

OZONE ANALYZER INTERCOMPARISON
 Thermo 49i 1225011092

intercomparison place : Monte Cimone
 intercomparison operator: Simonetta Montaguti
 Transfer Standard: Thermo 49iPs s/n: 1118511036
 Transfer Standard has been evaluated by EMPA on 2023-11-13 with SRP#15 giving
 slope of 0.9938 and intercept of -0.22
 TS has been warmed-up for more then 12 hours and OA has been conditioning at
 200ppb for more then 2 hour
 OA has been evaluated at the following 9 concentration levels: 0, 15, 25, 50,
 75, 80, 100, 125 e 150 ppb

OA and TS condition:
 OA 1225011092 BKG=0.0 ; Coeff=1.010
 TS 1118511036 BKG=-0.3 ; Coeff=1.013
 intercomparison start : 2024-08-07 12:59 ; intercomparison end : 2024-08-07
 19:57
 LinregressResult(slope=1.003879347716729, intercept=0.7942923188780853,
 rvalue=0.999995124239679, pvalue=4.498115668063529e-49,
 stderr=0.0007191880783492815, intercept_stderr=0.04857208834020977)

Linear regression results OAm_{mean} = TS_{mean}*slope + intercept:
 TS Transfer Standard
 OA O3 Analyzer

slope = 1.003879 slope_stderr = 7.192e-04
 intercept = 0.794292 intercept_stderr = 4.857e-02
 rsquare = 0.999990 covariance = 3.068e-21

TS_{mean}: TS average [O3] for each calibration step
 OA_{mean}: OA average [O3] for each calibration step
 Predicted = OA_{mean}*slope + intercept
 TS_{std}: TS standard deviation [O3] for each calibration step
 OA_{std}: OA standard deviation [O3] for each calibration step
 Residual = TS - predicted
 Deviation = OA - TS

TS _{mean}	TS _{std}	OA _{mean}	OA _{std}	predicted	residual	deviation
0.160	0.126	-0.510	0.259	0.282	-0.122	-0.670
74.310	0.126	72.980	0.319	74.057	0.253	-1.330
49.445	0.076	48.570	0.494	49.553	-0.107	-0.875
99.141	0.126	97.840	0.418	99.014	0.128	-1.301
24.631	0.144	23.620	0.286	24.506	0.125	-1.011
119.006	0.133	117.800	0.371	119.051	-0.046	-1.206
14.672	0.140	13.740	0.237	14.588	0.085	-0.932
0.104	0.095	-0.480	0.303	0.312	-0.208	-0.584
24.625	0.122	23.740	0.413	24.626	-0.002	-0.885
99.172	0.156	98.020	0.232	99.195	-0.022	-1.152
49.448	0.108	48.460	0.388	49.442	0.006	-0.988
74.317	0.049	73.250	0.420	74.328	-0.011	-1.067
19.684	0.155	18.510	0.181	19.376	0.308	-1.174
119.007	0.135	117.700	0.293	118.951	0.056	-1.307
0.101	0.142	-0.670	0.412	0.122	-0.020	-0.771
49.453	0.153	48.470	0.447	49.452	0.001	-0.983
24.594	0.122	23.630	0.257	24.516	0.078	-0.964
74.286	0.088	73.450	0.301	74.529	-0.243	-0.836
99.175	0.073	98.070	0.349	99.245	-0.070	-1.105
119.065	0.071	117.910	0.413	119.162	-0.097	-1.155
-0.048	0.325	-0.750	0.755	0.041	-0.090	-0.702

U_{noise}: OA_{std} average = 0.359
 U_{linearity}: Residual standard deviation = 0.134
 U_{repeat} = sqrt(U_{noise}² + U_{linearity}²) = 0.384

$$\begin{aligned} \text{Udrift} &= \sqrt{0.58^2 + (0.0025 * C)^2} &= 0.632 \\ U &= \sqrt{U_{\text{repeat}}^2 + \text{Udrift}^2} &= 0.739 \\ C & &= 100.0 \end{aligned}$$

compensation equation to obtain unbiased concentration
 $[O_3]_{\text{unbiased}} = ([O_3] * 1.004) + 0.794$

Intercomparison 49i s/n 1225011092 date : 20240807

