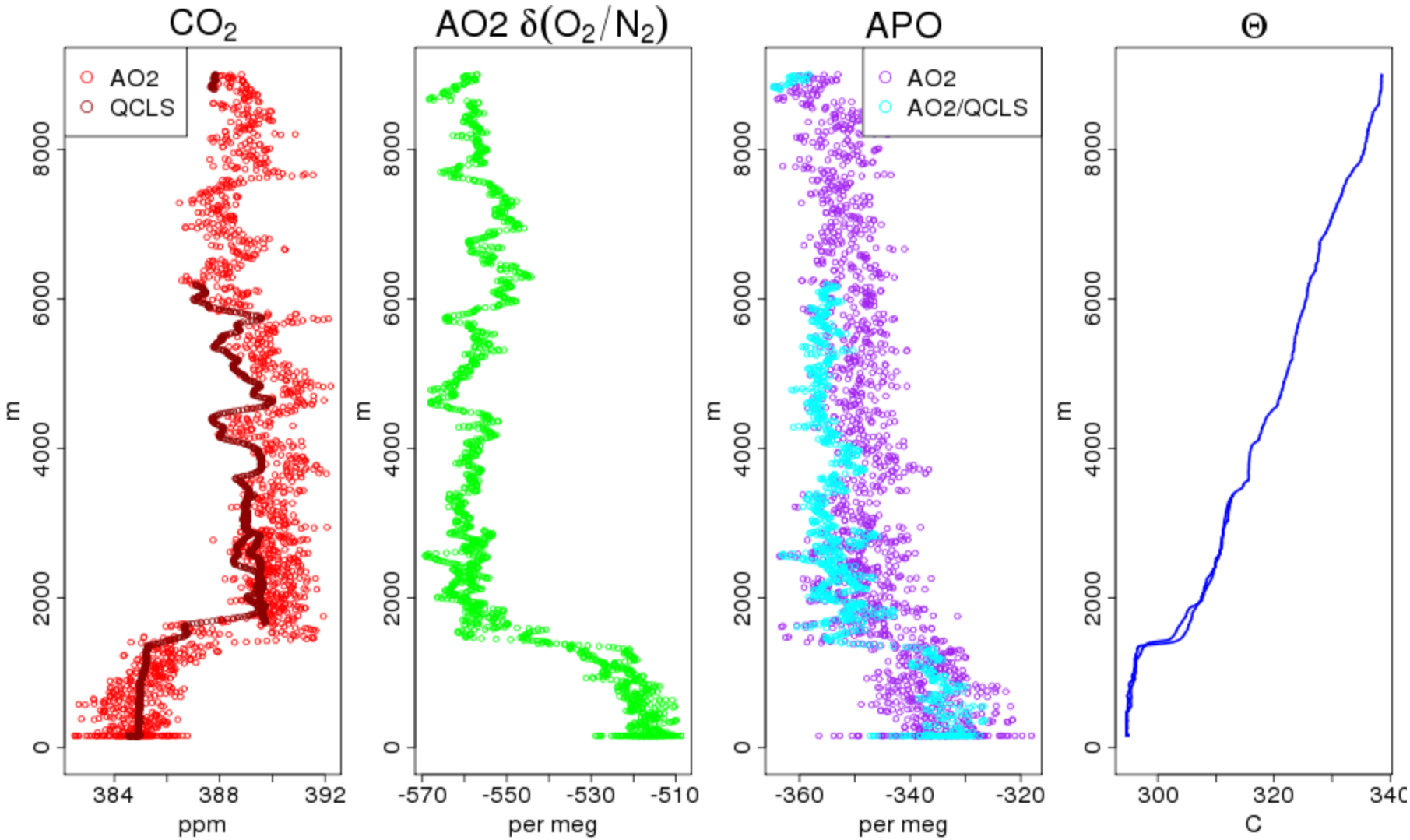
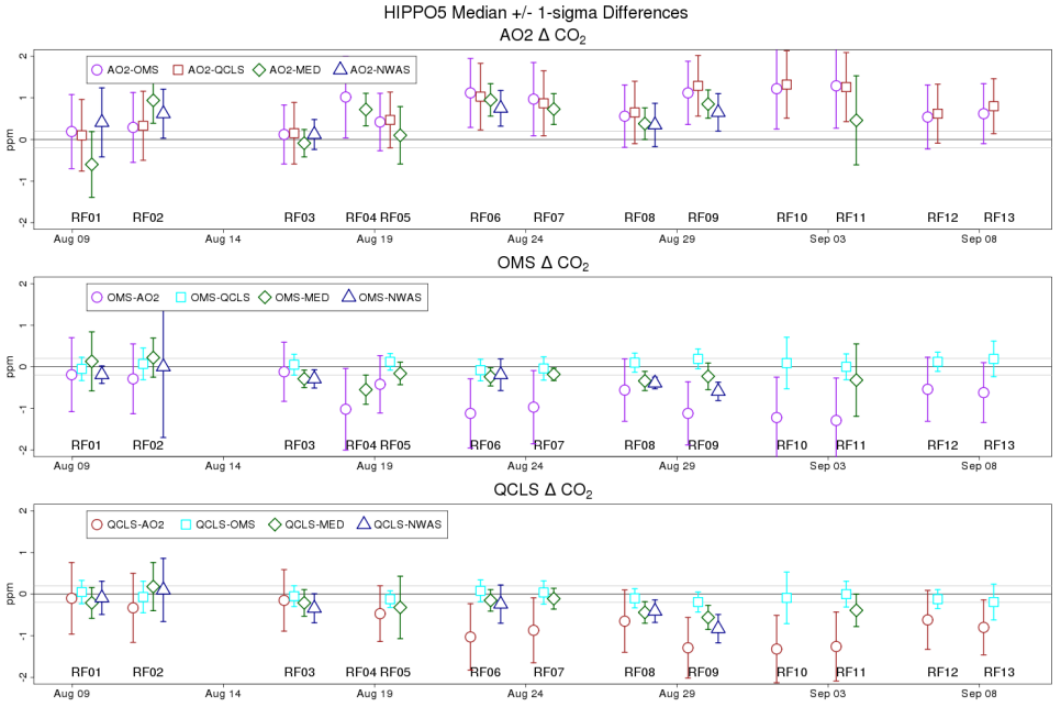
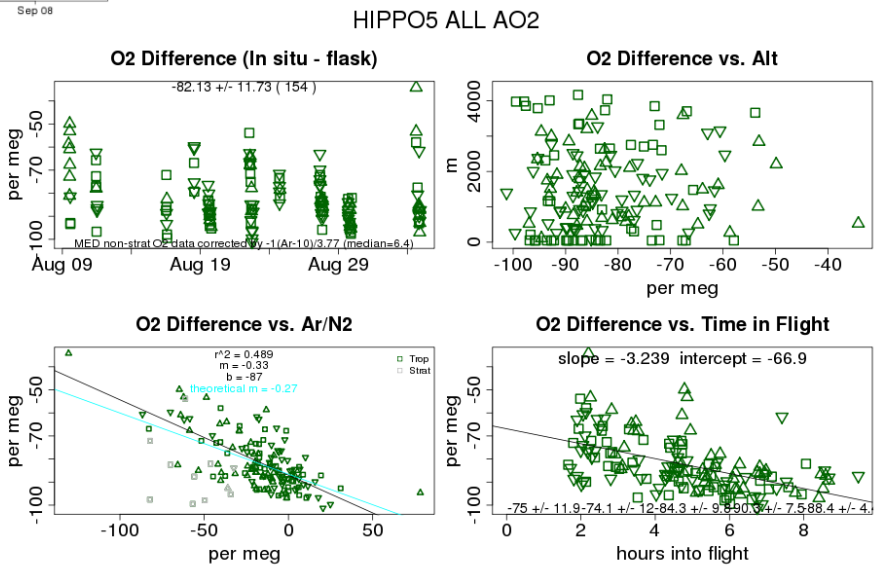
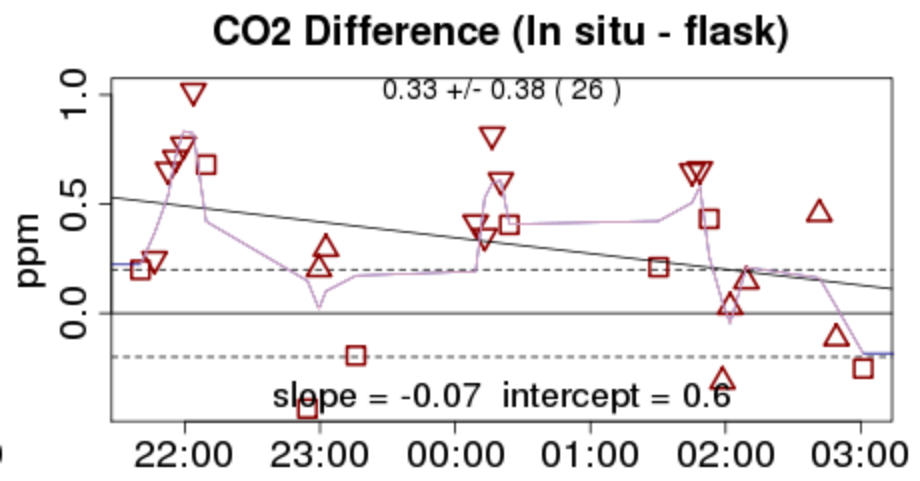
Britt Stephens- NCAR

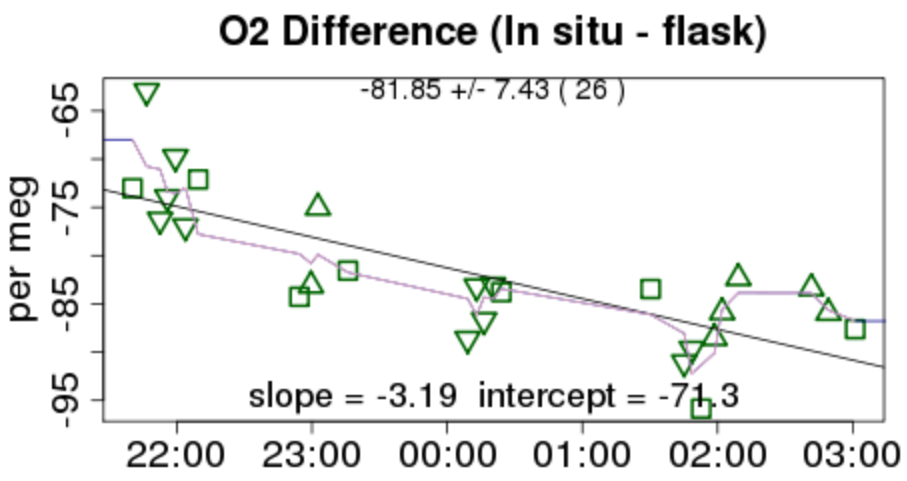
CO_2 and AO_2

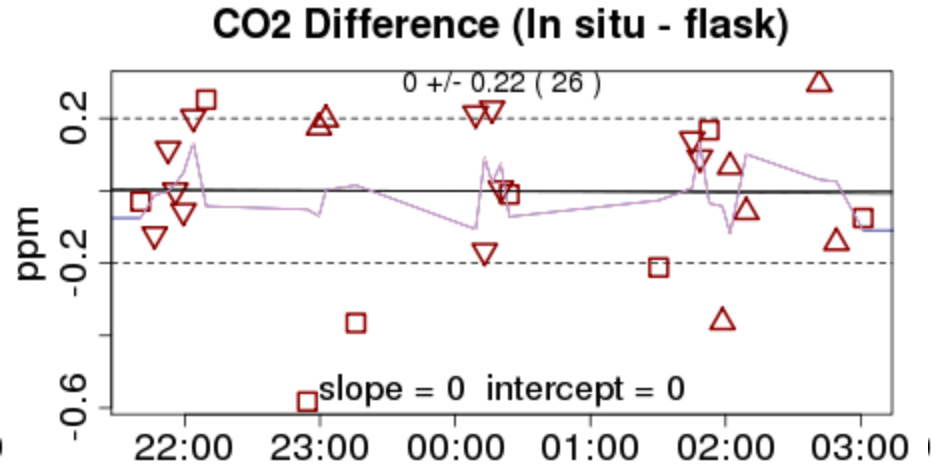

CO2
AO2
QCLS
m
0
2000
4000
6000
8000
384
388
392
ppm
AO2 δ(O2/N2)
-570
-550
-530
-510
per meg
APO
AO2
AO2/QCLS
-360
-340
-320
per meg
Θ
300
320
340
C

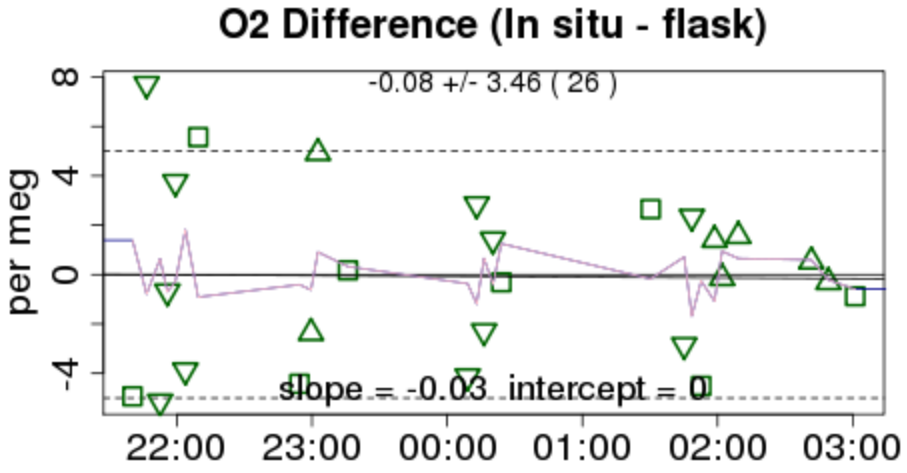

HIPPO5 Median +/- 1-sigma Differences
AO2 Δ CO2
AO2-OMS
AO2-QCLS
AO2-MED
AO2-NWAS
ppm
RF01
RF02
RF03
RF04
RF05
RF06
RF07
RF08
RF09
RF10
RF11
RF12
RF13
Aug 09
Aug 14
Aug 19
Aug 24
Aug 29
Sep 03
Sep 08
OMS Δ CO2
OMS-AO2
OMS-QCLS
OMS-MED
OMS-NWAS
QCLS Δ CO2
QCLS-AO2
QCLS-OMS
QCLS-MED
QCLS-NWAS


HIPPO5 ALL AO2
O2 Difference (In situ - flask)
-82.13 +/- 11.73 (154)
MED non-strat O2 data corrected by -1(Ar-10)/3.77 (median=6.4)
per meg
Aug 09
Aug 19
Aug 29
O2 Difference vs. Alt
m
per meg
O2 Difference vs. Ar/N2
r^2 = 0.489
m = -0.33
b = -87
theoretical m = -0.27
Trop
Strat
per meg
O2 Difference vs. Time in Flight
slope = -3.239 intercept = -66.9
-75 +/- 11.9 -74.1 +/- 12 -84.3 +/- 9.8 90.3 +/- 7.5 88.4 +/- 4.
per meg
hours into flight


CO2 Difference (In situ - flask)
0.33 +/- 0.38 (26)
slope = -0.07 intercept = 0.6
ppm
1.0
0.5
0.0
22:00
23:00
00:00
01:00
02:00
03:00


O2 Difference (In situ - flask)
-81.85 +/- 7.43 (26)
slope = -3.19 intercept = -71.3
per meg
-65
-75
-85
-95
22:00
23:00
00:00
01:00
02:00
03:00


CO2 Difference (In situ - flask)
0 +/- 0.22 (26)
slope = 0 intercept = 0
ppm
0.2
-0.2
-0.6
22:00
23:00
00:00
01:00
02:00
03:00


O2 Difference (In situ - flask)
-0.08 +/- 3.46 (26)
slope = -0.03 intercept = 0
per meg
8
4
0
-4
22:00
23:00
00:00
01:00
02:00
03:00

AO2 – MEDUSA before and after adjustment

	HIPPO1		HIPPO2		HIPPO3	
	Ave	SD	Ave	SD	Ave	SD
O2 (per meg)	24.1	10	-6.7	13.4	-17.3	13.3
O2a (per meg)	0.1	5.8	0	3.5	0	4.8
CO2 (ppm)	0.12	0.31	0.29	0.45	0.41	0.47
CO2a (ppm)	0	0.23	0	0.24	0	0.22

- AO2 O_2, CO_2, and APO data for all HIPPO flights are posted on the server, latest versions:
  - HIPPO1 = v03a
  - HIPPO2 = v01a
  - HIPPO3 = v01a
  - HIPPO4 = prelima
  - HIPPO5 = prelima
- Flag "a" indicates data adjusted to agree with MEDUSA, non-adjusted data available at http://www.eol.ucar.edu/~stephens/AO2 (no log-in needed)
- APO.X = O2_AO2 + 1.1 * (CO2.X - 350) / 0.2094
- HIPPO1-3 are ***"release"*** data. There is no such thing as ***"final"*** data.
- Ongoing laboratory tests to explore biases
- Potential for multi-HIMIL cabin-air tests during IDEAS IV (Feb-Mar 2013)
- Please keep B. Stephens informed of any analyses using these data