ECC OZONE EQUATION

$$P_{ozone} = 4.307x10^{-4} \bullet (I - I_{BG}) \bullet T_{pump} \bullet t_{100} \bullet C_{eff} \bullet C_{ref}$$

P_{ozone} = Partial pressure of ozone (millipascals)

$4.307x10^{-4}$ = Constant to convert current to ozone conc.

I = Cell current (microamps) ~ 5 µamps @ o_3 peak

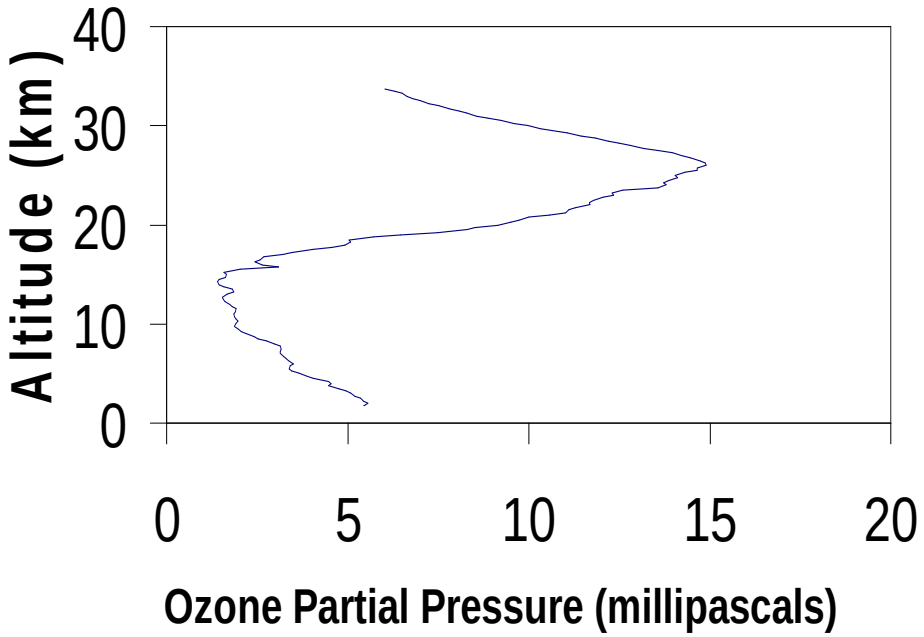
I_{BG} = Cell background current < 0.07 µamps on zero o_3

T_{pump} = Temperature of sonde pump (K)

T_{100} = Pump flow rate: seconds per 100 cc

C_{eff} = Pump flow rate efficiency factor 1.0 surface to 300 hPa, 1.25 at 5 hPa.

C_{ref} = Ozone correction for Dobson Spectrophotometer or Brewer total ozone measurement.



C_{eff} = PCF = Pump correction factor calculation

Pump #	A0	A1	A2	A3
6a9992	2.8921	-4.8563	3.7928	-0.8716
6aavg	2.8921	-4.8563	3.7928	-0.8716
5aNOAA	2.5636	-3.7047	2.8036	-0.6651
5aTBMT	1.3513	-0.969	0.7313	-0.1357
1ZAVG	3.5025	-5.8894	4.3261	-0.9549

The PCF values (for any pressure) in are calculated from the following cubic equation.

PCF = 1.00 if pressure > 300 hPa.
ELSE
$PCF = A0 + A1 \bullet X + A2 \bullet X^2 + A3 \bullet X^3$

Where: X = 1 + 1/ln(P)
(in words: X is 1 plus 1 divided by the natural log of pressure in hPa)

The .de1 file from strato shows the 1ZAVG used for all ENSCI sondes. NOTE that coefficients in .de1 are pc0 instead of A0….through pc3 instead of A3.

Ozone pump correction file = PUMP.DAT
Coefficients = 1ZAVG
Pump coefficient pc0 = 3.5025
pc1 = -5.8894
pc2 = 4.3261
pc3 = -0.9549
Correlation Coefficient = 0.9992

[Pump efficiency fit for sonde 2Z9672]

P (hPa) =	1000	300	100	50	30	20	10	7	5
f (measured) =	1.0000	1.0000	1.0250	1.0406	1.0555	1.0745	1.1369	1.1910	1.2552
f (computed) =	1.0000	1.0000	1.0213	1.0378	1.0564	1.0776	1.1375	1.1883	1.2562
Delta =	0.0000	0.0000	-0.0037	-0.0028	0.0009	0.0032	0.0006	-0.0027	0.0010