Mon. Not. R. Astron. Soc. **000**, 000–000 (0000) Printed March 28, 2013 (MN LATEX style file v2.2)

Description of Keck HIRES data reduction steps

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March 28, 2013

ABSTRACT

Material that may get included in a paper. Describes the data reduction steps carried out for the Keck HIRES spectra of the Orion proplyds. Basic reduction steps: order extraction, wavelength calibration, detilting, de-overlapping, flat-fielding. Decomposition into continuum plus line. Deconvolution of fine-structure multiplets. Decomposition of line into sky plus nebula plus proplyd. Sample results for slit p84 from the giant proplyd 244-440.

1 BASIC REDUCTION

2 DECOMPOSITION

2.1 Continuum subtraction

We fit the continuum and subtract it.

2.2 Deconvolution of multiplets

For the O I lines

2.3 Nebular subtraction

3 SAMPLE RESULTS: 244-440 SLIT 84

3.1 High-ionization lines

3.2 Moderate-ionization lines

3.3 Low-ionization lines

3.4 Neutral collisional lines

3.5 [O I] lines

3.6 Fluorescent lines

3.6.1 [N I] lines

3.6.2 O I lines

3.6.3 Fe II lines

3.6.4 Si II lines

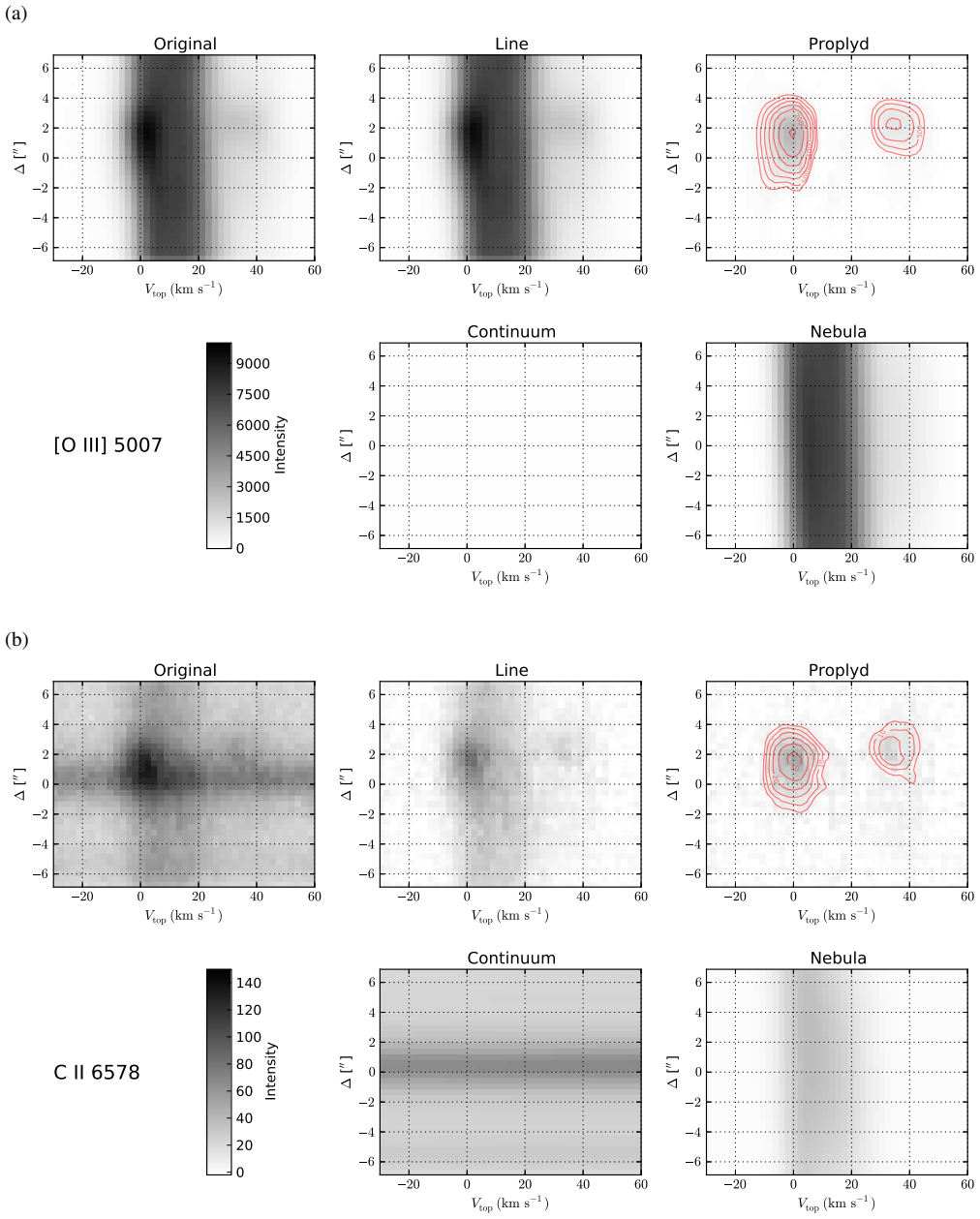

Figure 1. (a) Collisionally excited forbidden line of doubly ionized oxygen: [O III] λ5007. (b) Recombination line of singly ionized carbon: C II λ6578

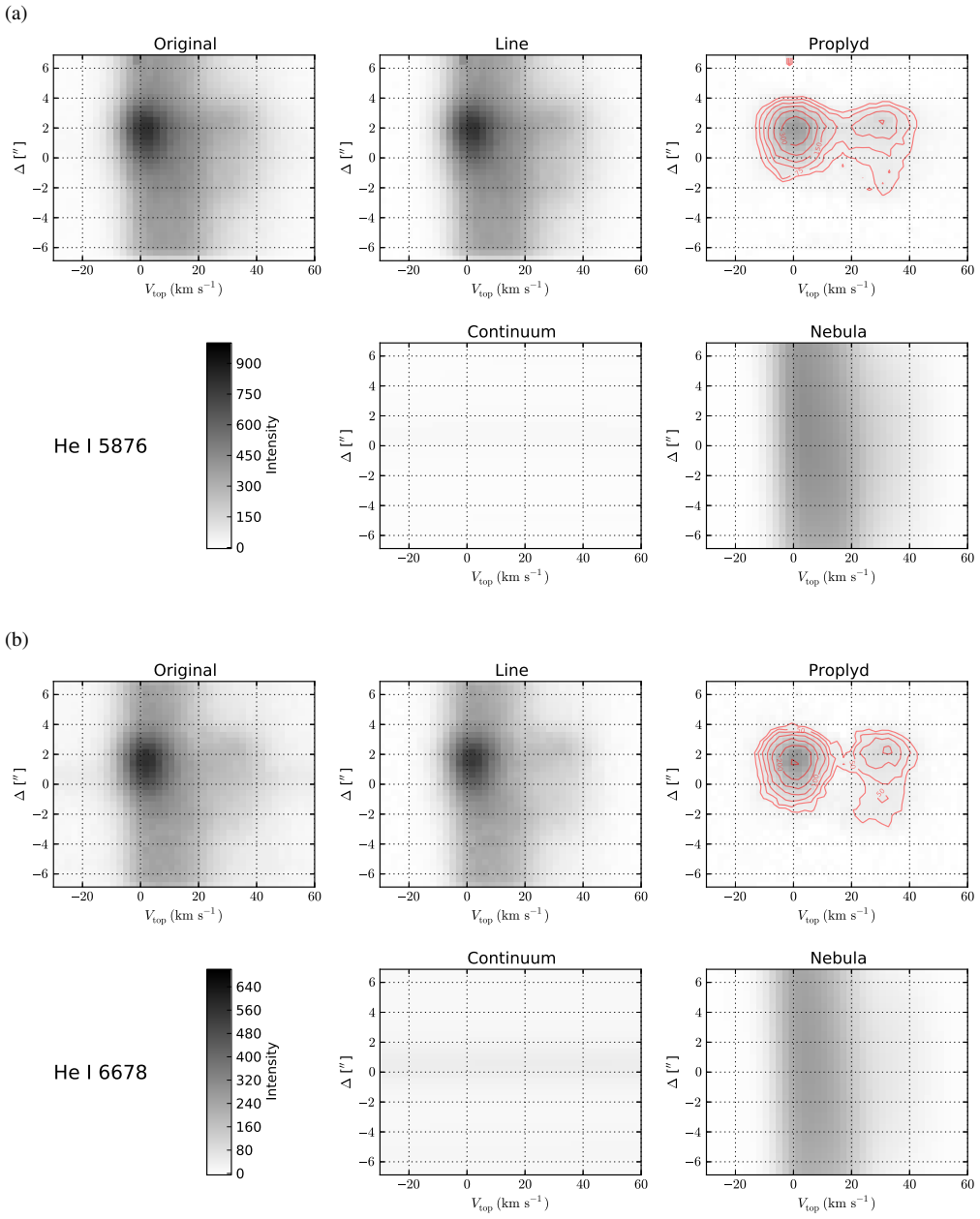

Figure 2. Recombination lines of neutral helium: (a) He I λ5876 triplet; (b) He I λ6678 singlet.

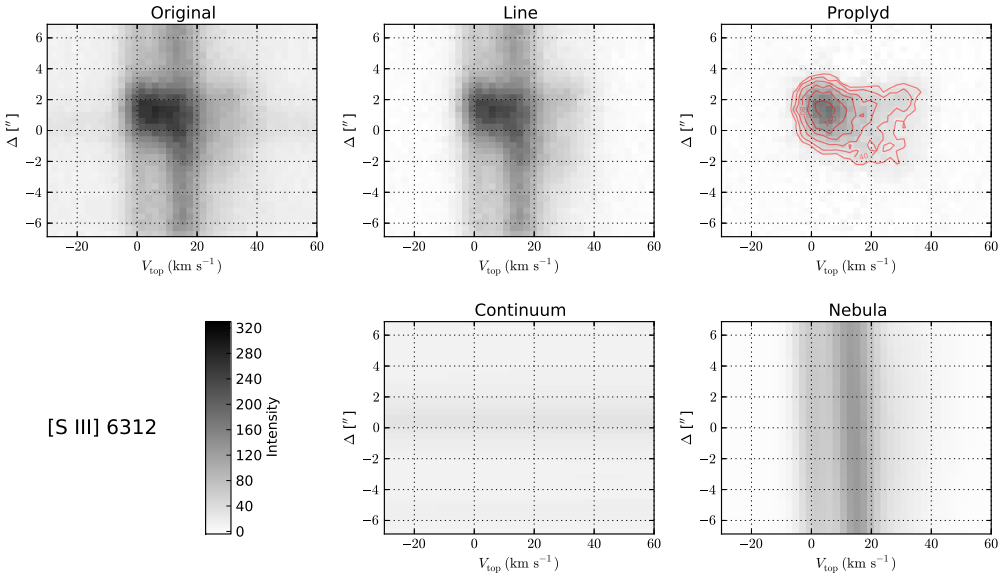

Figure 3. Collisionally excited line of doubly ionized sulfur: [S III] λ6312.

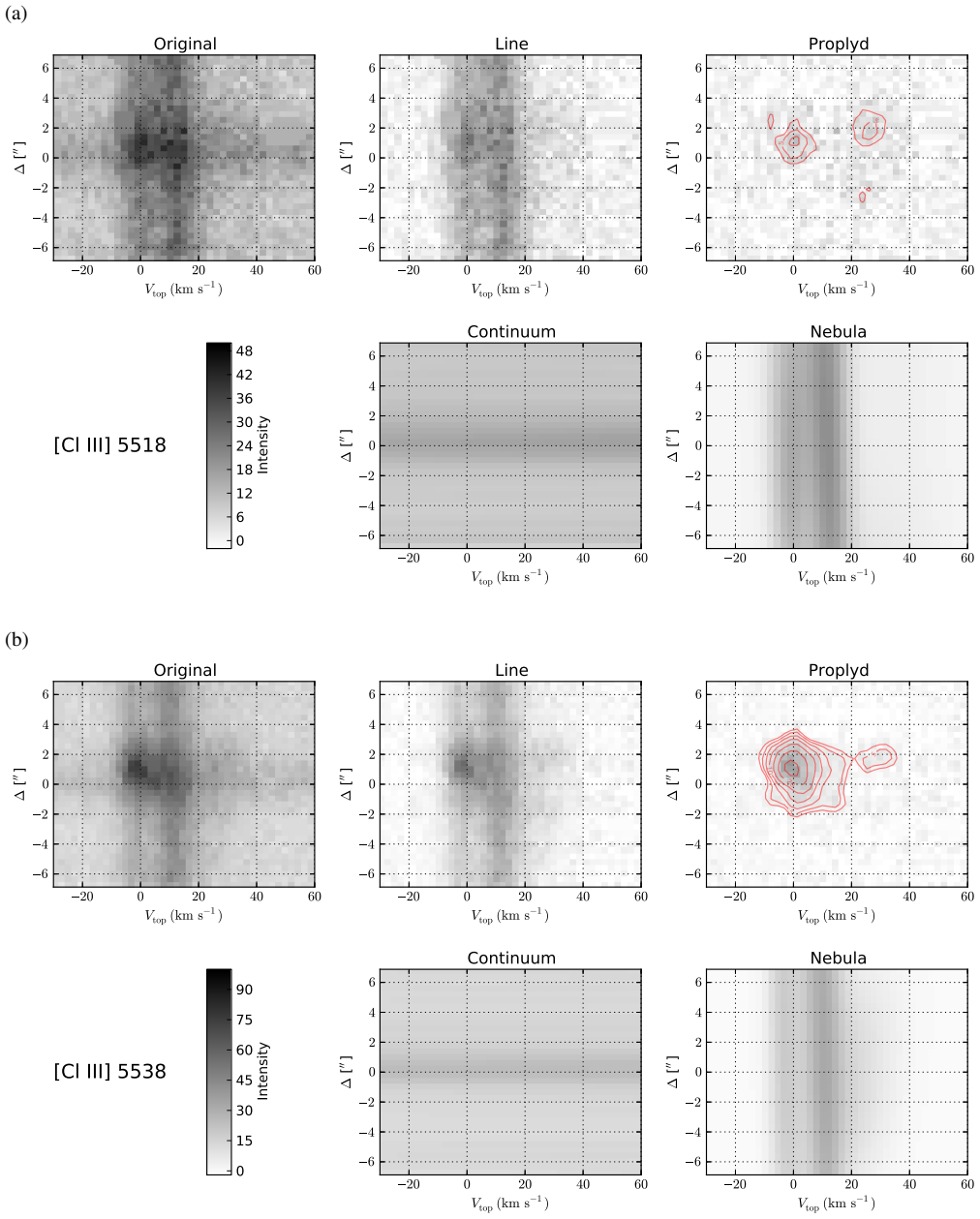

Figure 4. Collisionally excited lines of doubly ionized chlorine: (a) [Cl III] λ5518; (b) [Cl III] λ5538.

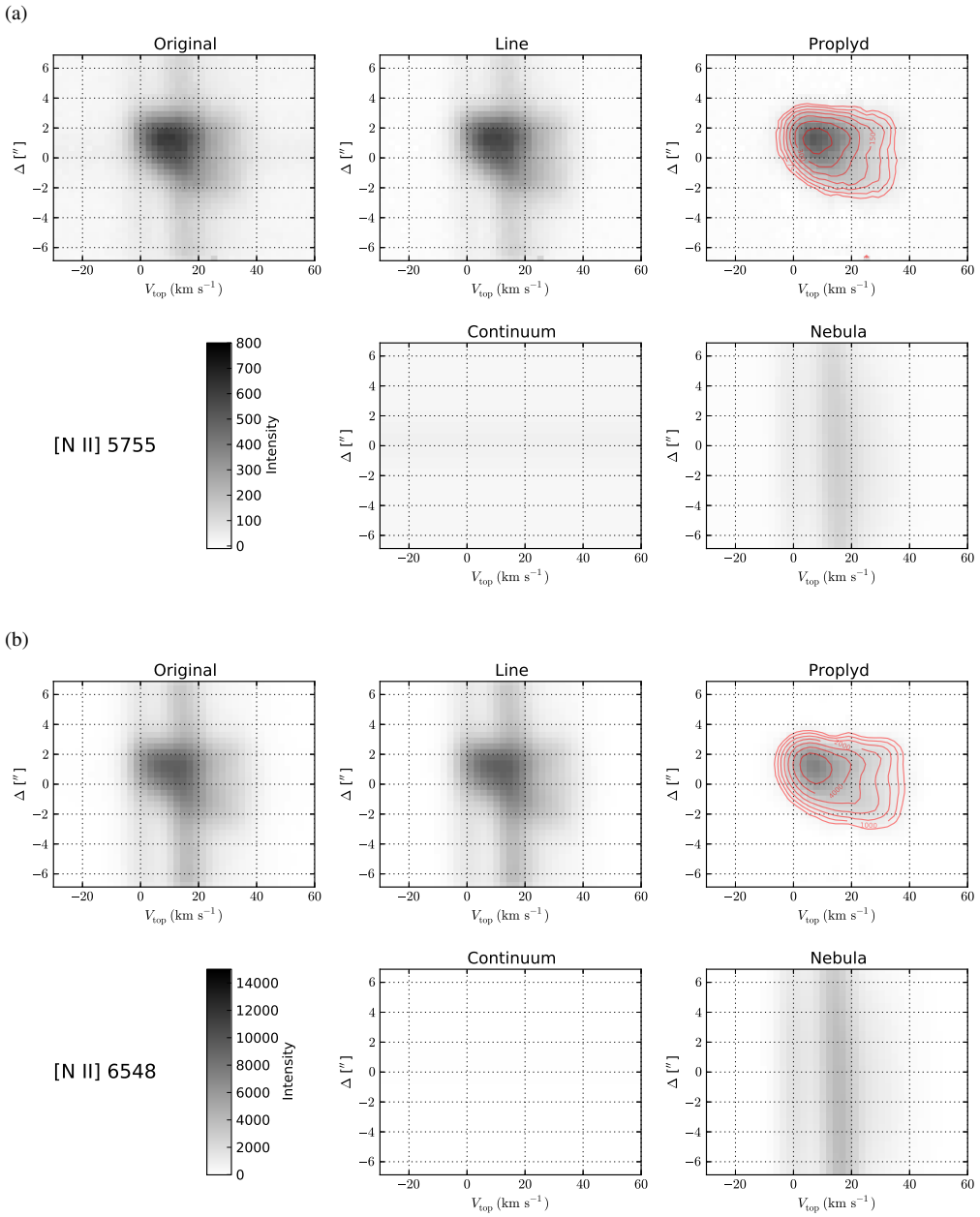

Figure 5. Collisionally excited lines of singly ionized nitrogen: (a) [N II] $\lambda 5575$ auroral line; (b) [N II] $\lambda 6548$ nebular line.

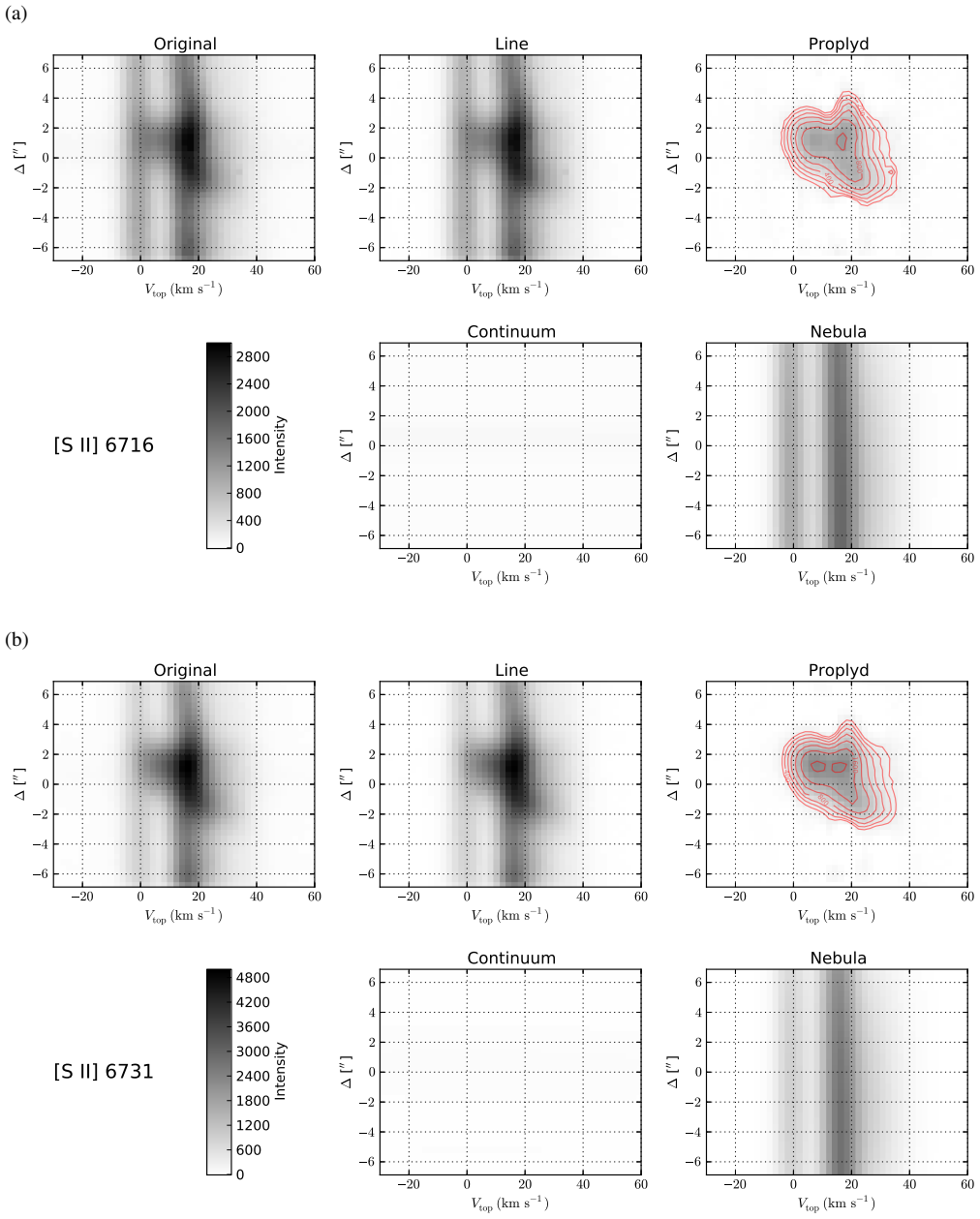

Figure 6. Collisionally excited lines of singly ionized sulfur: (a) [S II] λ6731; (b) [S II] λ6716.

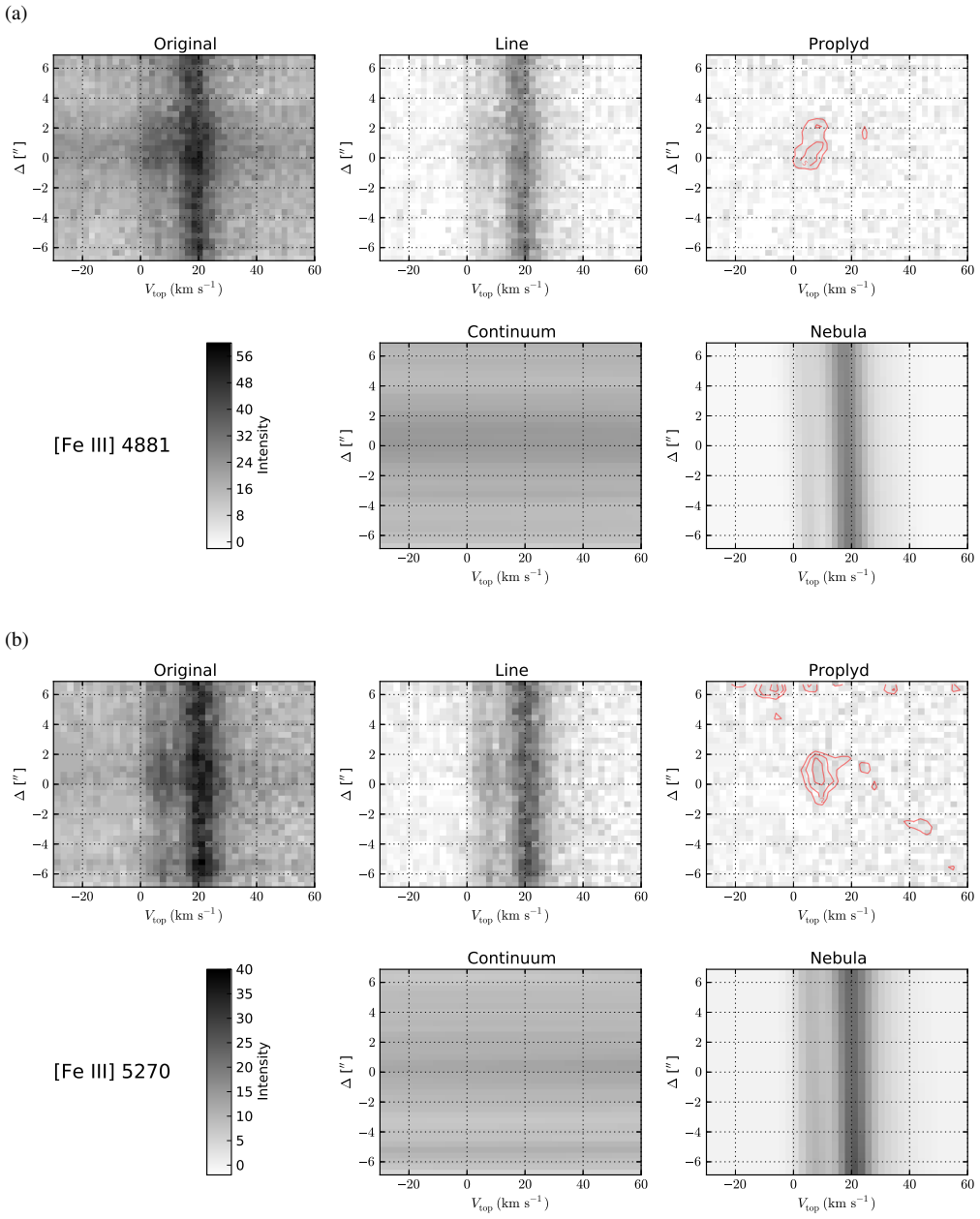

Figure 7. Collisionally excited lines of doubly ionized iron: (a) [Fe III] λ4881; (b) [Fe III] λ5270.

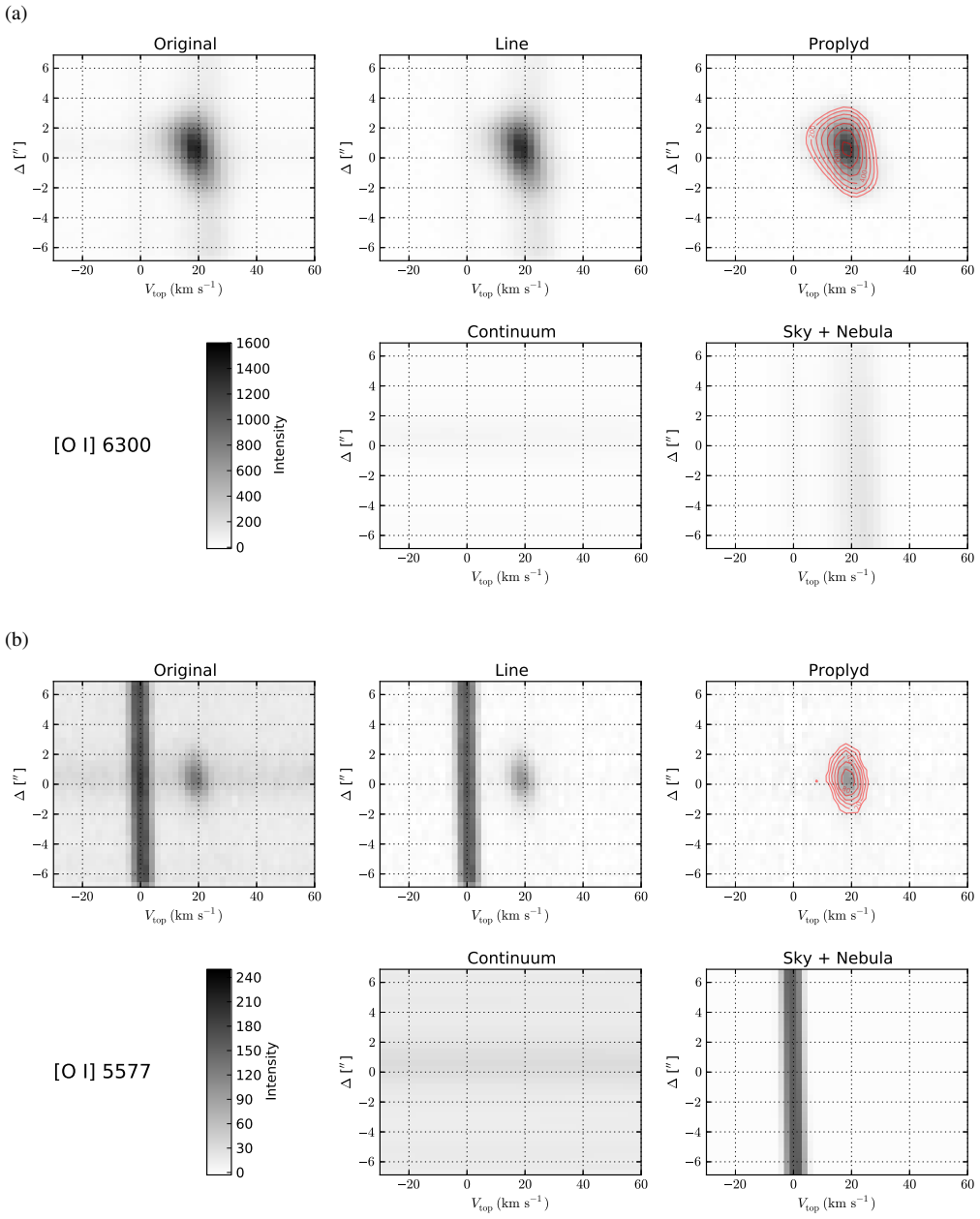

Figure 8. Collisionally excited forbidden lines of neutral oxygen: [O I] λ6300 and λ5577

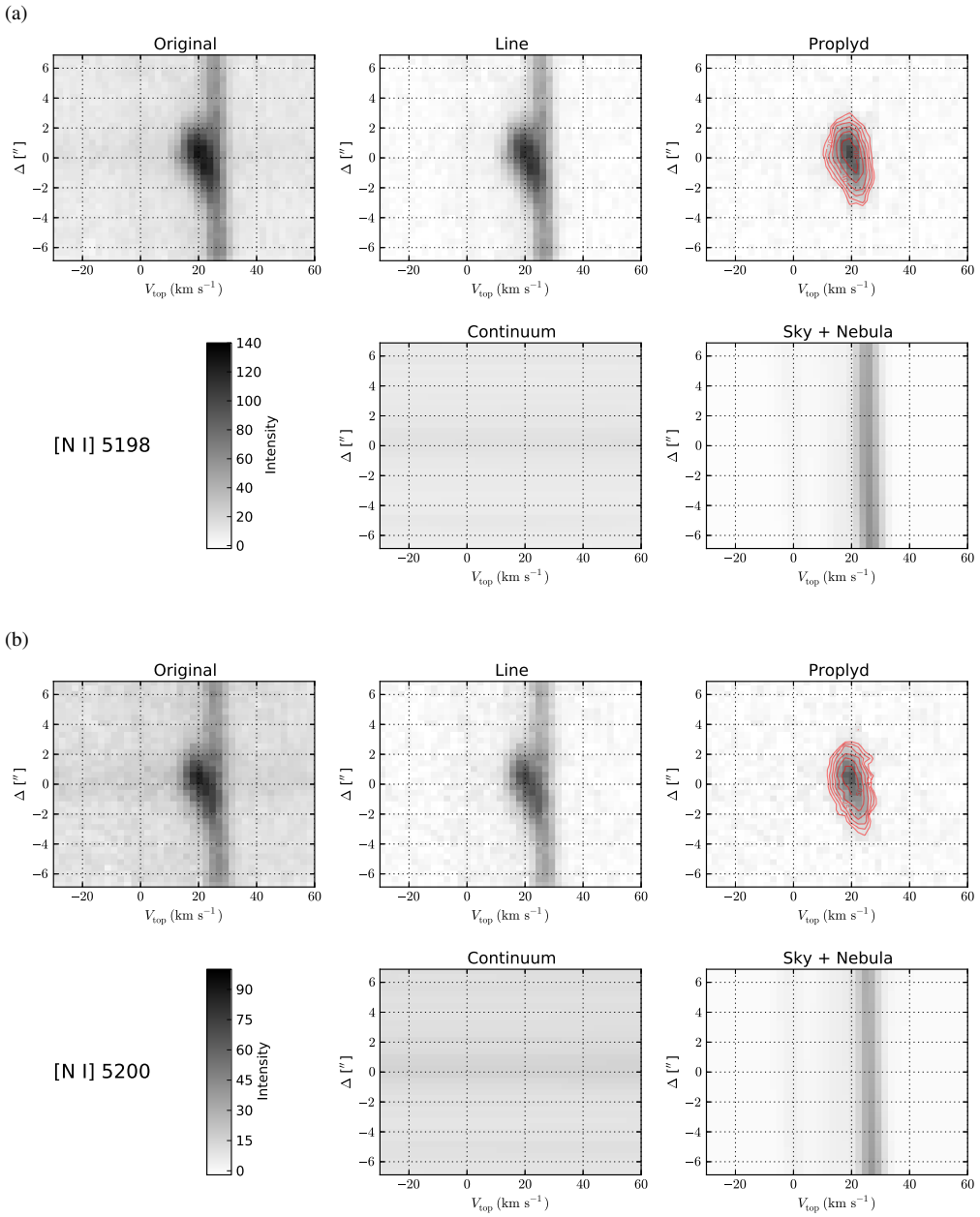

Figure 9. Continuum fluorescence-excited forbidden lines of neutral nitrogen: [N I] $\lambda\lambda$5198, 5200

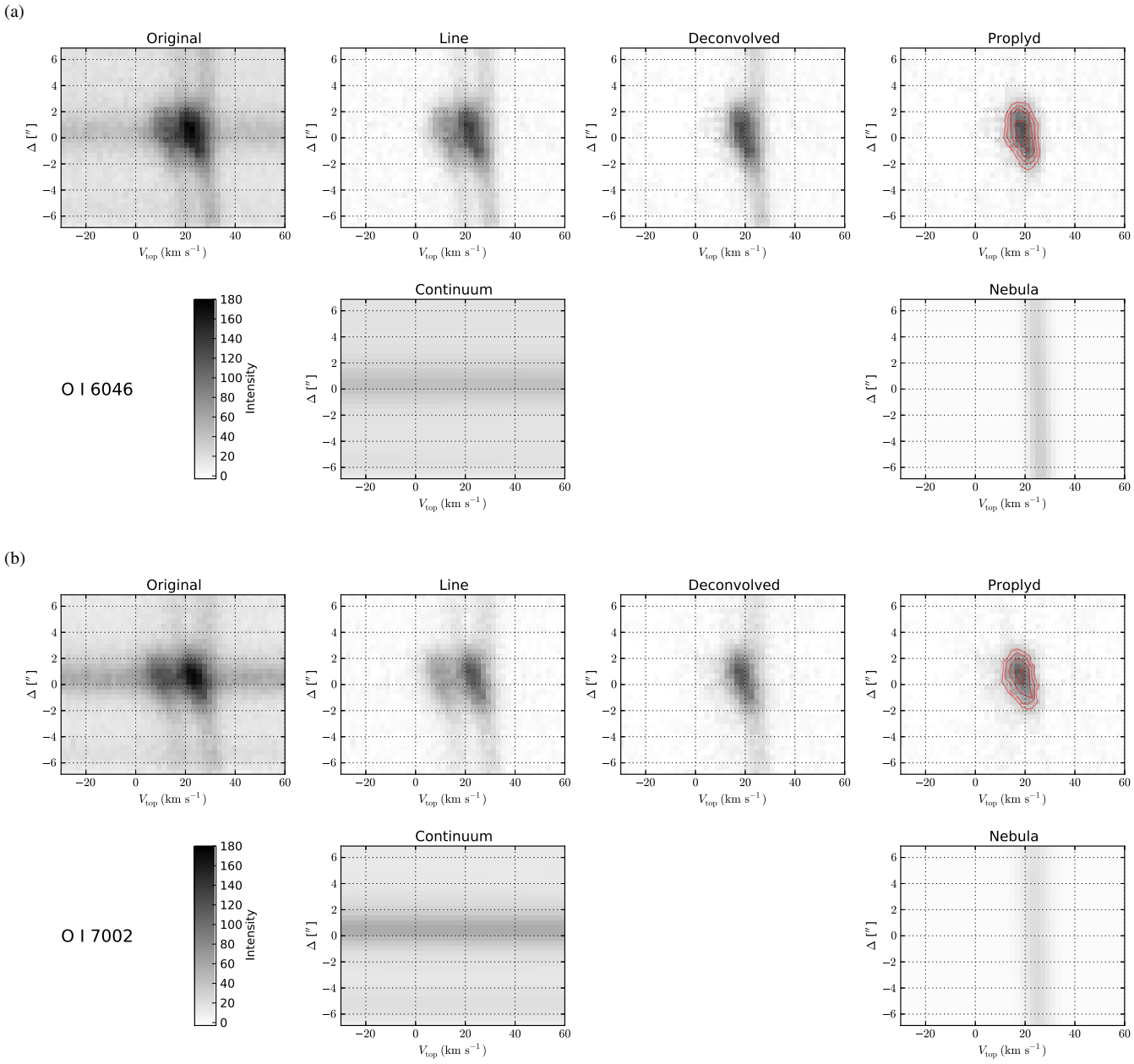

Figure 10. Continuum fluorescence-excited forbidden lines of neutral oxygen: [O I] λ6046 and λ7002.

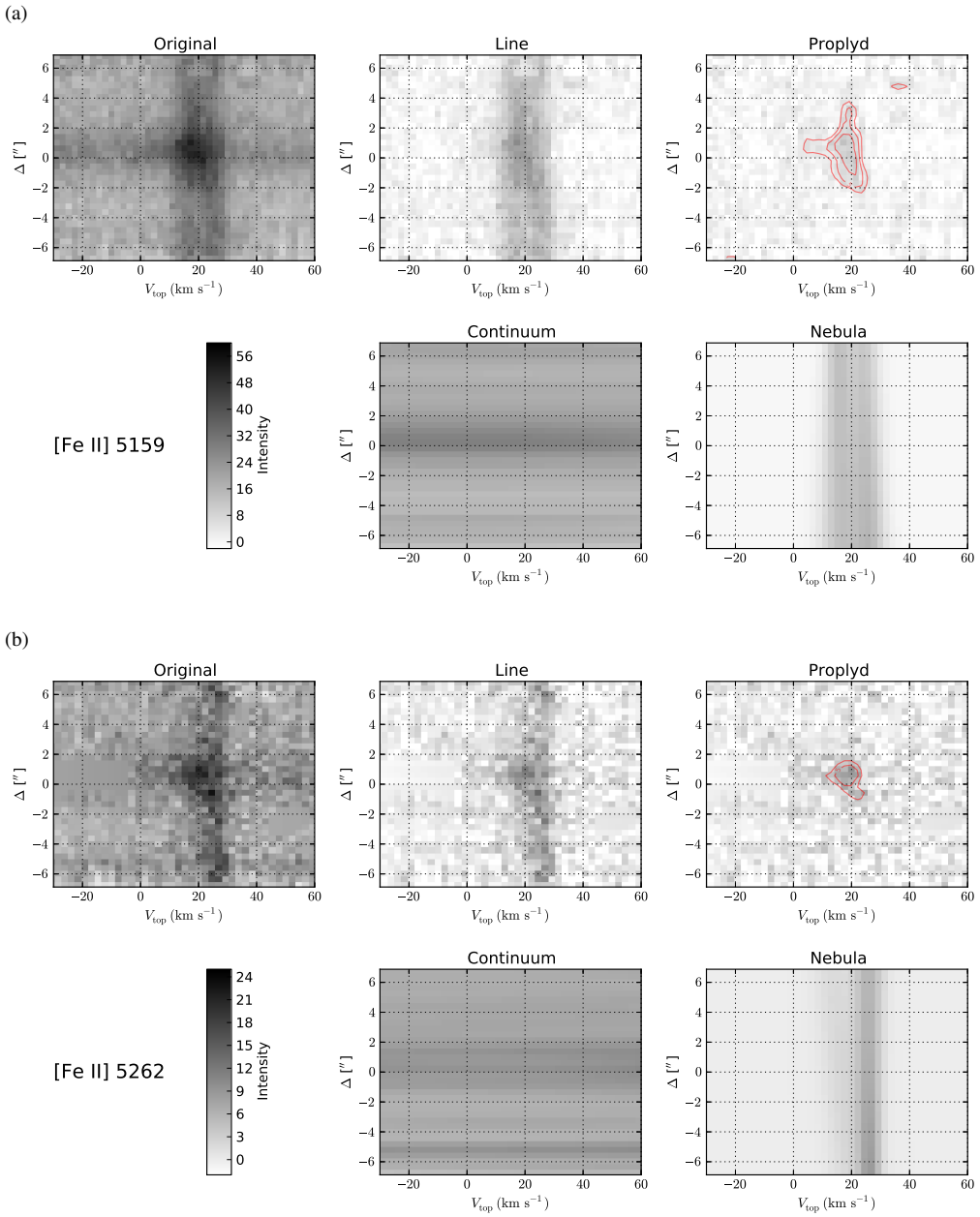

Figure 11. Continuum fluorescence-excited forbidden lines of singly-ionized iron: [Fe II] λ5159 and λ5262.

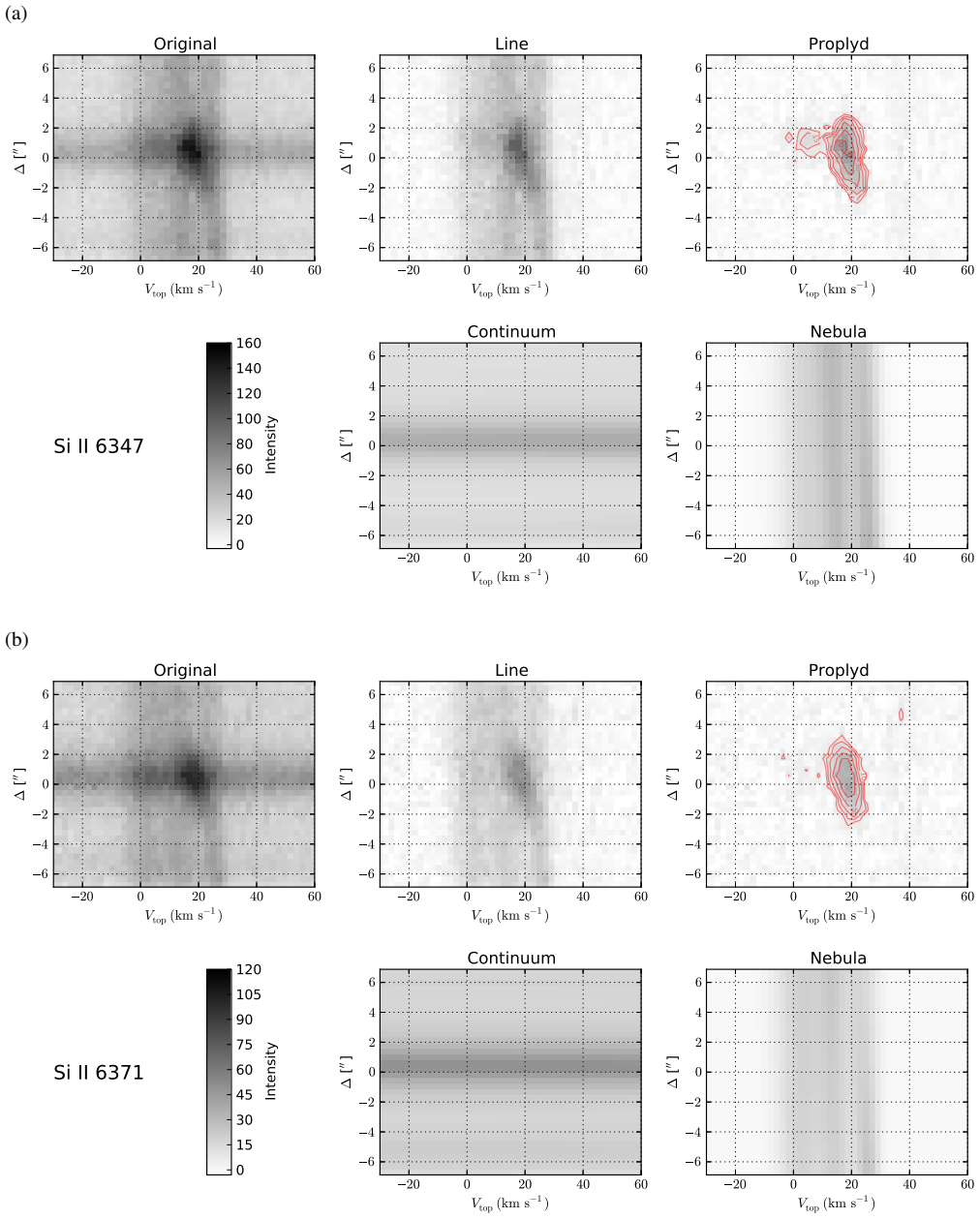

Figure 12. Continuum fluorescence/recombination-excited permitted lines of singly-ionized silicon: Si II λ6347 and λ6371.