

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 19:48 ; intercomparison end : 2024-08-08  
 02:45  
 LinregressResult(slope=1.0034142307255958, intercept=0.8109405054772836,  
 rvalue=0.999992694092778, pvalue=2.0966633277339307e-47,  
 stderr=0.0008799498254478785, intercept\_stderr=0.05944194338181281)

Linear regression results OAmean = TSmean\*slope + intercept:  
 TS Transfer Standard  
 OA O3 Analyzer

slope	= 1.003414	slope_stderr	= 8.799e-04
intercept	= 0.810941	intercept_stderr	= 5.944e-02
rsquare	= 0.999985	covariance	= -2.615e-21

TSmean: TS average [O3] for each calibration step  
 OAmean: OA average [O3] for each calibration step  
 Predicted = OAmean\*slope + intercept  
 TSstd: TS standard deviation [O3] for each calibration step  
 OAst: OA standard deviation [O3] for each calibration step  
 Residual = TS - predicted  
 Deviation = OA - TS

TSmean	TSstd	OAmean	OAst	predicted	residual	deviation
0.078	0.137	-0.630	0.249	0.179	-0.101	-0.708
74.331	0.122	73.430	0.349	74.492	-0.161	-0.901
49.451	0.106	48.370	0.303	49.346	0.105	-1.081
99.095	0.204	98.150	0.472	99.296	-0.201	-0.945
24.616	0.030	23.300	0.500	24.190	0.425	-1.316
119.034	0.061	117.680	0.343	118.893	0.141	-1.354
14.738	0.142	13.960	0.403	14.819	-0.080	-0.778
0.030	0.067	-0.540	0.276	0.269	-0.239	-0.570
24.625	0.061	23.740	0.372	24.632	-0.007	-0.885
99.133	0.171	97.940	0.393	99.085	0.048	-1.193
49.479	0.072	48.570	0.323	49.547	-0.068	-0.909
74.315	0.106	73.350	0.280	74.411	-0.096	-0.965
19.678	0.110	18.860	0.383	19.735	-0.057	-0.818
119.003	0.094	117.790	0.353	119.003	0.000	-1.213
0.057	0.088	-0.550	0.474	0.259	-0.202	-0.607
49.487	0.069	48.310	0.262	49.286	0.201	-1.177
24.614	0.098	23.650	0.459	24.542	0.072	-0.964
74.303	0.063	73.270	0.329	74.331	-0.028	-1.033
99.159	0.065	97.900	0.300	99.045	0.114	-1.259
119.016	0.047	117.910	0.375	119.124	-0.108	-1.106
0.138	0.114	-0.910	0.381	-0.102	0.241	-1.048

Unoise: OAst average = 0.361  
 Ulinearity: Residual standard deviation = 0.164  
 Urepeat = sqrt(Unoise^2 + Ulinearity^2) = 0.397

$$\begin{aligned} \text{Udrift} &= \sqrt{0.58^2 + (0.0025 * C)^2} &= 0.632 \\ U &= \sqrt{U_{\text{repeat}}^2 + \text{Udrift}^2} &= 0.746 \\ C & &= 100.0 \end{aligned}$$

compensation equation to obtain unbiased concentration  
 $[O_3]_{\text{unbiased}} = ([O_3] * 1.003) + 0.811$

Intercomparison 49i s/n 1225011092 date : 20240808

