

Measurement Comparisons for O_3 , NO_2 , NO , NO_y , NO_z

NOAA ARNOLD: O_3 , NO_x , NO_2 , NO_y , NO_3 , N_2O_5
Brown, Fibiger, McDuffie

UC-B TDLIF: NO_2 , PNs, ANs, HNO_3
Cohen, Sparks, Ebben, Wooldridge

NCAR CL: NO , NO_y , O_3
Weinheimer, Montzka

Introduction:

- Early in the process, so caution.
- However, generally good results.
- Useful to look at time series. Won't show.
- Whole-project scatter plots give quick look.
Can indicate systematic biases.

Comparisons to be made:

O₃: O3_CL & O3_ARNOLD

NO₂: NO2_LIF & NO2_ARNOLD

NO: NO_CL & NO_ARNOLD

NO_y: NOy_CL & NOy_LIF & NOy_ARNOLD

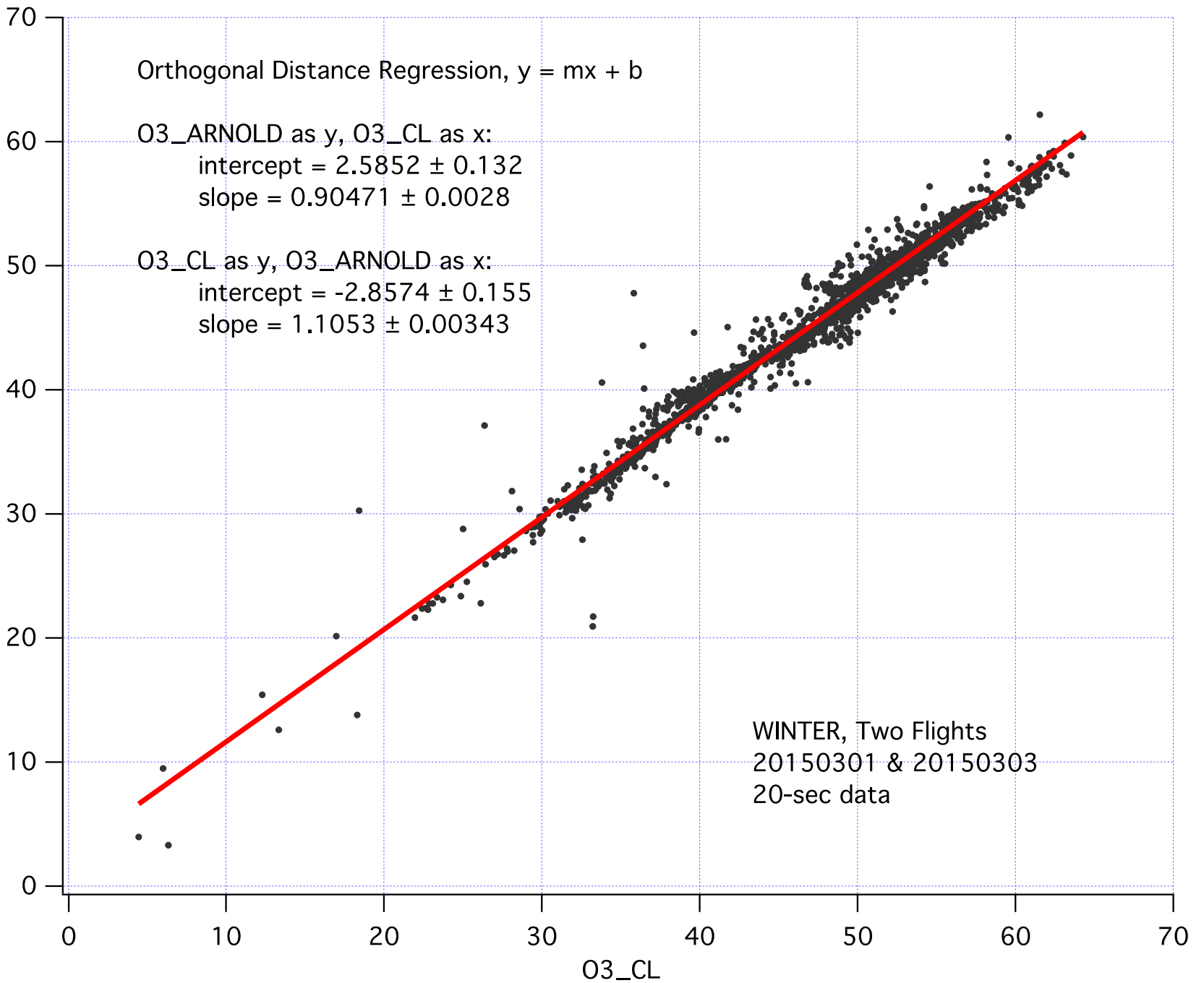
NO_z: NOz_CL & NOz_LIF & NOz_ARNOLD

O₃ Comparison

NCAR Chemiluminescence: O3_CL

NOAA ARNOLD: O3_ARNOLD

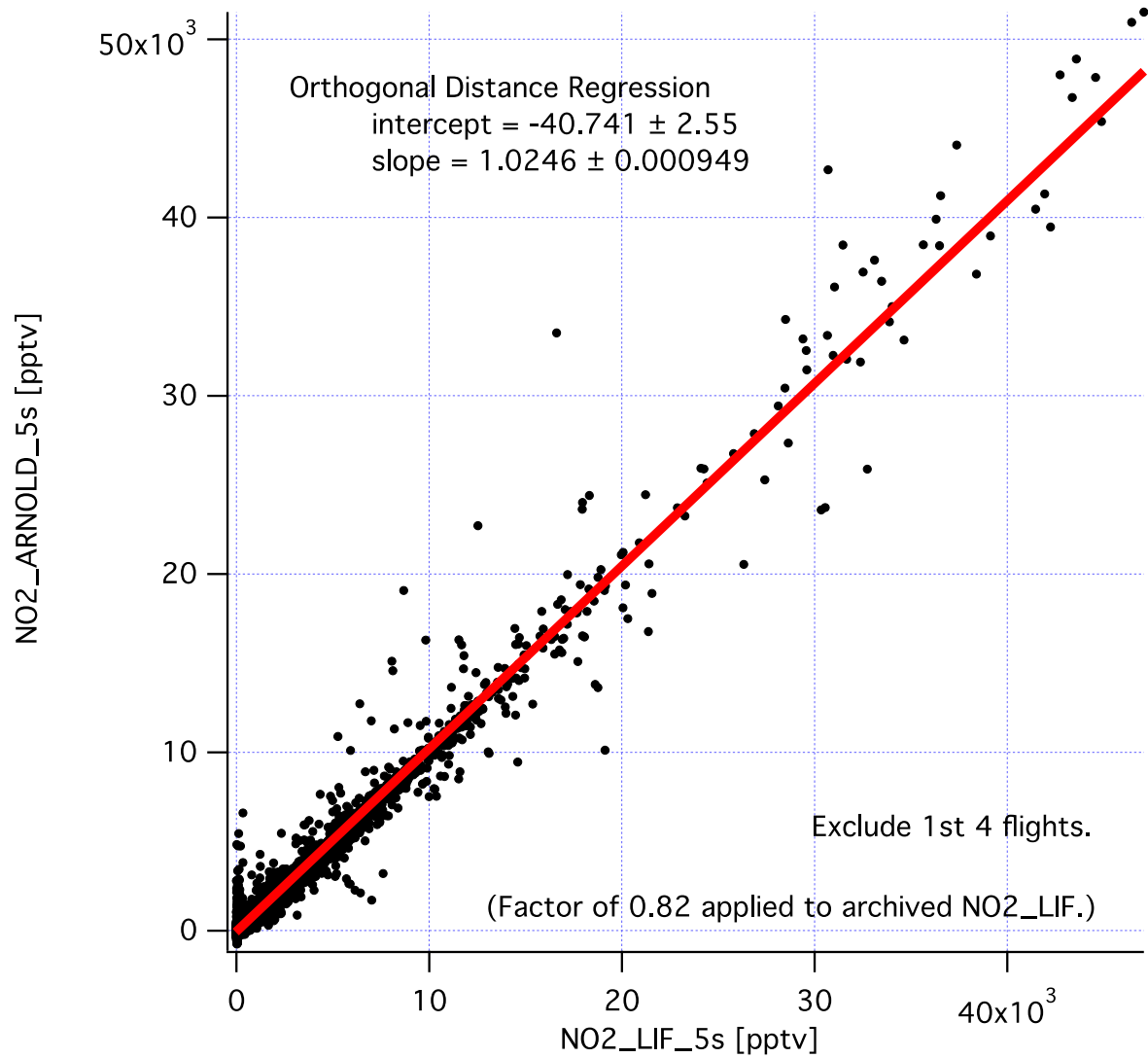
O3_ARNOLD



NO₂ Comparison

UC-B Laser-Induced Fluorescence: NO2_LIF

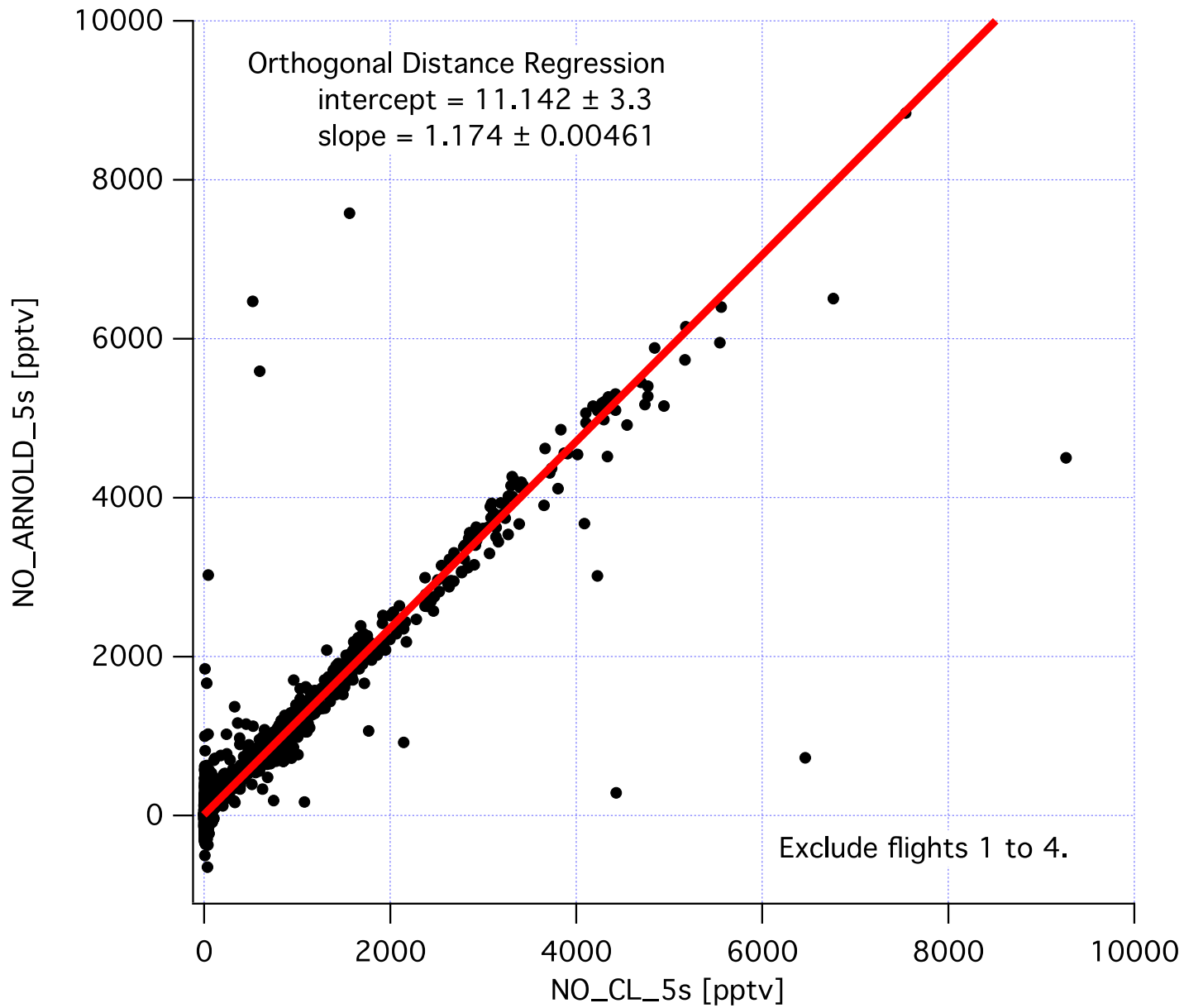
NOAA ARNOLD: NO2_ARNOLD



NO Comparison

NCAR Chemiluminescence: NO_CL

NOAA ARNOLD: $NO_ARNOLD = NOx_ARNOLD - NO2_ARNOLD$



NO_y Comparison

NCAR Chemilum.:

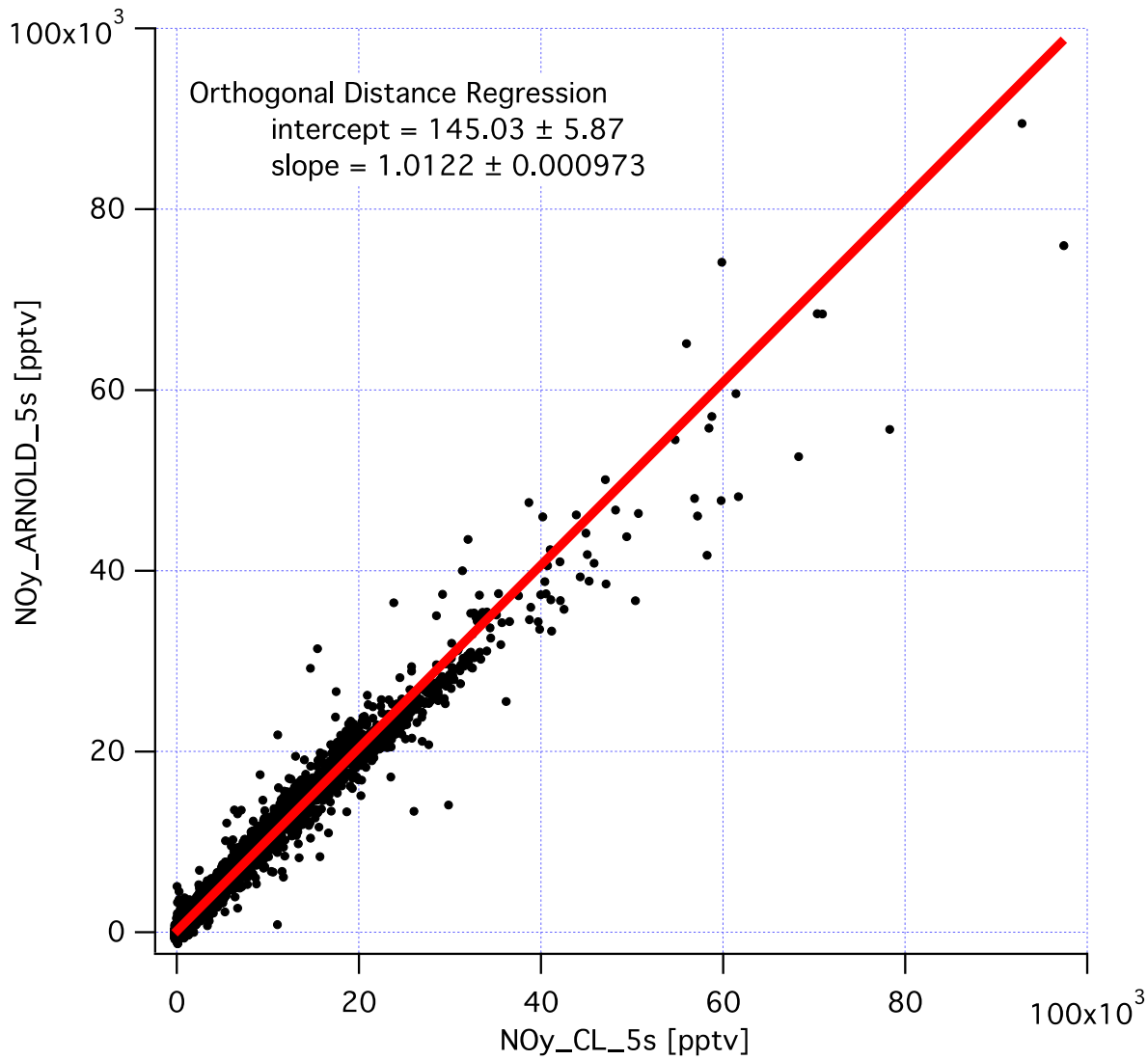
NO_y_CL

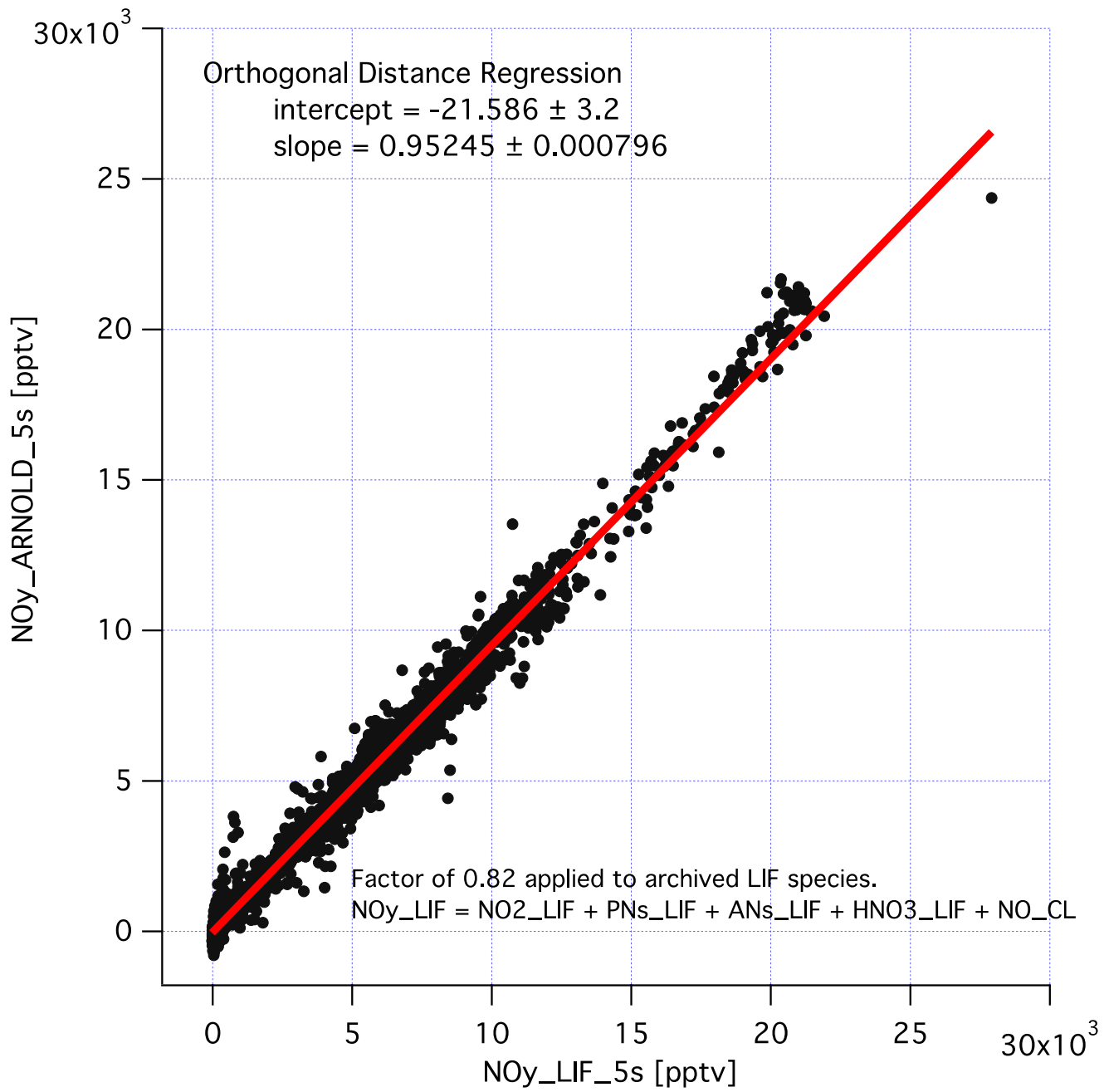
NOAA ARNOLD:

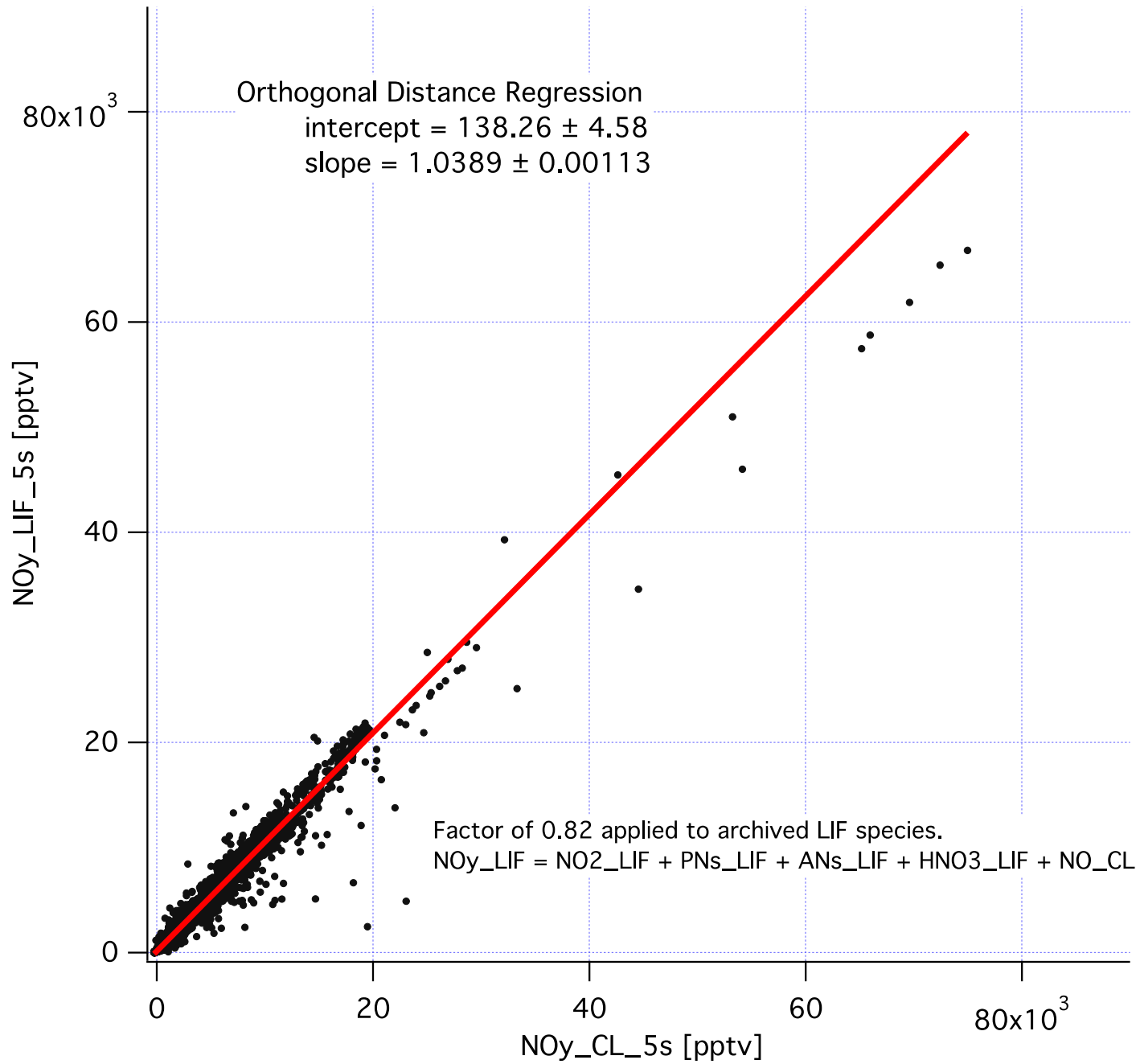
NO_y_ARNOLD

UC-B TDLIF:

[NO₂_LIF + PN_s_LIF + AN_s_LIF + HNO₃_LIF] + NO_CL







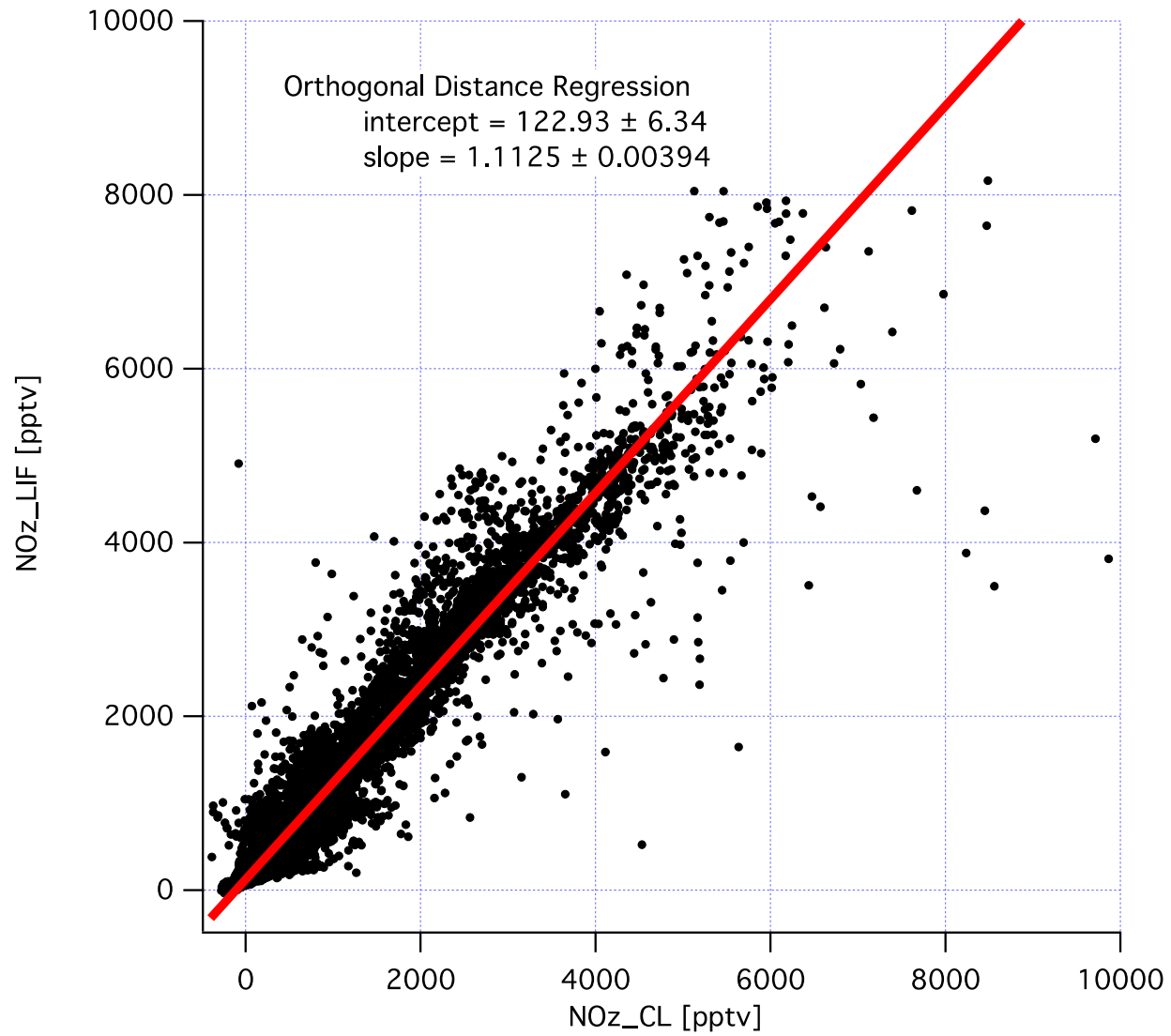
$$\text{NO}_z == \text{NO}_y - \text{NO}_x \text{ (oxidized NO}_x\text{)}$$

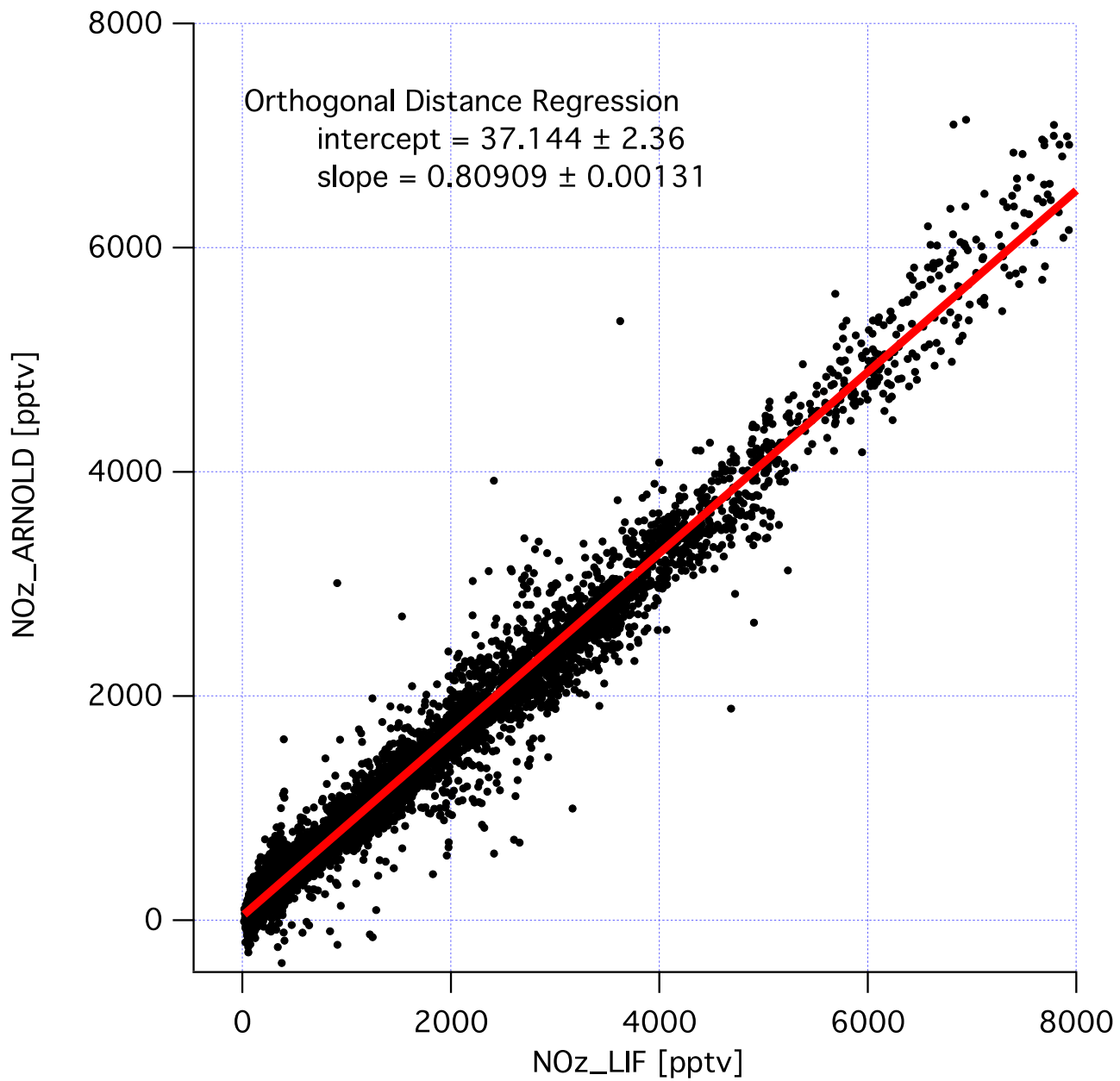
NCAR Chemiluminescence: $\text{NOz_CL} = \text{NOy_CL} - \text{NO_CL} - \text{NO2_LIF}$

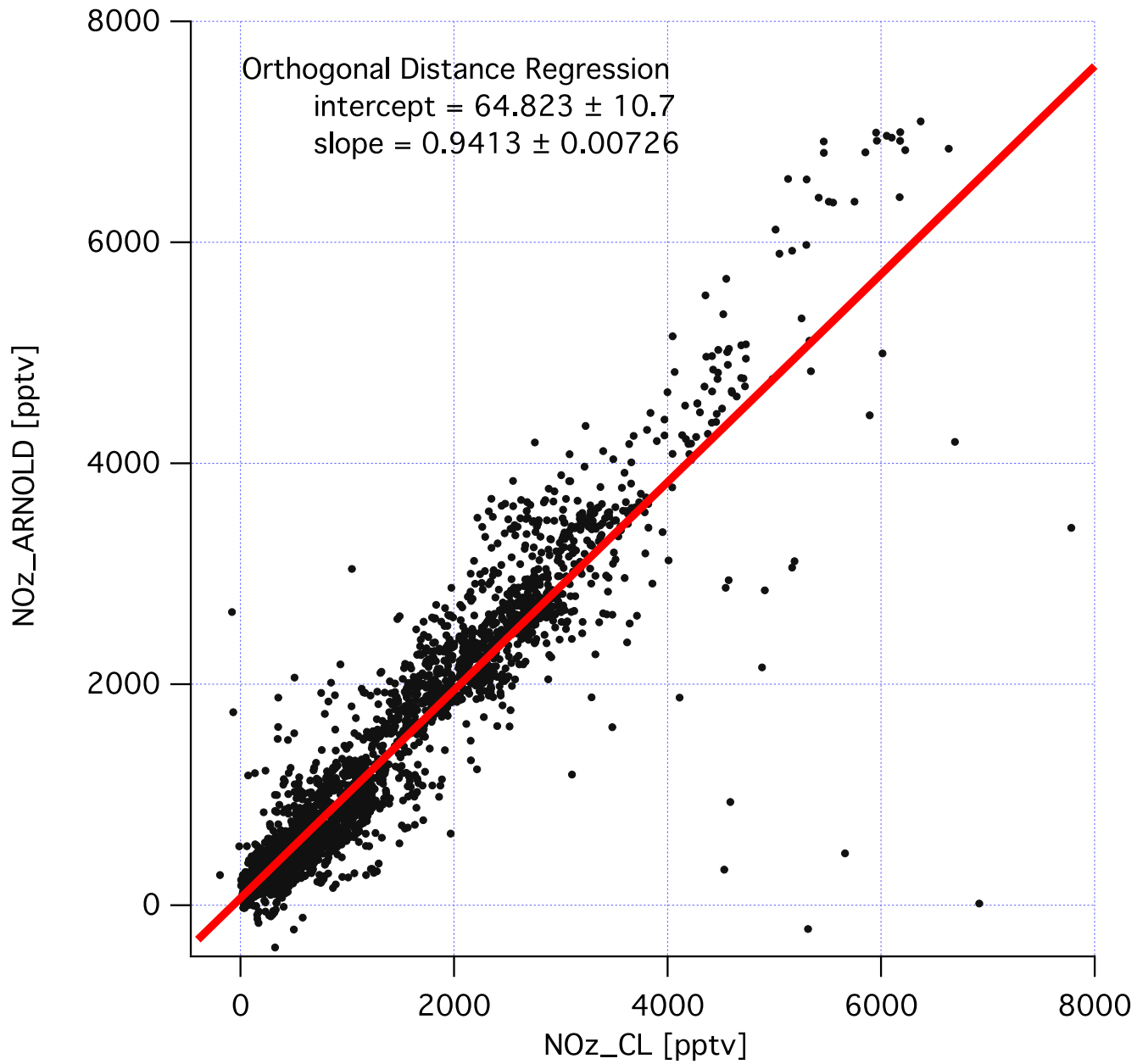
NOAA ARNOLD: $\text{NOz_ARNOLD} = \text{NOy_ARNOLD} - \text{NOx_ARNOLD}$

UC-B Th. Dissoc. Laser-Ind Fl: $\text{NOz_LIF} = \text{PNs} + \text{ANs} + \text{HNO3}$

Spikes (+/-) due to lack of synchronization, for CL & ARNOLD.







Conclusions / Future Directions:

- Overall measurements compare well, many to 10ish percent or better.
- Still premature. Final reduction steps TBD.
- Particulate nitrate needs to be included.
- Need time sync to look at 1-sec features.

