that the ionizing flux increased by the same amount as the observed continuum.† The continuum changed by about 0.2 magnitudes or 20%, which corresponds to $\Delta\log(U)\simeq 0.08$. We measure a change in optical depth (τ) for C IV of (roughly) 0.53 to 0.22 (assuming resolved troughs and a covered continuum source). For N V, we find the change to be 0.94 to 0.53. Since, τ is roughly proportional to column density (see BJB and references therein), and column density is proportional to fractional abundance (we assume no change in total column density), we find $(fa_2 - fa_1)/fa_1 \sim 0.58$ for C^{+3} and 0.44 for N^{+4}. Note that this agrees qualitatively with the fact that as we move further from U_p for a particular ion, the fractional change in column density increases. That is, if $U > U_p(N^{+4})$ and the ionization is increasing, we should see larger fractional changes in C^{+3} than in N^{+4} (see figure 3–5 and 3–6).‡

Referring to figure 3–5, we see that these changes would require very high values of U ($\gtrsim 1$). A more probable case is that the ionizing flux increased by more than 20%, and thus $\Delta\log(U)\gtrsim 0.1$. Unfortunately, the fractional changes for C^{+3} and N^{+4} are very similar above $U \gtrsim -0.8$, otherwise we could solve for the ionizing flux change *and* U using the ion changes. If we assumed $\Delta\log(U)\sim 0.2$, referring to figure 3–6, we find that $U \sim 0$. However, the ionizing flux change may be even higher, and the only firm limit we can put is $U \gtrsim U_p(N^{+4})$.

We conclude that, other than a high U, the changes in this object also require that the ionizing flux change by a significantly larger fraction than the observed continuum level at $\sim$1500Å (rest frame).

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† Note that most of our studies appear to require larger fractional changes in the ionizing flux, to account for the large BAL changes with only small observed continuum changes.

‡ A similar qualitative agreement with the photoionization model was seen in the changes in UM 232 (see BJB), for the BALs of C IV, Si IV, and Al III. Note that for a dynamical change, such as clouds moving across the line-of-sight, we would expect to see *equal* fractional changes in column densities of the different ions.