Solar/'Cosmic' abundances

$.7 \cdot .0245 = 0.017$ $.7 \cdot .023 = 0.016$ convert Z/Y to Z

$\frac{.14}{\sqrt{2} \cdot .03} = 3.3$ Data from Table 2 shows Asplund et al. 2009 ARA&A under-estimate uncertainties in abundances by about a factor of two. Table 5:

$$\text{logN} := \begin{pmatrix} 10.98 & 0.01 & 10.98 & 0.01 & 10.98 & 0.02 & 10.96 & 0.01 & 0.01 \\ 8.56 & 0.06 & 8.47 & 0.05 & 8.35 & 0.03 & 8.66 & 0.06 & 0.06 \\ 7.96 & 0.06 & 7.87 & 0.05 & 7.76 & 0.05 & 7.85 & 0.06 & 0.08 \\ 8.87 & 0.06 & 8.73 & 0.05 & 8.76 & 0.03 & 8.8 & 0.04 & 0.04 \\ 8.12 & 0.06 & 7.97 & 0.1 & 8.08 & 0.03 & 8 & 0.08 & 0.04 \\ 7.62 & 0.05 & 7.64 & 0.04 & 7.56 & 0.05 & 0 & 0 & 0.04 \\ 7.59 & 0.05 & 7.55 & 0.04 & 7.5 & 0.02 & 0 & 0 & 0.08 \\ 7.37 & 0.11 & 7.16 & 0.03 & 7.21 & 0.13 & 7.3 & 0.04 & 0.09 \\ 6.44 & 0.06 & 6.44 & 0.13 & 6.66 & 0.06 & 6.62 & 0.06 & 0 \\ 7.55 & 0.05 & 7.54 & 0.04 & 7.44 & 0.04 & 0 & 0 & 0.14 \end{pmatrix} \quad \text{Elements} := \begin{pmatrix} \text{He} \\ \text{C} \\ \text{N} \\ \text{O} \\ \text{Ne} \\ \text{Mg} \\ \text{Si} \\ \text{S} \\ \text{Ar} \\ \text{Fe} \end{pmatrix}$$

$\text{rows}(\text{logN}) = 10$ $i := 0 .. \text{rows}(\text{logN}) - 1$ $j := 0 .. 3$

$j =$

0
1
2
3

Abundance data from:
Grevesse & Sauval 1998
Asplund et al. 2009 ARA&A
B stars Przybilla et al. 2008 & others
HII regions Esteban et al. 2005 & others

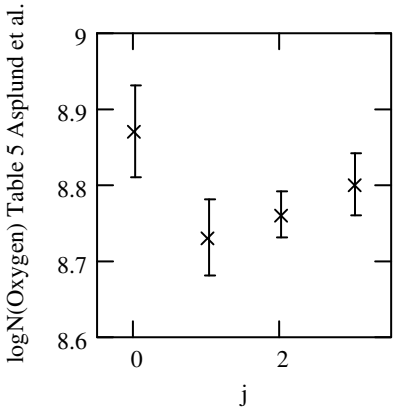
$\text{Oxygen} := 3$

$\text{logNO}_j := \text{logN}_{\text{Oxygen}, 2 \cdot j}$

$\sigma O_j := \text{logN}_{\text{Oxygen}, 2 \cdot j + 1}$

$$\text{logNO} = \begin{pmatrix} 8.87 \\ 8.73 \\ 8.76 \\ 8.8 \end{pmatrix}$$

vs. 8.66+/.05 Asplund et al. 2005, increased by 0.07 (1.5 sigma) in 4 years, yet more evidence that Asplund et al. are underestimating uncertainties.



So, recognizing that Asplund et al. are underestimating uncertainties by about a factor of two, and rejecting the notion of "correcting" the solar abundances to account for heavy element enrichment over the last 4.567 billion years (the last 2 points represent abundances in B stars and HII regions respectively)[after all, the Sun could have been 'precocious' (i.e. born in a region enriched, on average, from it's neighbors)], all the Oxygen data is consistent with 8.80 +/- 0.05. Certainly the uncertainty in the abundance of anything (save, maybe, He) can't be less than 10%, or 0.04 DEX.