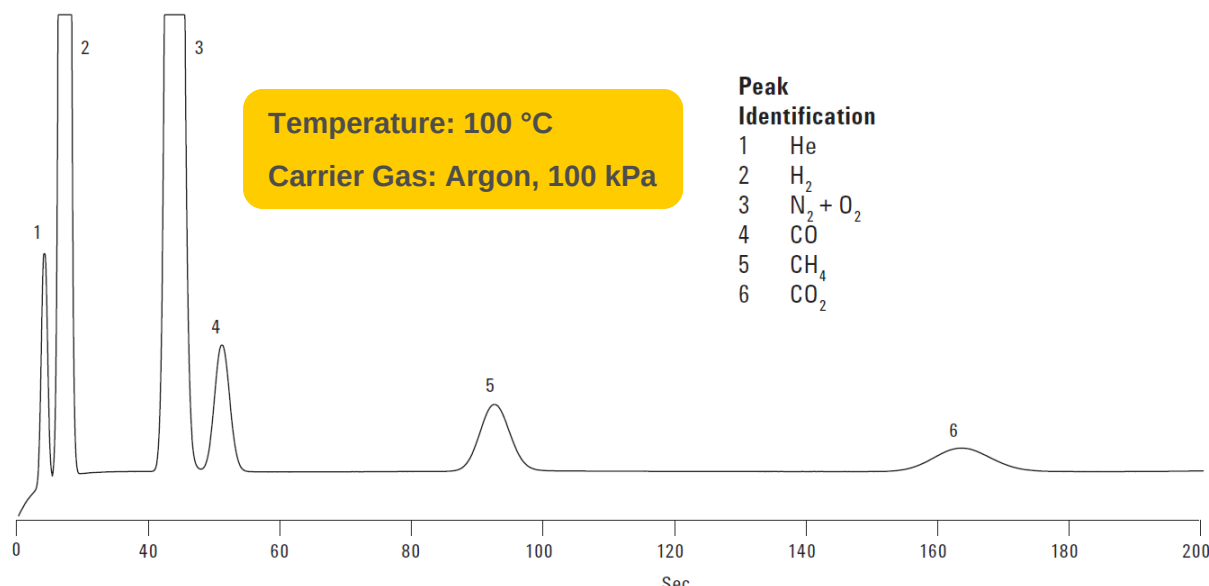
☐ Repeat sequence indefinitely

GasMix waits until Micro GC is READY

Start Cancel



Permanent Gas Analysis using COx column

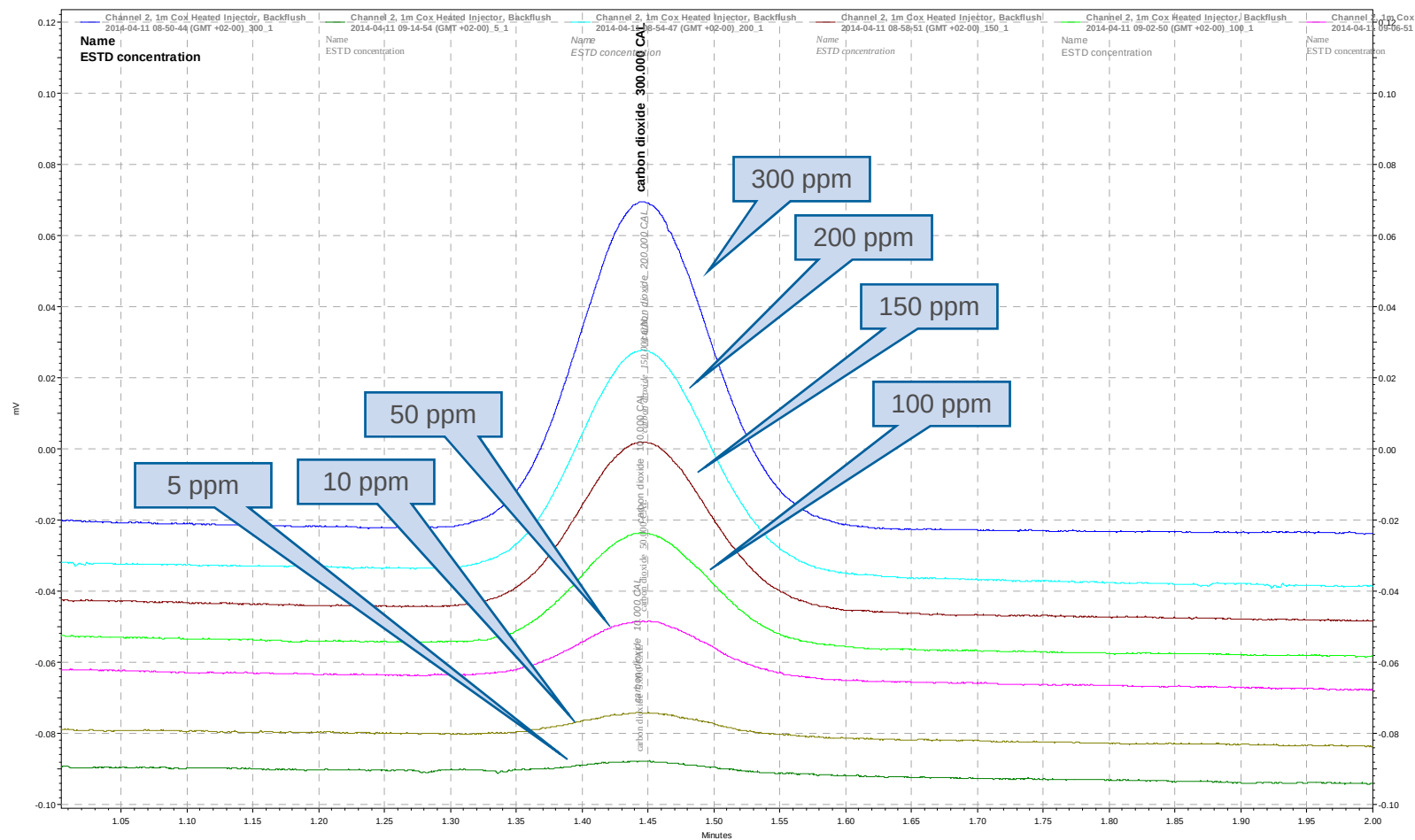


- Micro packed column
- No Nitrogen and Oxygen separation
- **Carbon dioxide** will elute from this column
- **No regeneration needed**
- Available with **Backflush** for extended column lifetime
- Good alternative for the MolSieve 5A column



Linearity and Limit of Detection

GasMix used to dilute calibration gas

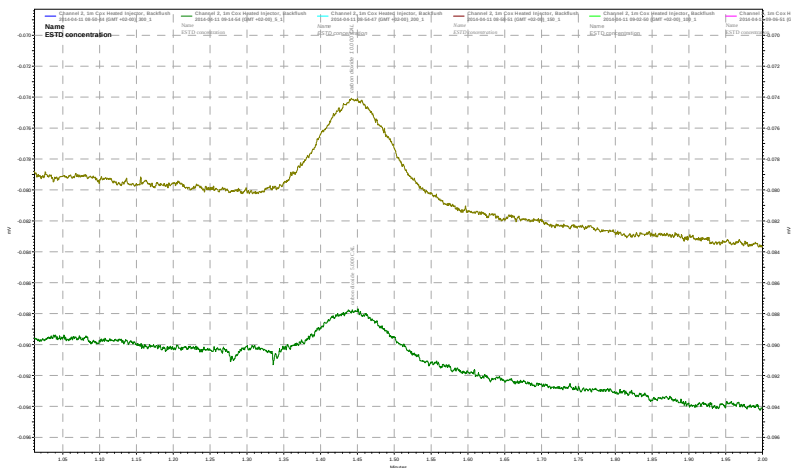
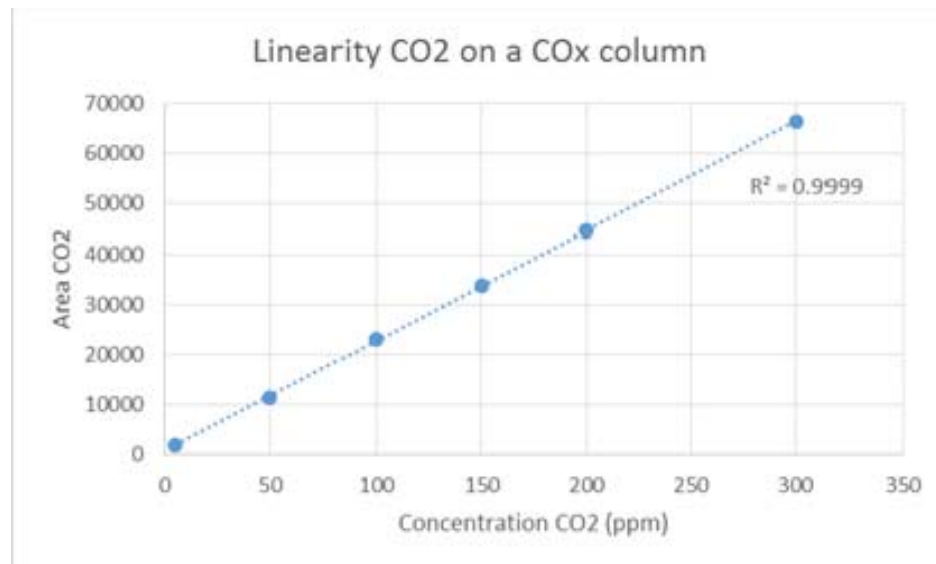


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Linearity and Limit of Detection

Linearity

- R^2 : 0.9999
- Range: 5 – 300 ppm



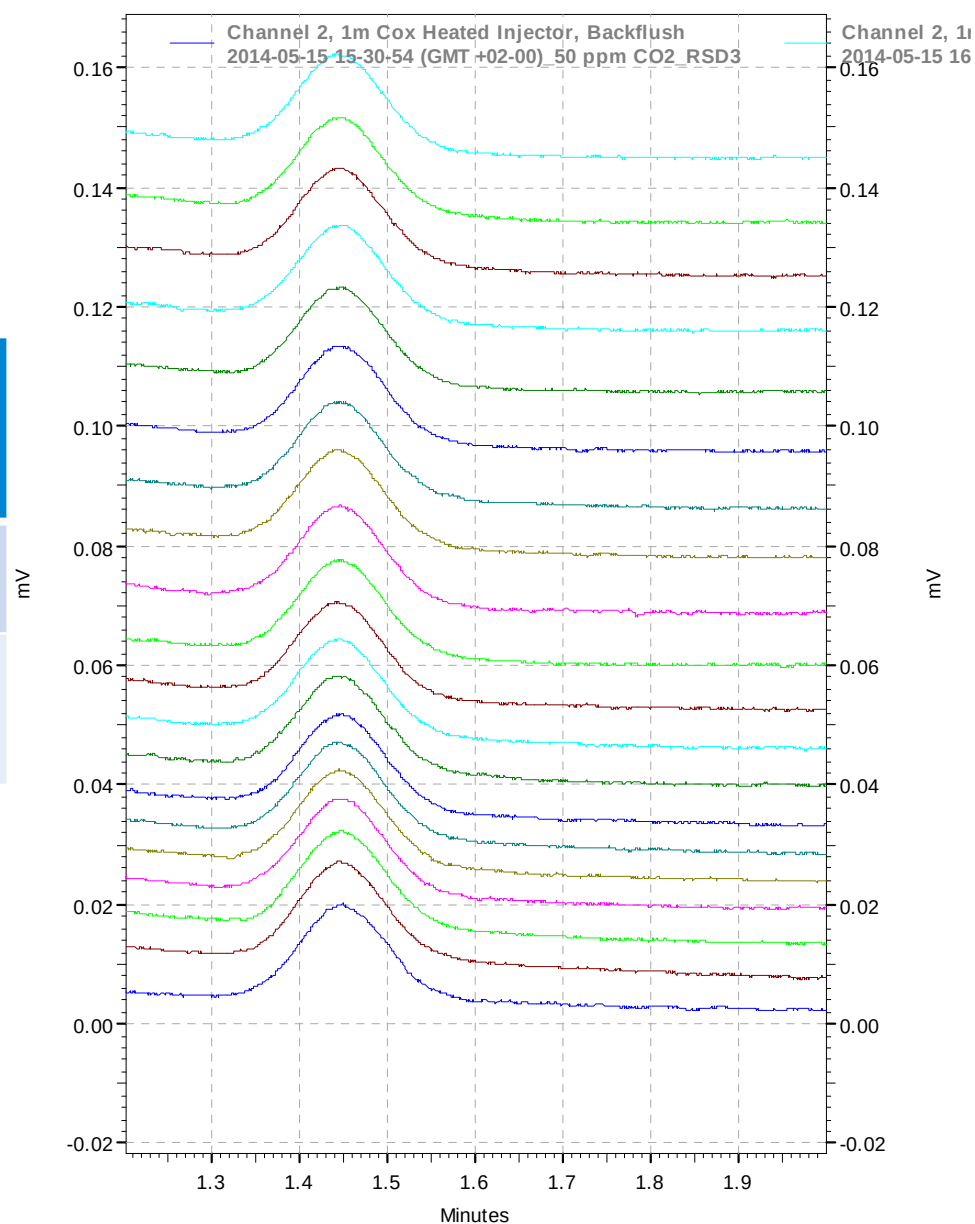
Detection limit

- 5 ppm
- Micro-packed COx column results in peak broadening
- The GasMix was used to the systems LOD



Repeatability

Carbon dioxide; 50 ppm	RSD % (n = 20)
Retention time	0.16 %
Concentration; external standard method	2.6 %



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Summary

- Easy and convenient coupling of Micro GC and GasMix is possible
- Bidirectional communication of Micro GC (OpenLAB CDS) and GasMix (separate software)
- Excellent linearity, Retention time RSD % and Concentration RSD%





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