How to use the solar abundances in Asplund et al. (2009)

Table 1 in this paper provides a summary of recently measured abundances of various elements in the Sun. These measurements were made using two techniques: (1) analysis of absorption lines from the solar photosphere, and (2) measurement of the composition of meteorites.

The abundances are traditionally reported in a somewhat peculiar format. The table lists the following quantity,

\[
\log \left[ \frac{N(X)}{N(H)} \right]_{\text{solar}} + 12,
\]

where 'X' is the element of interest. The addition of 12 has been done for years and years; this was probably mathematically convenient back in the day when scientists did more calculations in their heads.

**Example:** suppose you would like to know the abundance of silicon in the Sun. From the table, we see that both the photospheric and meteoritic measurements have a value of 7.51. We must subtract 12 from this quantity to get the actual logarithmic abundance,

\[
\log \left[ \frac{N(\text{Si})}{N(\text{H})} \right]_{\text{solar}} = -4.49,
\]

and the linear abundance is:

\[
\frac{N(\text{Si})}{N(\text{H})} = 10^{-4.49} = 3.24 \times 10^{-5},
\]

i.e., there are about 3 silicon atoms for every 100,000 hydrogen atoms in the sun.

The full reference for this paper is: