



**Monitoring the ACIS contamination layer with the
IACHEC model for 1 E0102.2-7219**

An Assigned Talk

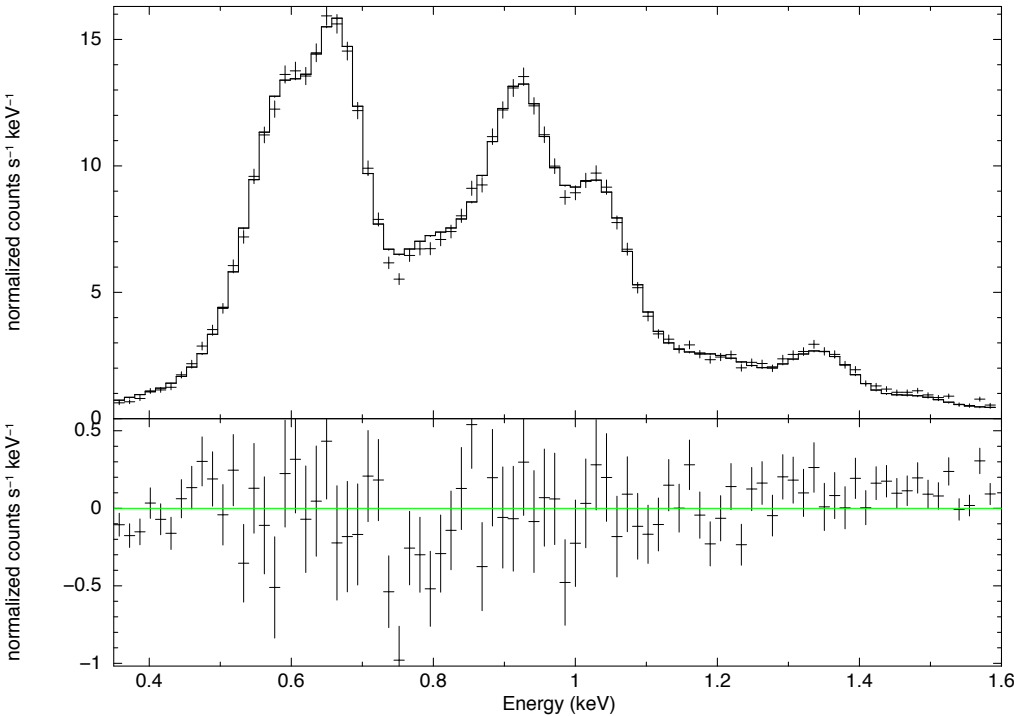


E0102 over Time

**E0102 is observed once a year in 3 positions on S3
We fit it with the standard IACHEC model to verify the contamination model
If the model is correct, the line normalizations should be constant with time even though the effective area at low energies is changing by a large amount**

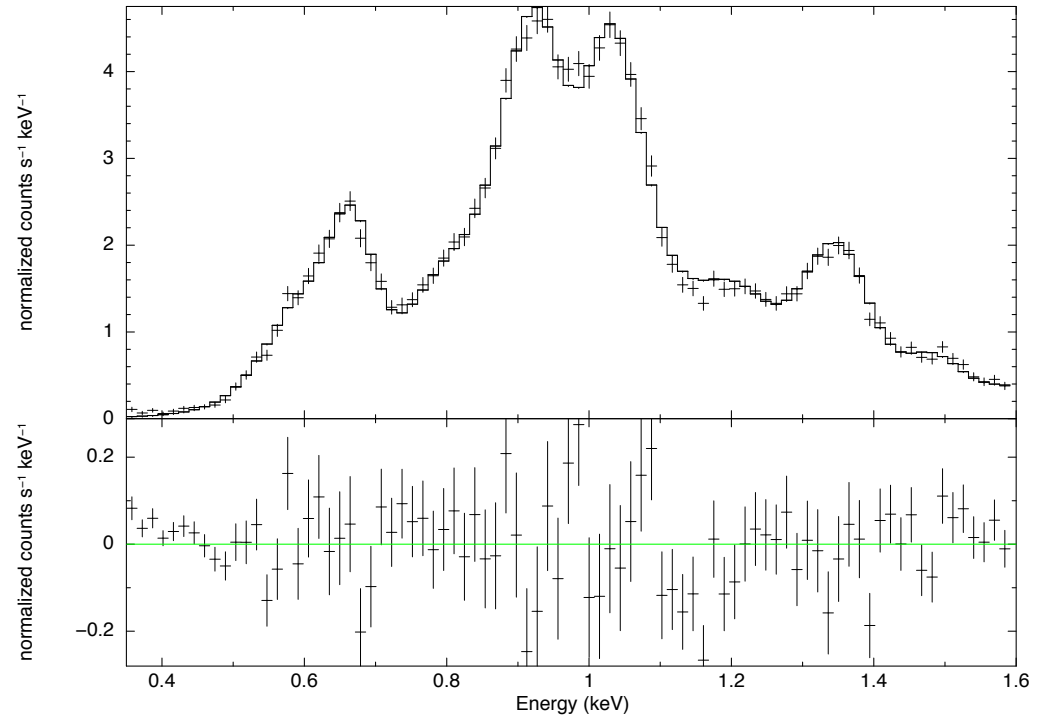
S3 2003

contamN0010, CIAO 4.9, CALDB 4.7.8, Gain correction applied to the data
S3, ObsID 3545, C-stat=142.465, dof=80, Q-stat=146.8, reduced Q stat=1.84



S3 2018

contamN0010, CIAO 4.9, CALDB 4.7.8, Gain correction applied to the data
S3, ObsID 20639, C-stat=128.595, dof=80, Q-stat=165.4, reduced Q stat=2.07





E0102 over Time

E0102 is observed once a year in at the aim point position on I3

Only 5 parameters are free in the fits, a global normalization and the normalizations for O VII, O VIII, Ne IX, and Ne X

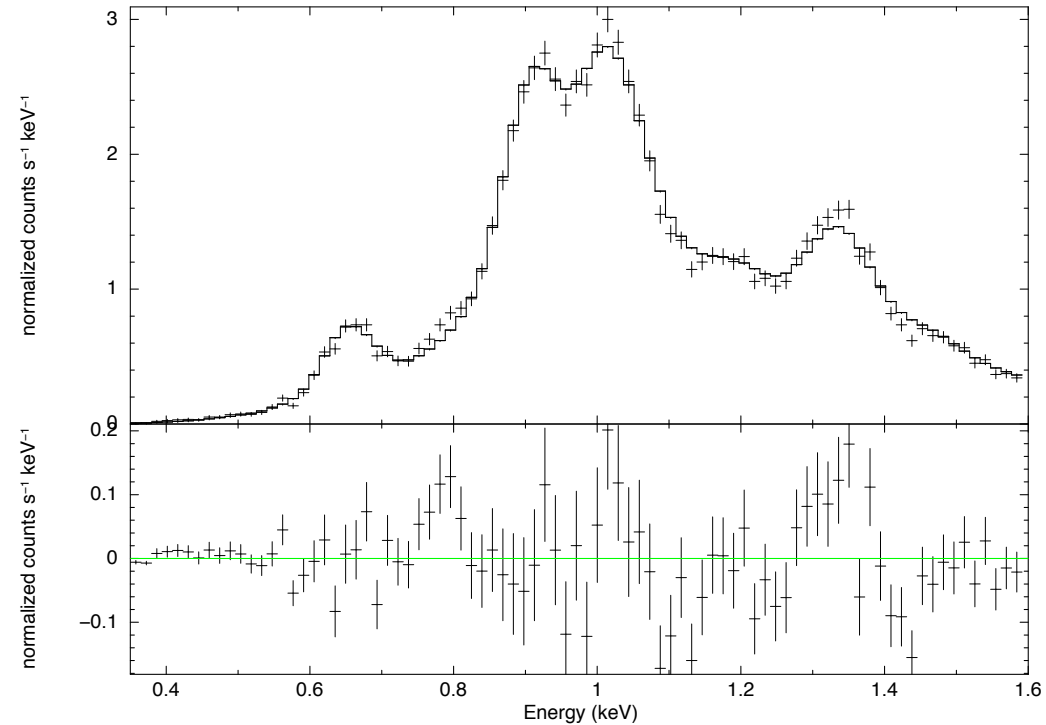
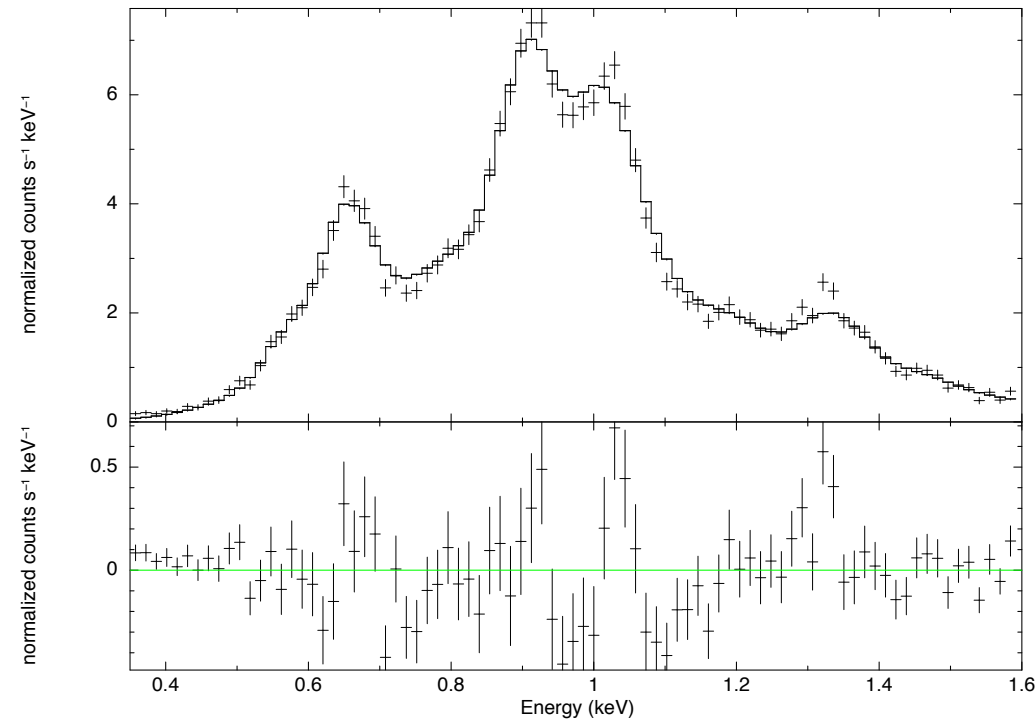
I3 fits would benefit if the Mg XI normalization were free

I3 2006

I3 2018

contamN0010, CIAO 4.9, CALDB 4.7.8, Gain correction applied to the data
I3, ObsID 6756, C-stat=157.157, dof=80, Q-stat=164.1, reduced Q stat=2.05

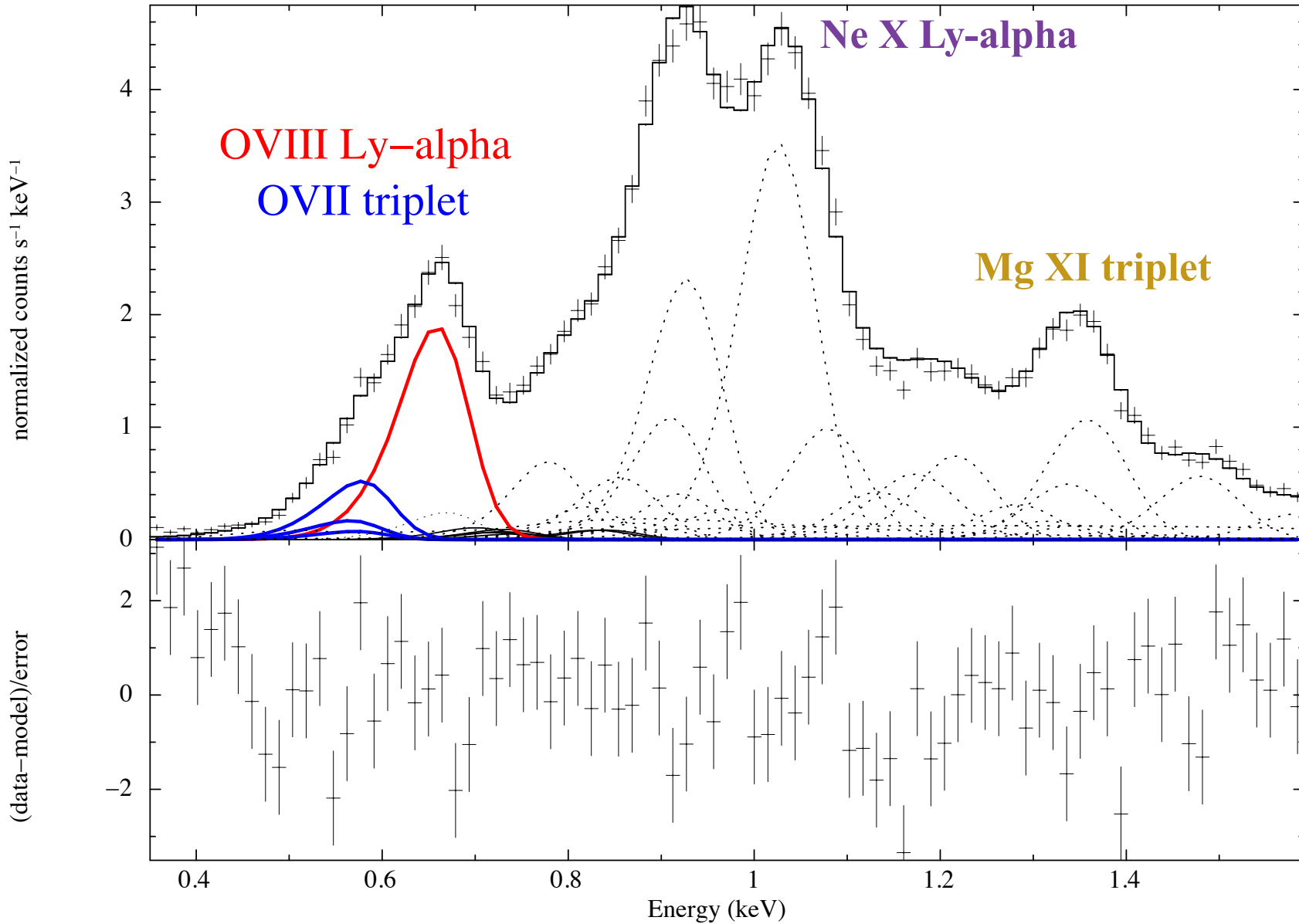
contamN0010, CIAO 4.9, CALDB 4.7.8, Gain correction applied to the data
I3, ObsID 20638, C-stat=145.888, dof=80, Q-stat=145.8, reduced Q stat=1.82





Bright Line Complexes

Ne IX triplet



OBSID 20639

S3 3/2018

It is getting progressively more difficult to constrain the OVII

normalization given the low number of counts.

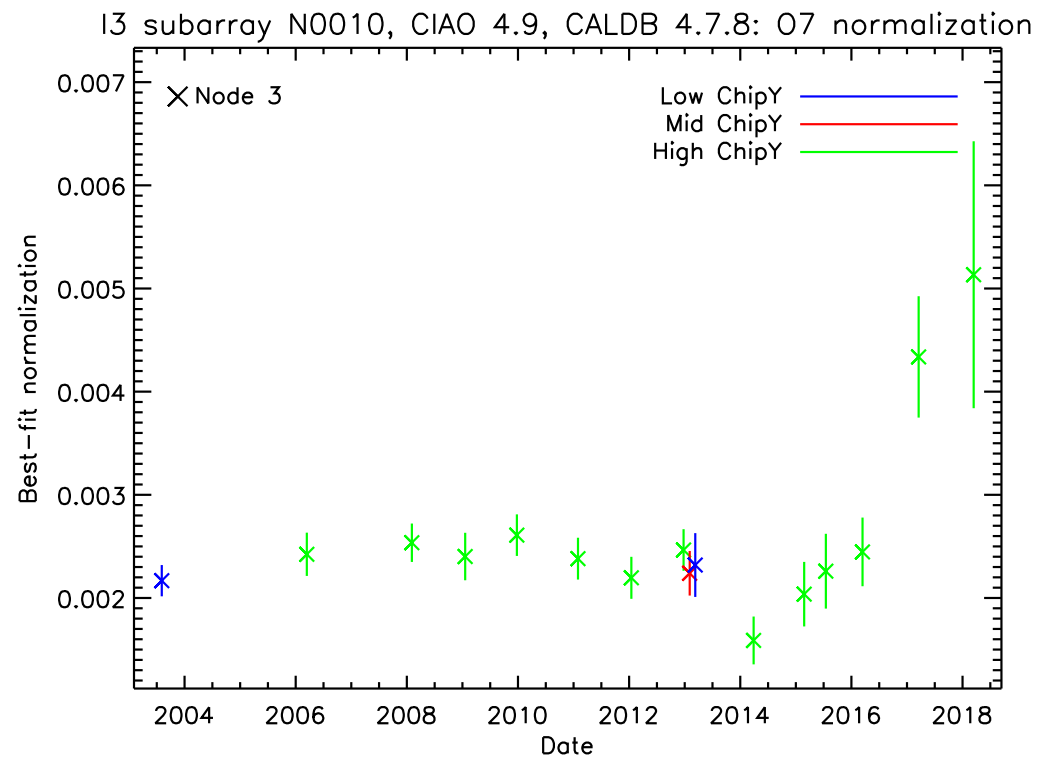
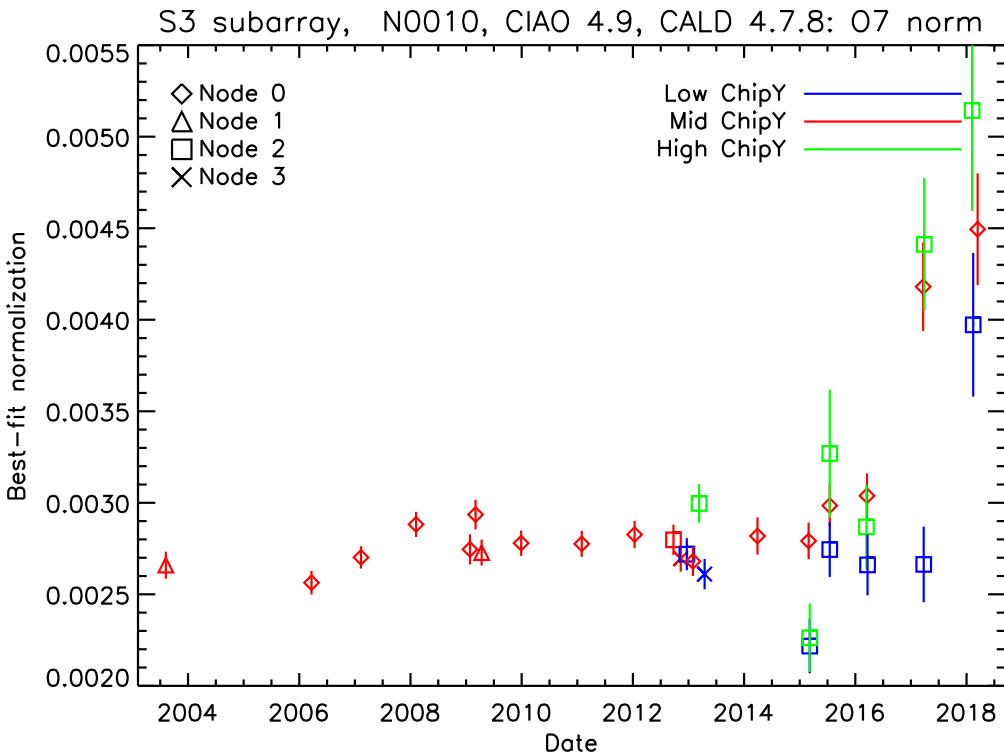


E0102 O VII Line Normalizations

- both S3 and I3 show an increase in the apparent normalization in 2017-2018

S3

I3





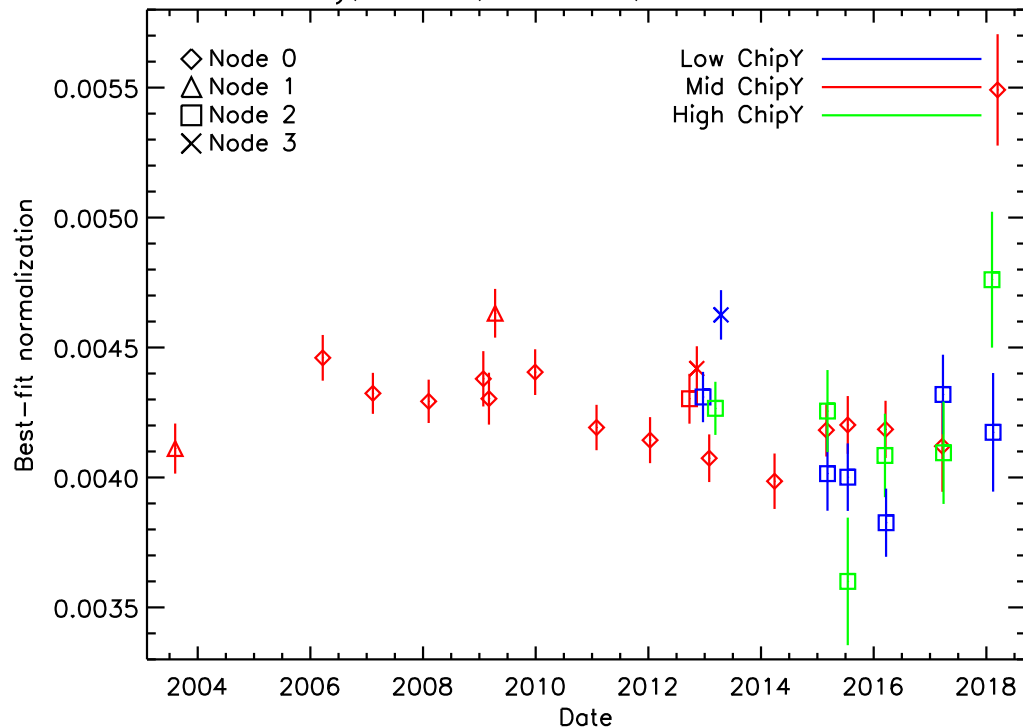
E0102 O VIII Line Normalizations

- S3 shows an increase in the apparent normalization in 2018, largest effect in the middle of the CCD, bottom of the CCD is consistent with previous measurements
- I3 shows an increase in the apparent normalization in 2017-2018

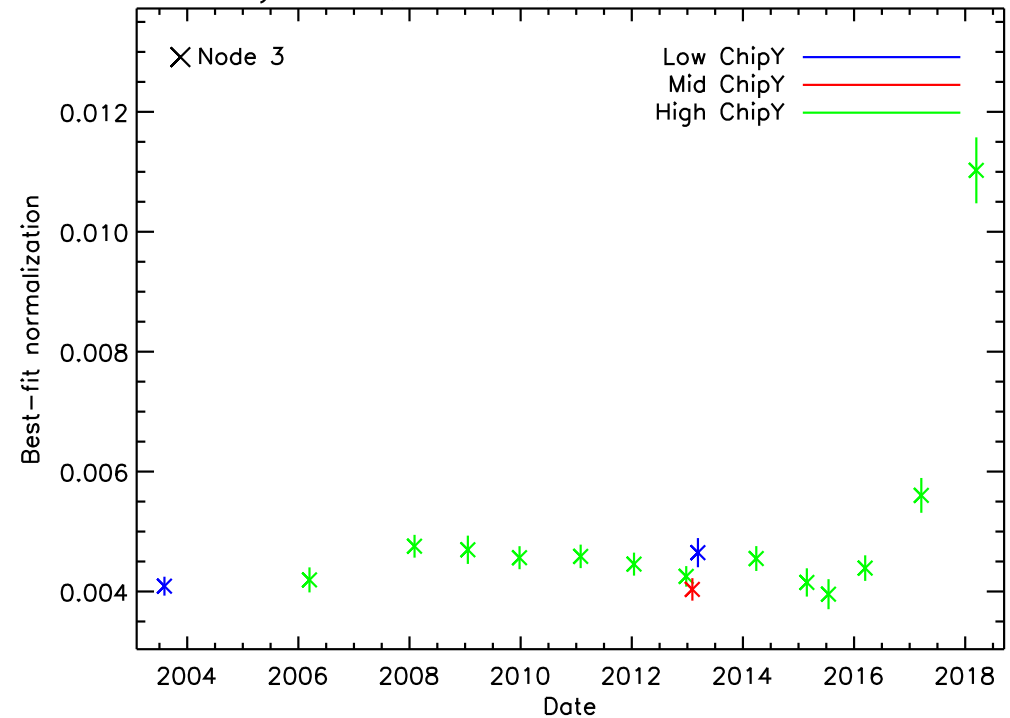
S3

I3

S3 subarray, N0010, CIAO 4.9, CALDB 4.7.8: O8 norm



I3 subarray N0010, CIAO 4.9, CALDB 4.7.8: O8 normalization



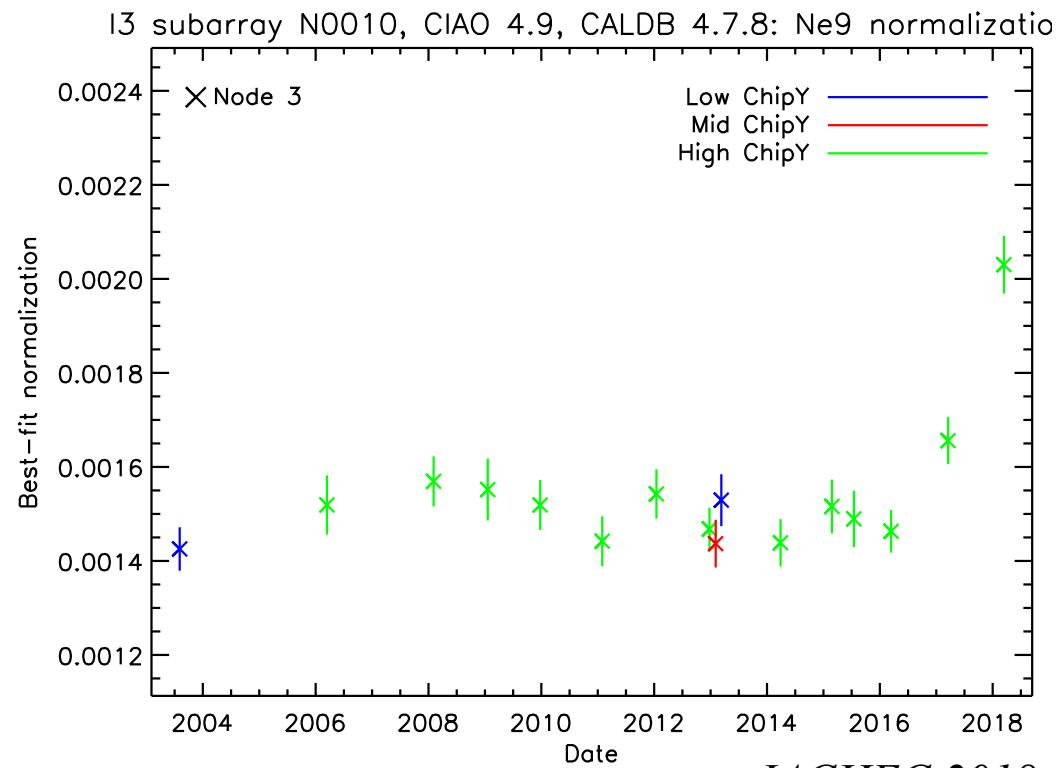
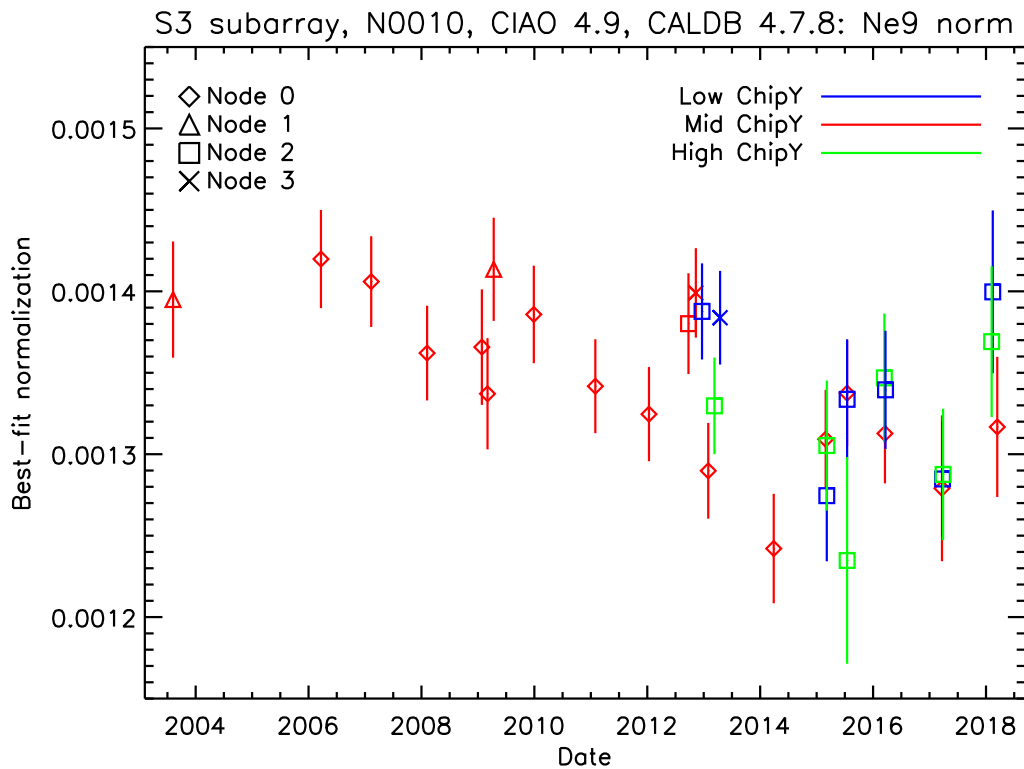


E0102 Ne IX Line Normalizations

- only I3 shows an increase in the apparent normalization in 2017-2018

S3

I3





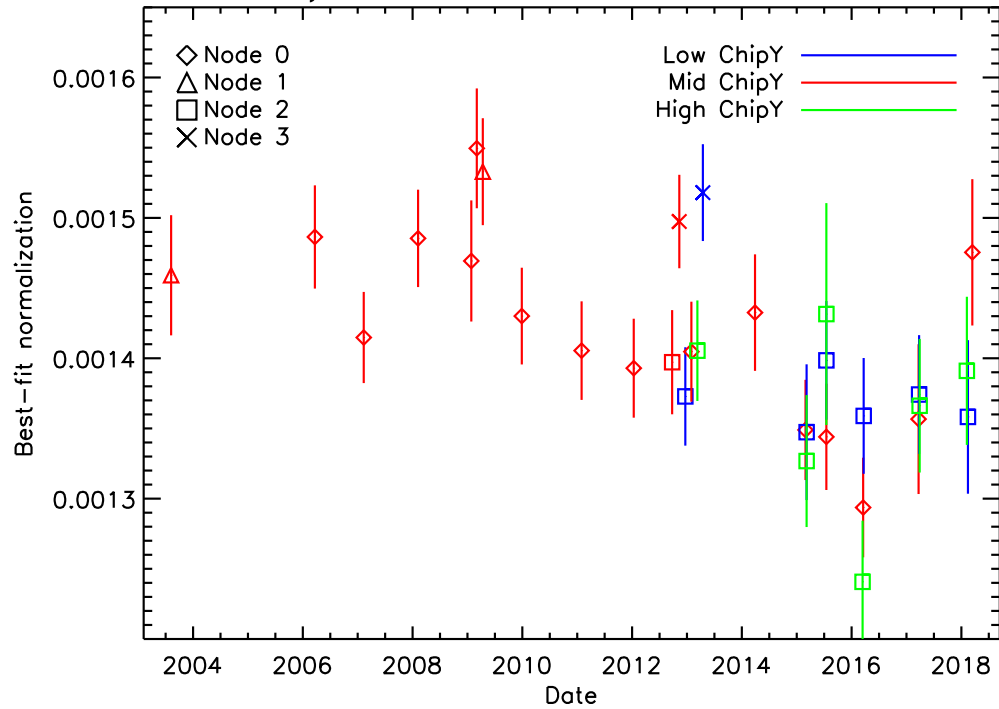
E0102 Ne X Line Normalizations

- only I3 shows an increase in the apparent normalization in 2018

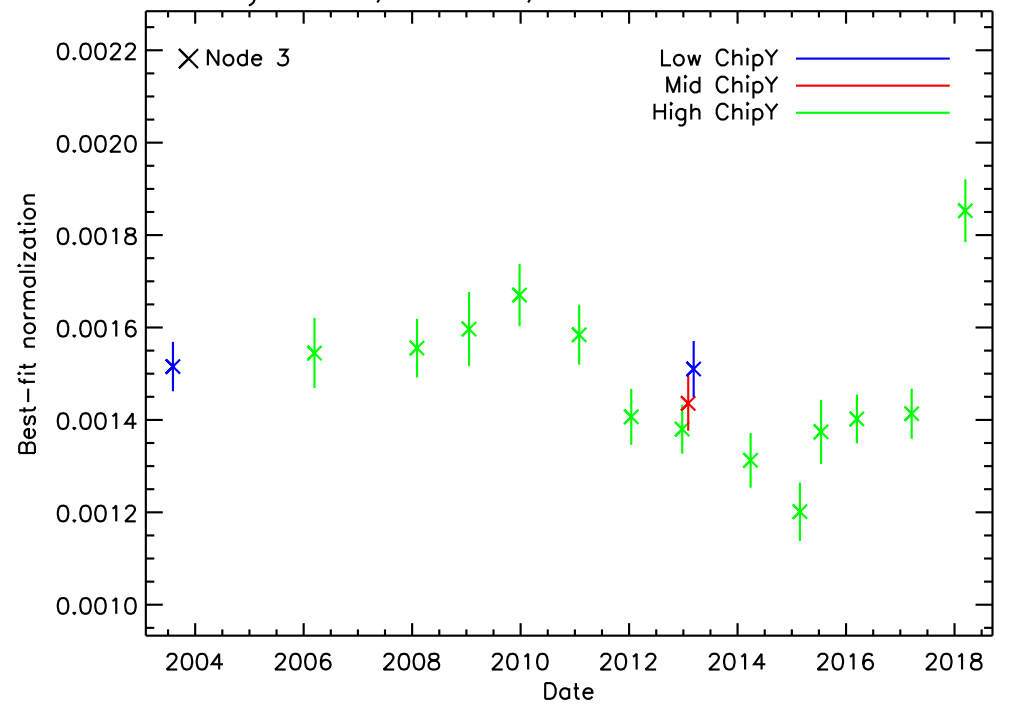
S3

I3

S3 subarray, N0010, CIAO 4.9, CALDB 4.7.8: Ne10 norm



I3 subarray N0010, CIAO 4.9, CALDB 4.7.8: Ne10 normalization





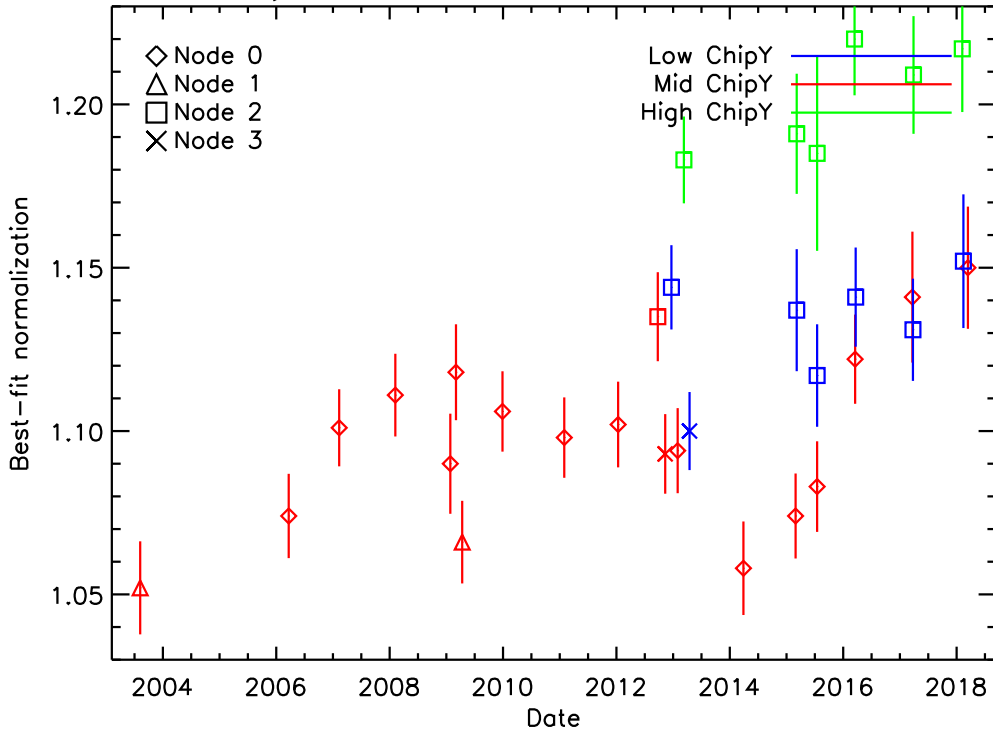
E0102 Global Normalizations

- S3 global normalization is higher for the high chipy positions
- I3 global normalization starts increasing in 2017

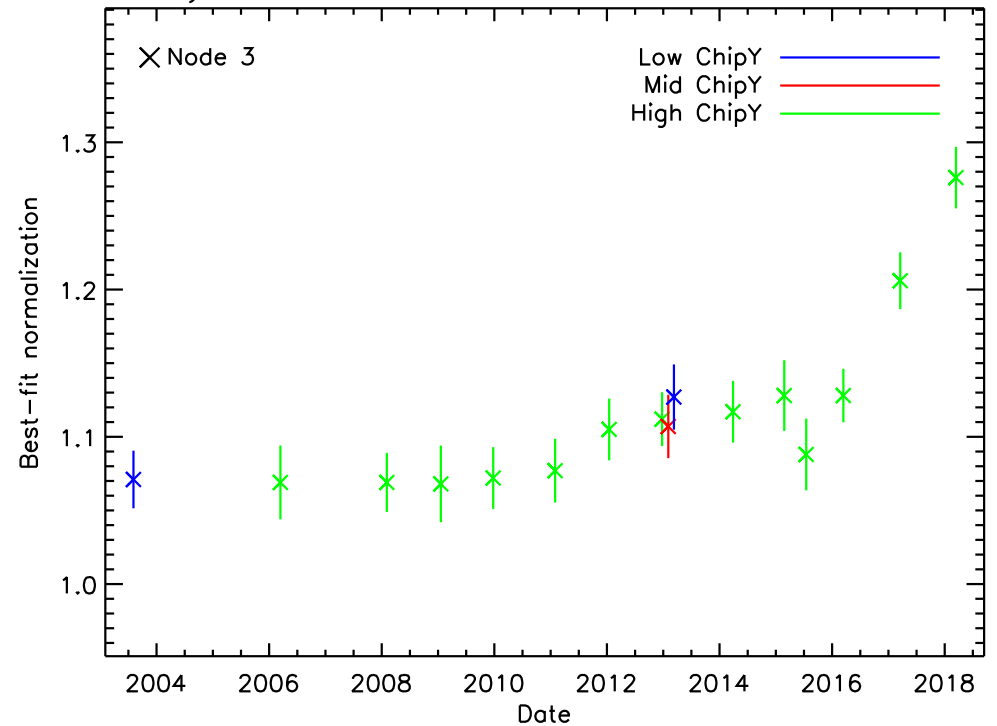
S3

I3

S3 subarray, N0010, CIAO 4.9, CALDB 4.7.8: overall norm



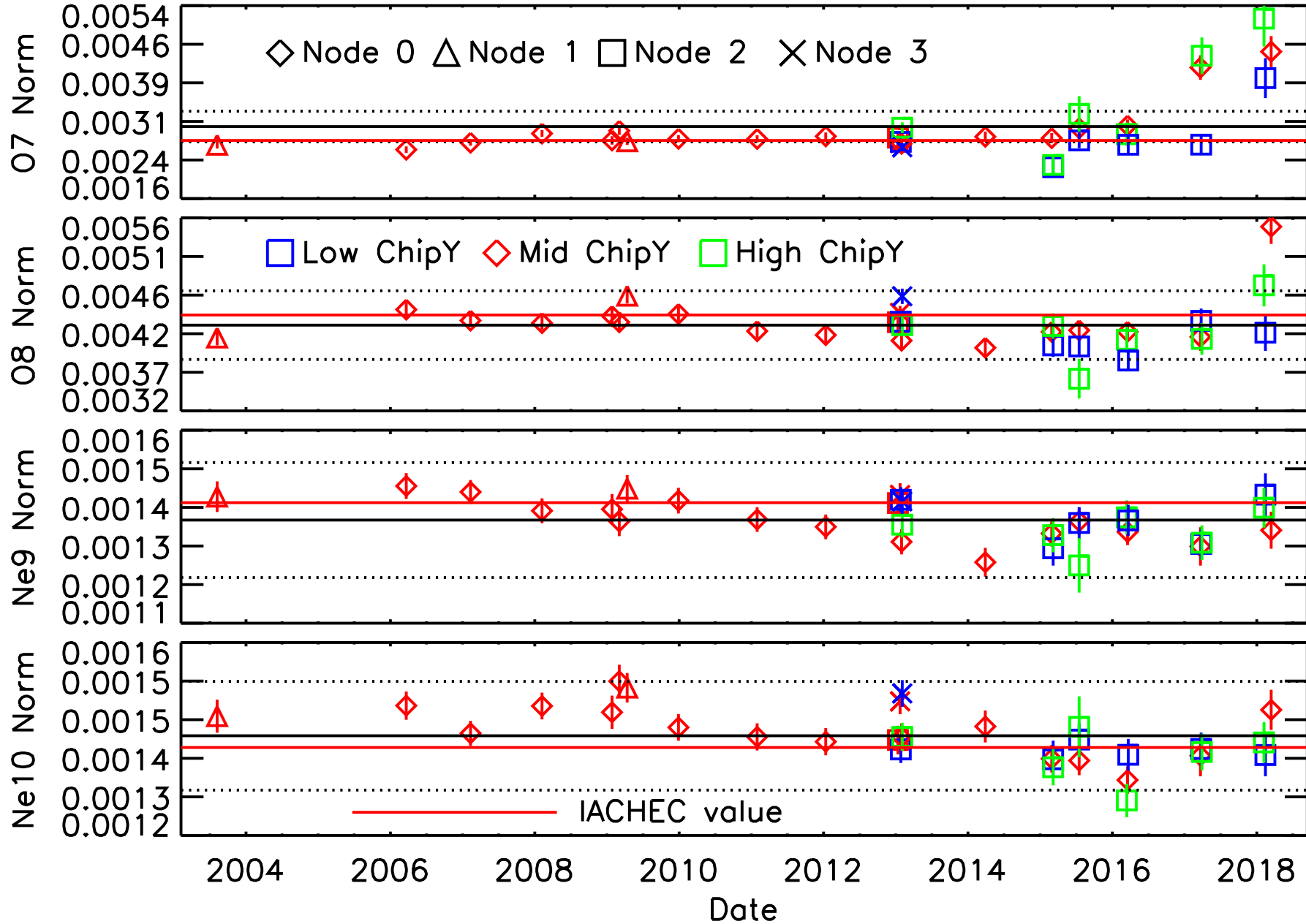
I3 subarray N0010, CIAO 4.9, CALDB 4.7.8: : overall normalizat





S3 subarray, N0010, CIAO 4.9, CALD 4.7.8

Comparison to IACHEC Values

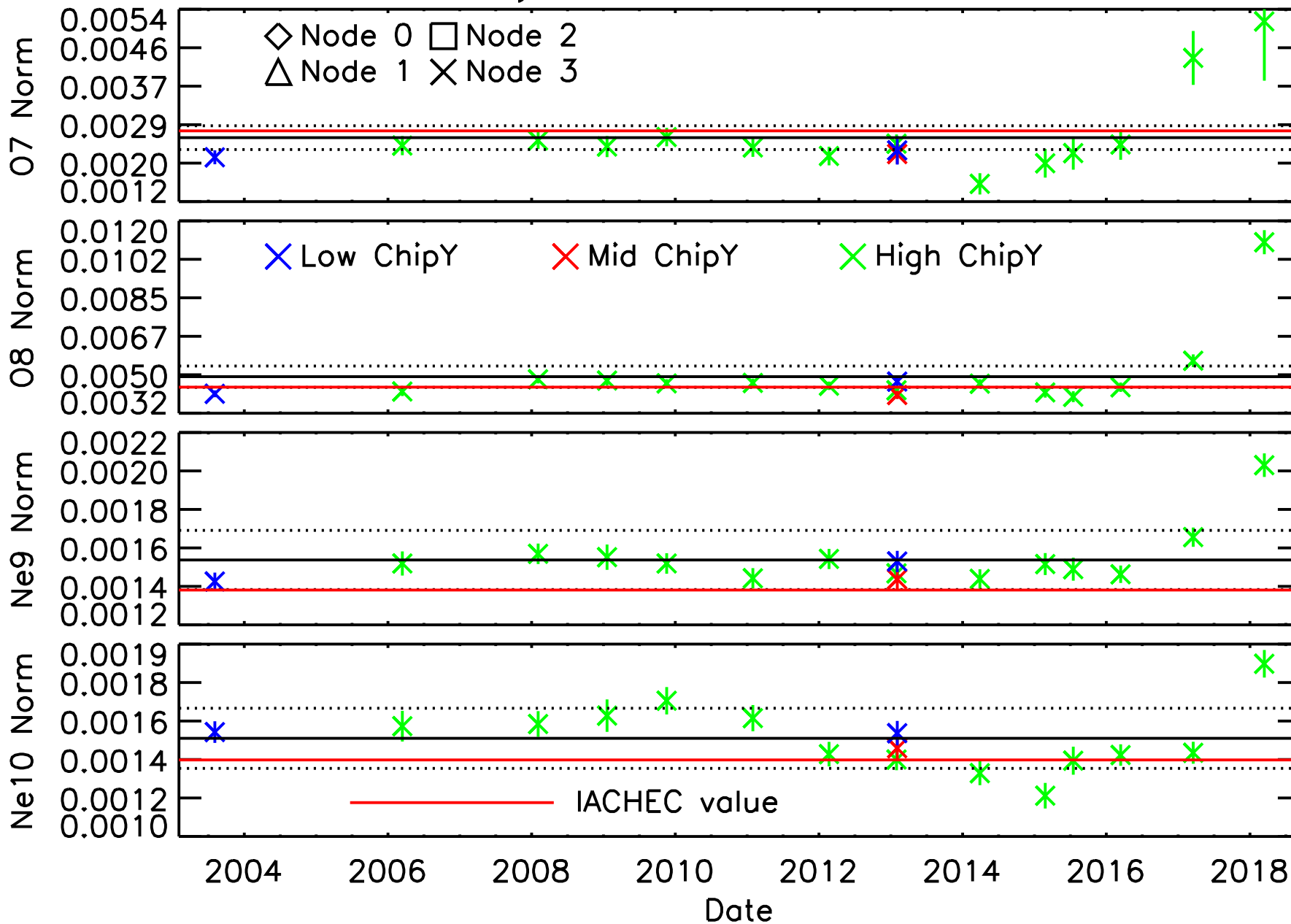


S3



I3 subarray, N0010, CIAO 4.9, CALD 4.7.8

Comparison to IACHEC Values

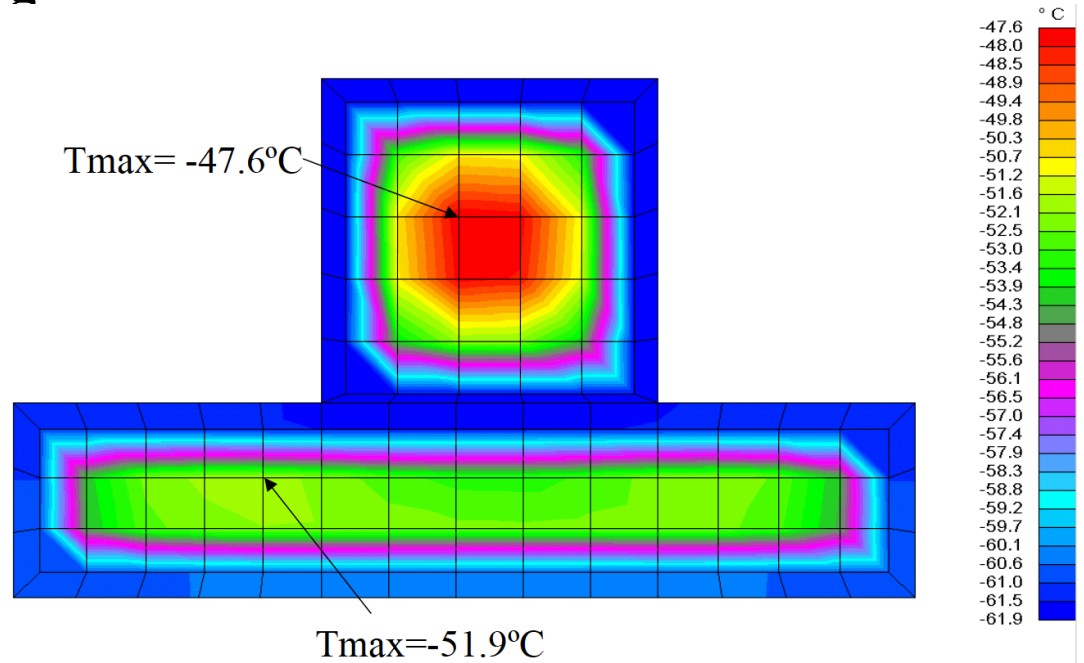
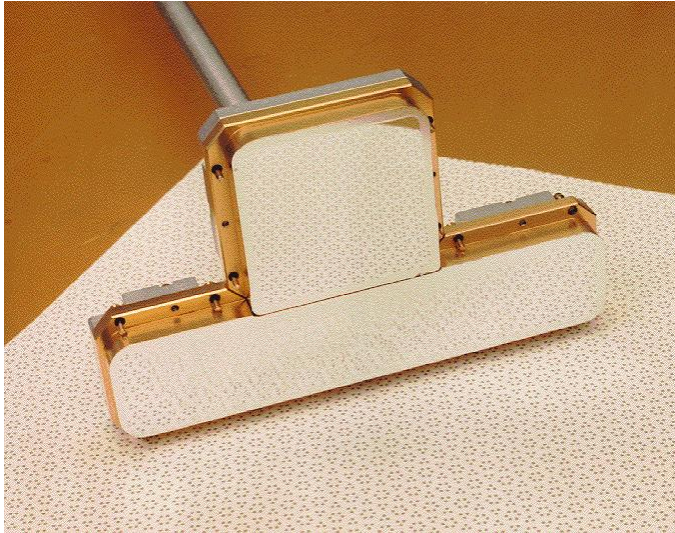


I3



WHY ???

- Why is the contamination apparently over-estimated on S3 and I3 ?
- Why is it over-estimated by the largest amount at the center of I3 ?



Could it be ? Vaporization Rate > Deposition Rate ??

Stay Tuned for IACHEC 2019 in Shonan Village !!!!