

Technical note

Quality of O₂ vertical profiles - M. Guirlet, ACRI-ST, September 2008

References:

- [1] TN Impact of the post-processing Cosmic Rays algorithm on the quality of O₂ vertical profiles, v1.1, M. Guirlet, ACRI-ST, June 2008.
- [2] Presentation M. Guirlet at QWG#17.
- [3] TN Quality of O₂ vertical profiles, v1.0, M. Guirlet, ACRI-ST, July 2008.

Version details

Name	General description	Date of internal release
7.0ab (ref. version: 60cf)	GOPR modified for the next baseline; includes the post-processing Cosmic Rays algorithm	08/2008

Testing dataset

Comment	Time period	Illumination condition
"Noisy O ₂ dataset": selection of products for which O ₂ profiles show some outliers (MG, QWG#13) for star 1 and star 23 at NH mid-latitudes	2003	full dark

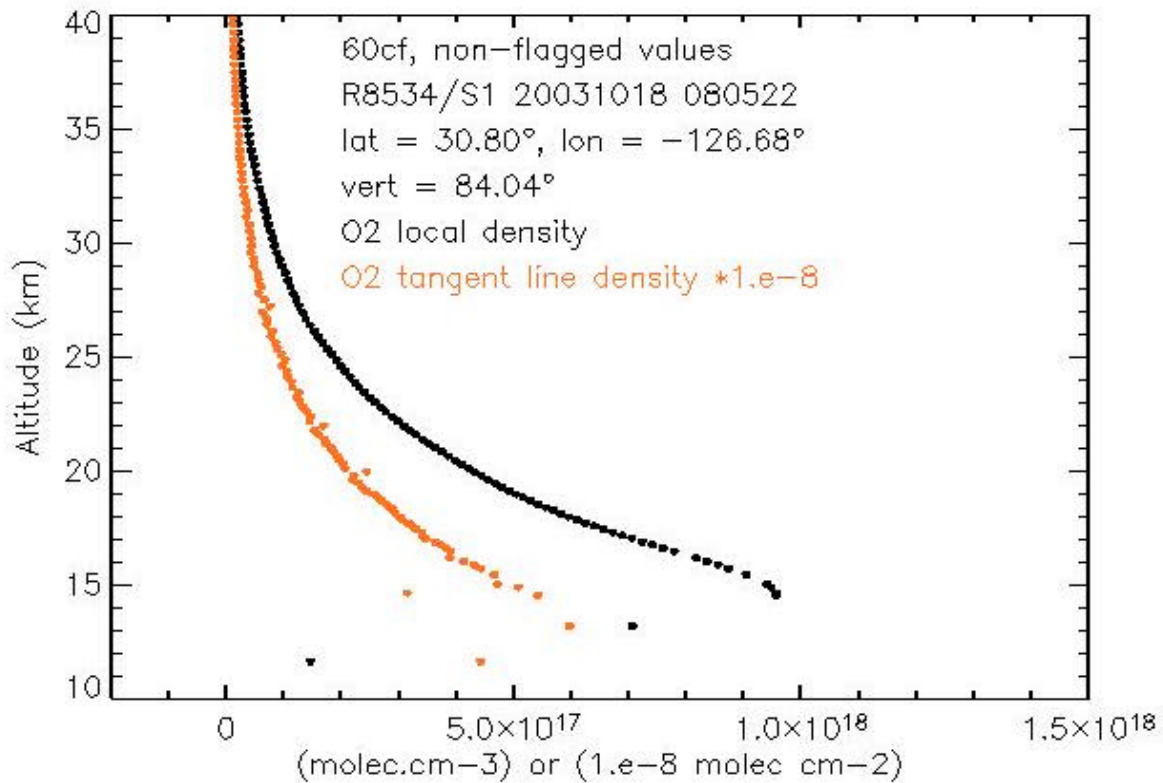
The same conclusions can be drawn as from the comparison of products processed with 6.0cf and the intermediate GOPR version for implementation testing of the full covariance matrix approach (see [3]).

There is a strong improvement of the quality of O₂ vertical profiles of local density in the majority of the cases investigated, as seen from the comparison between individual profiles from 6.0cf and from 7.0ab GOPR versions. For those cases processed with the new prototype version, in the altitude range between 20 km and 30 km, there are no more outliers of O₂ column density. Subsequently, the profiles of O₂ local density for those cases are much smoother, especially for star 1 test cases. At altitudes lower than 15 km, for star 1 test cases, the number of outliers in column density on successive altitude levels decreases, and the shape of the local density profile is improved in most cases.

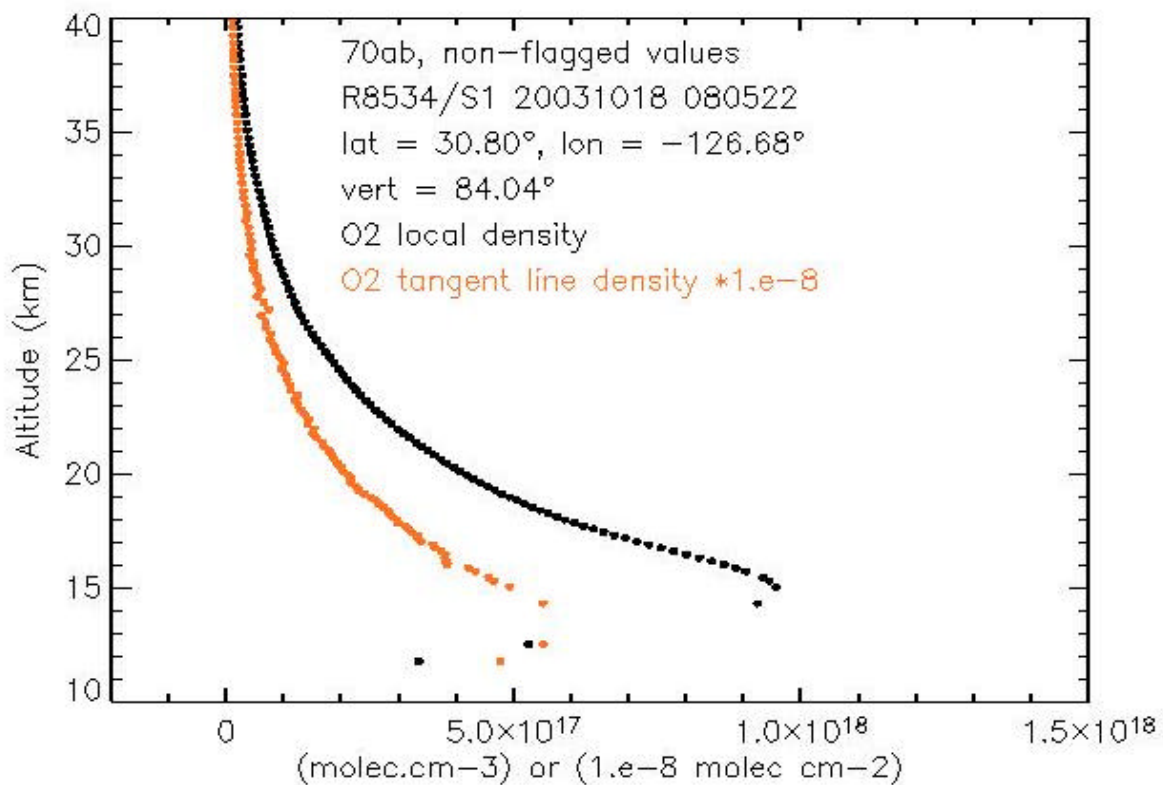
In other cases, it is less obvious if the modified prototype version brings some improvement in the individual vertical profiles of O₂ local density. In a few cases, there is even no change between the vertical profiles from the modified prototype version and the reference version. Focussing first on those specific cases, it will be investigated about another possible origin for bad quality of vertical profiles of O₂ density.

Star 1 – Dataset for noisy O_2 profiles in $30^\circ N$ - $60^\circ N$, 18/10/2003-21/10/2003

6.0cf **line density * 10^{-8} (molec cm^{-2})** local density (molec cm^{-3})

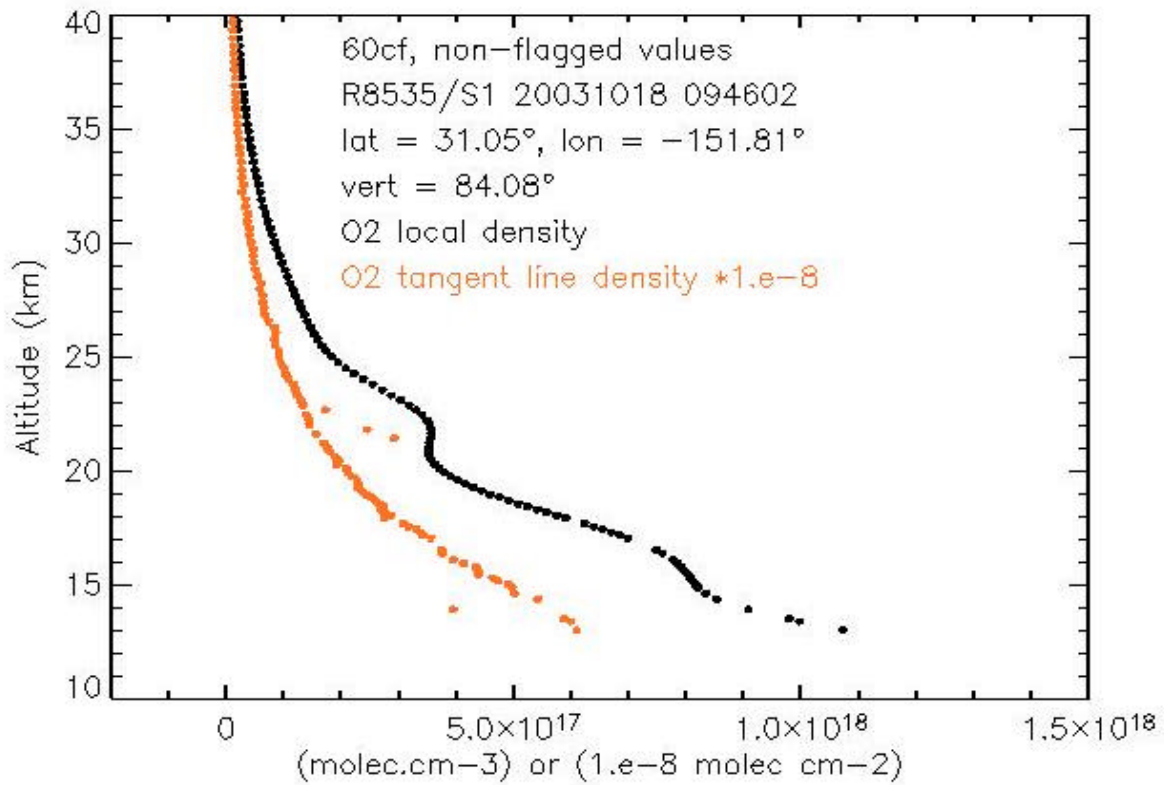


7.0ab **line density * 10^{-8} (molec cm^{-2})** local density (molec cm^{-3})



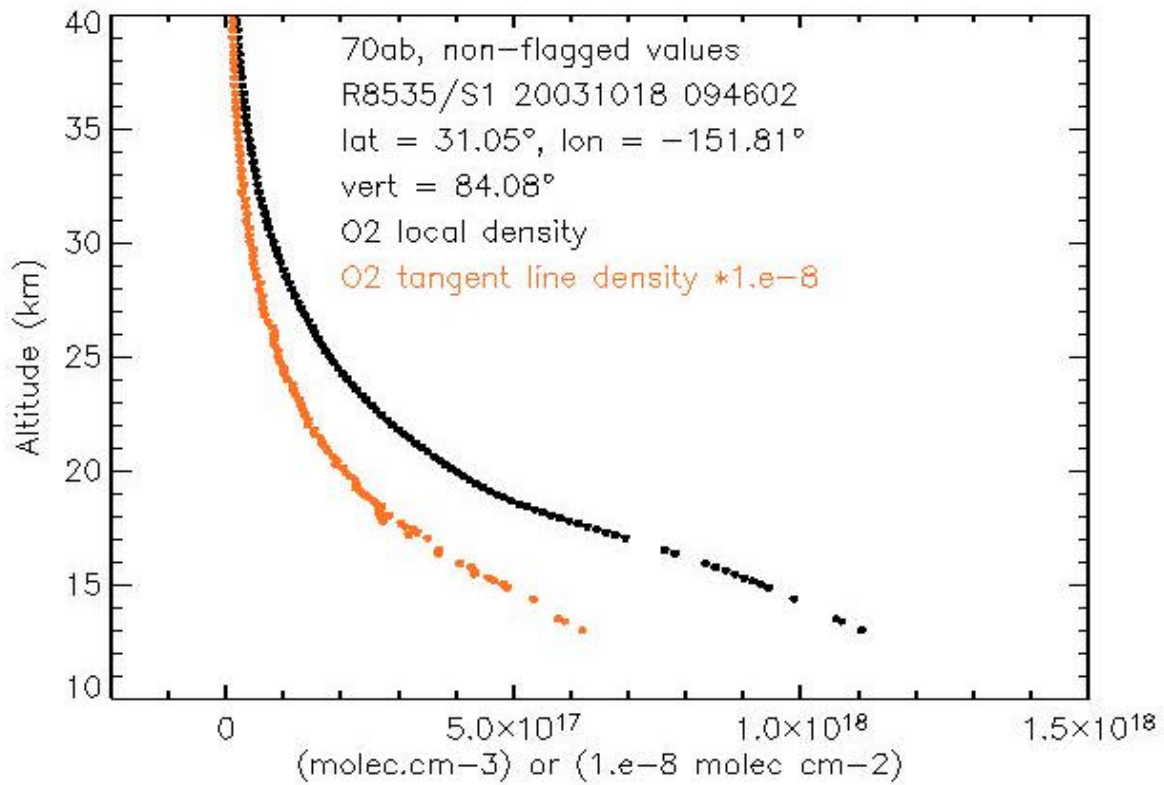
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



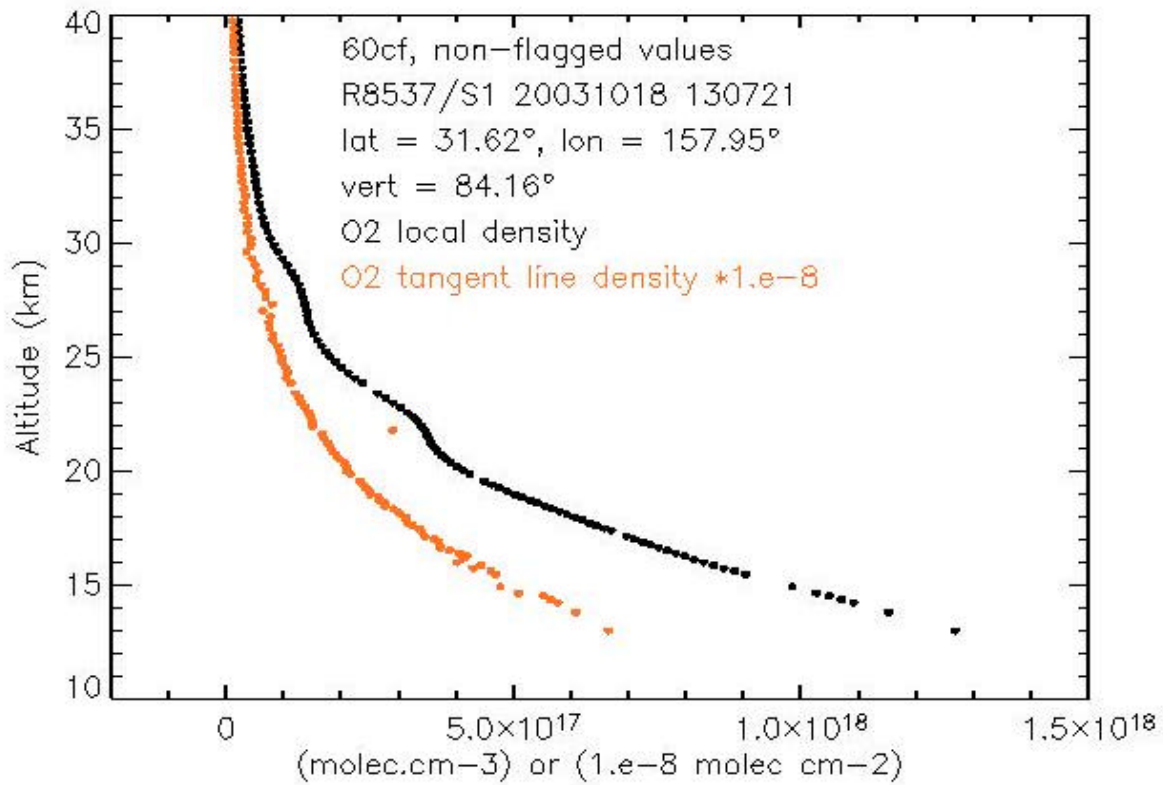
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



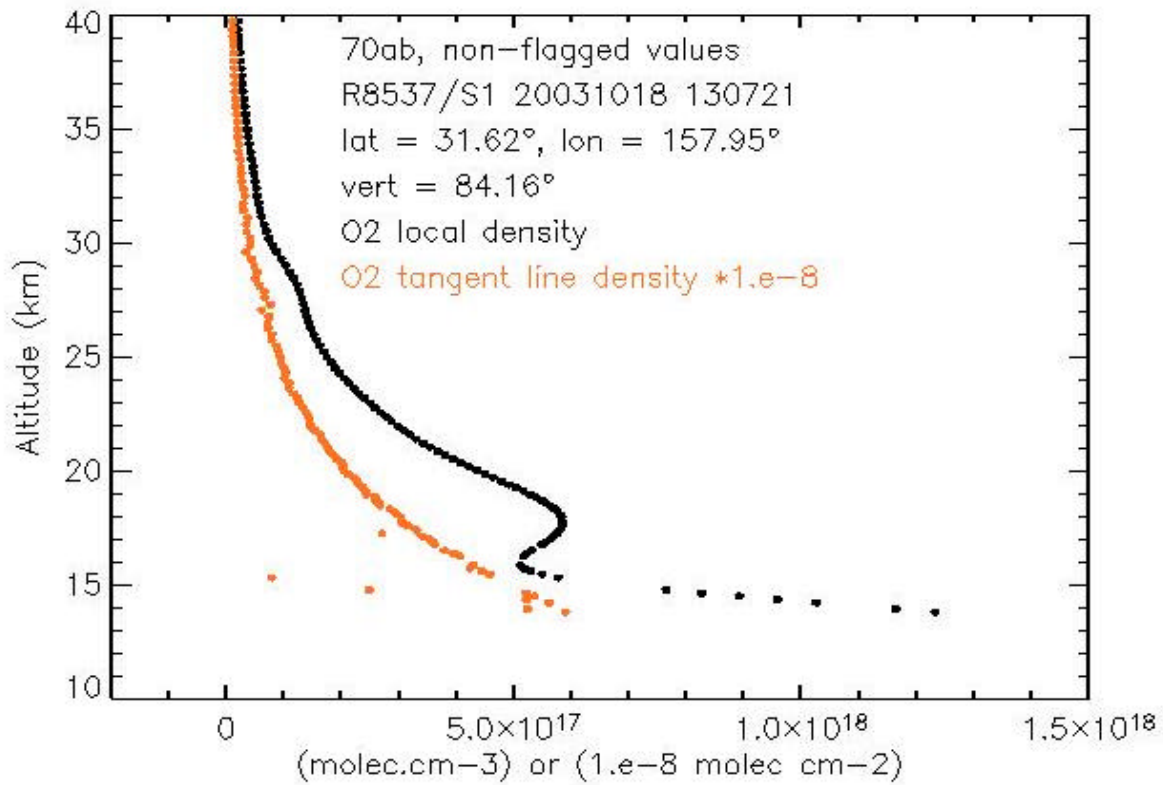
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



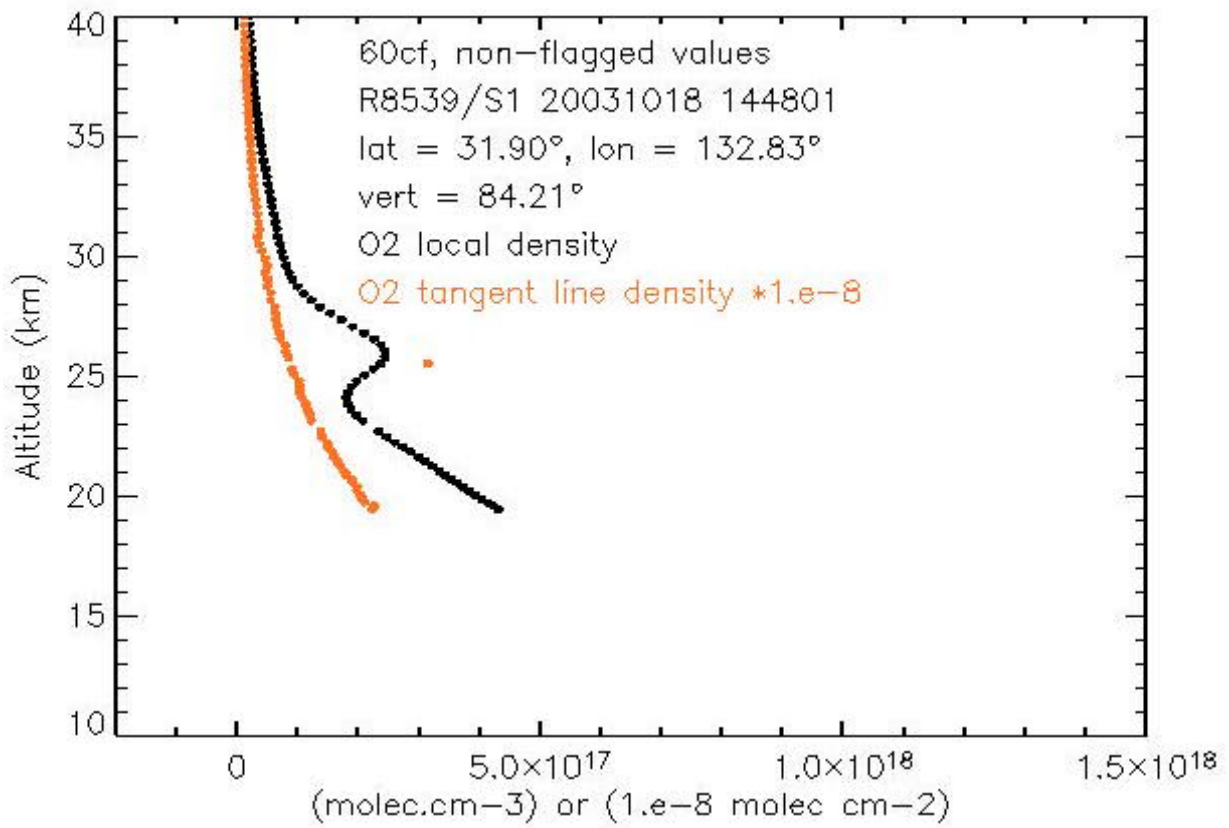
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



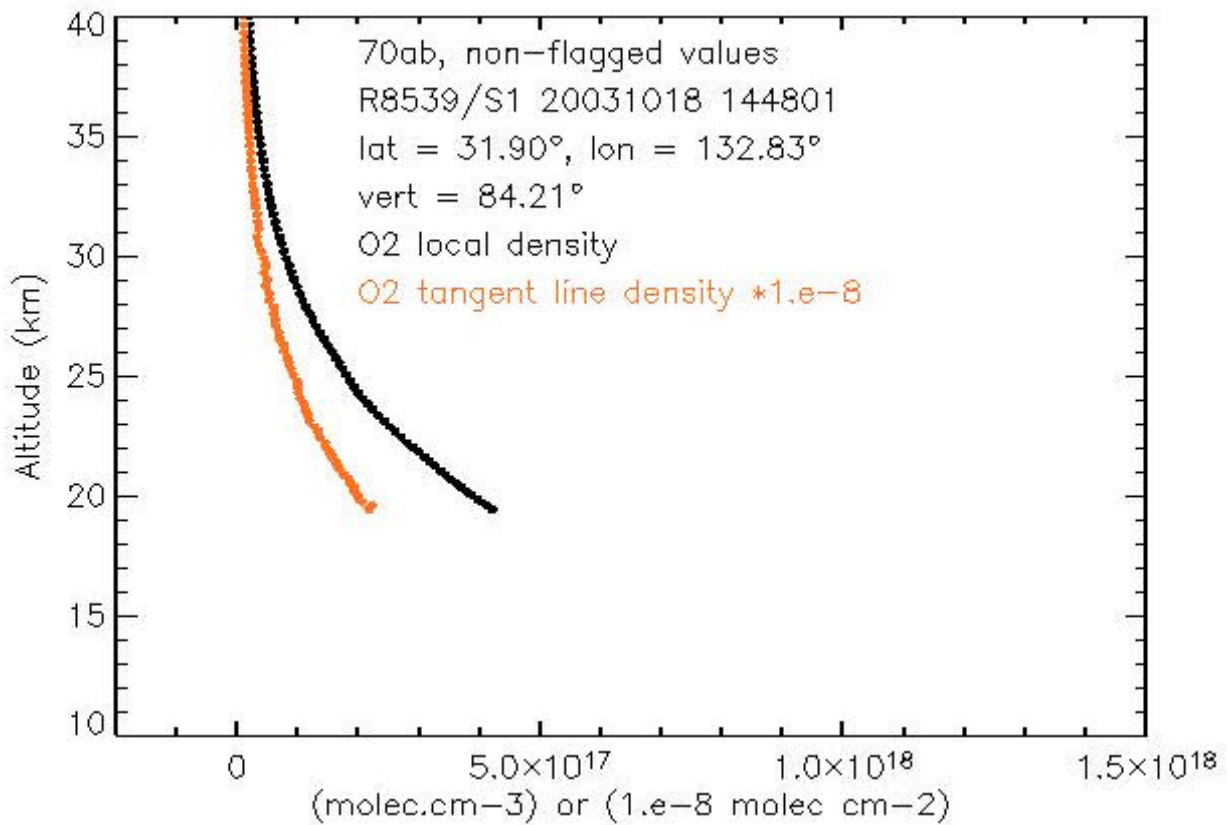
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



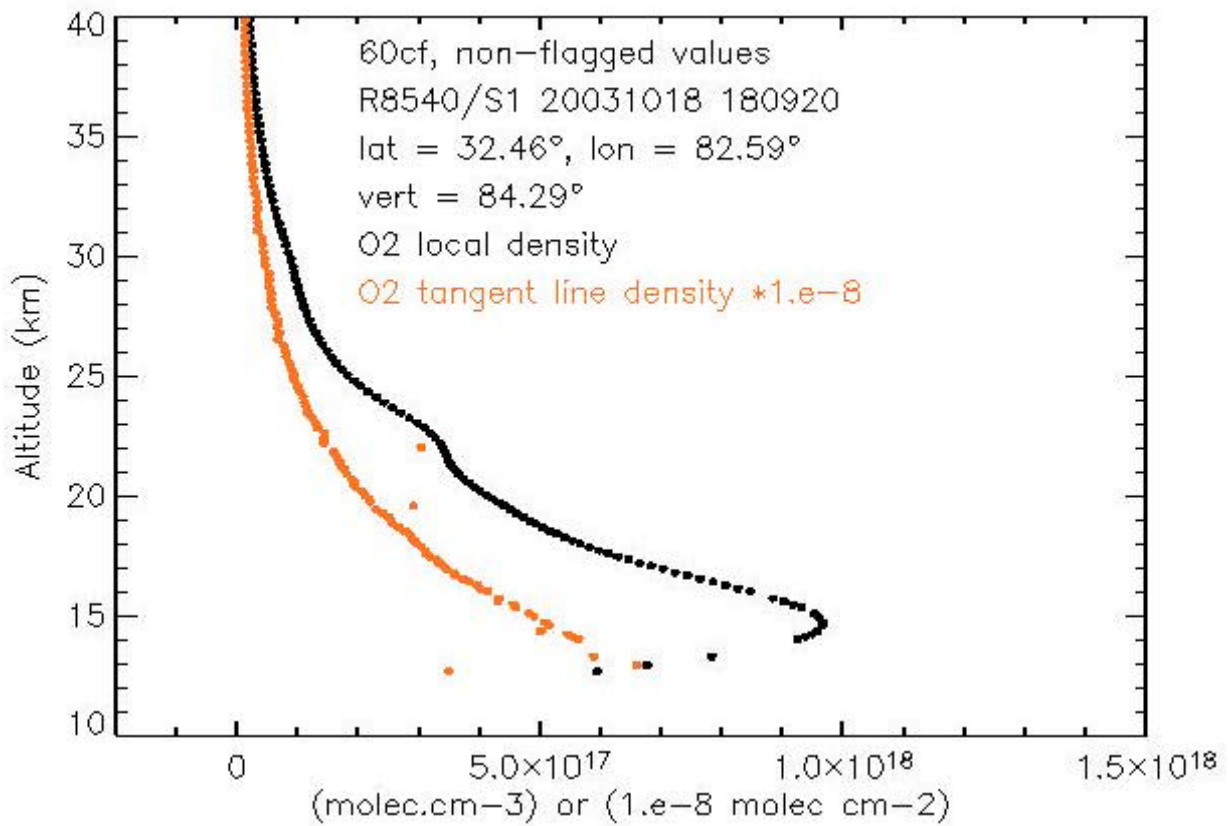
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



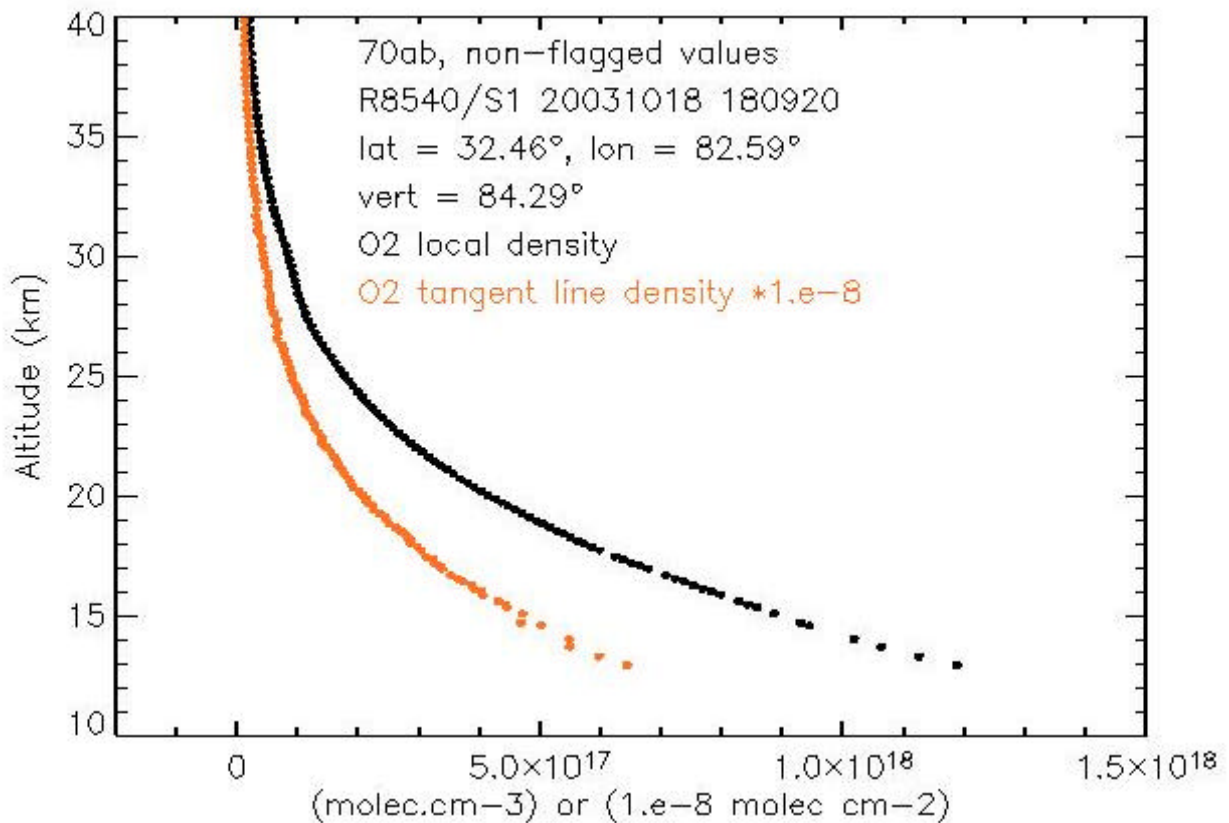
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



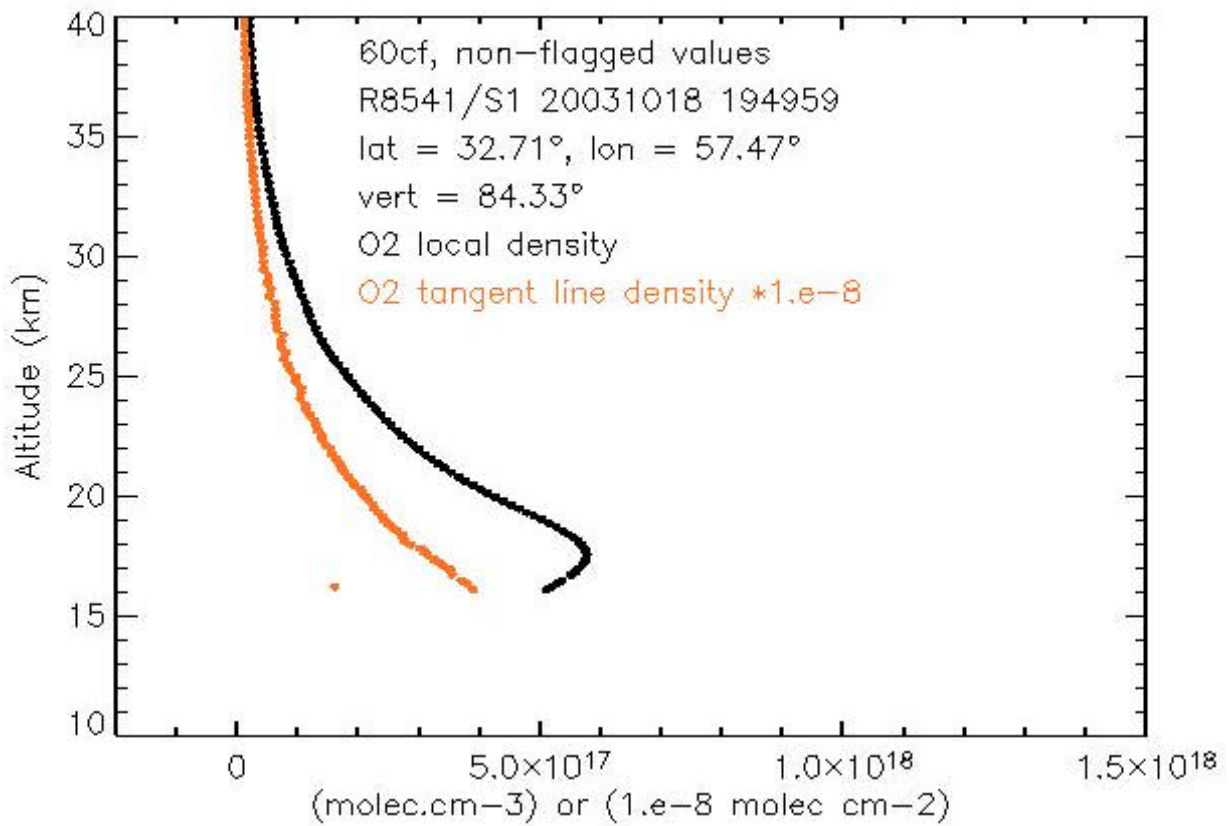
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



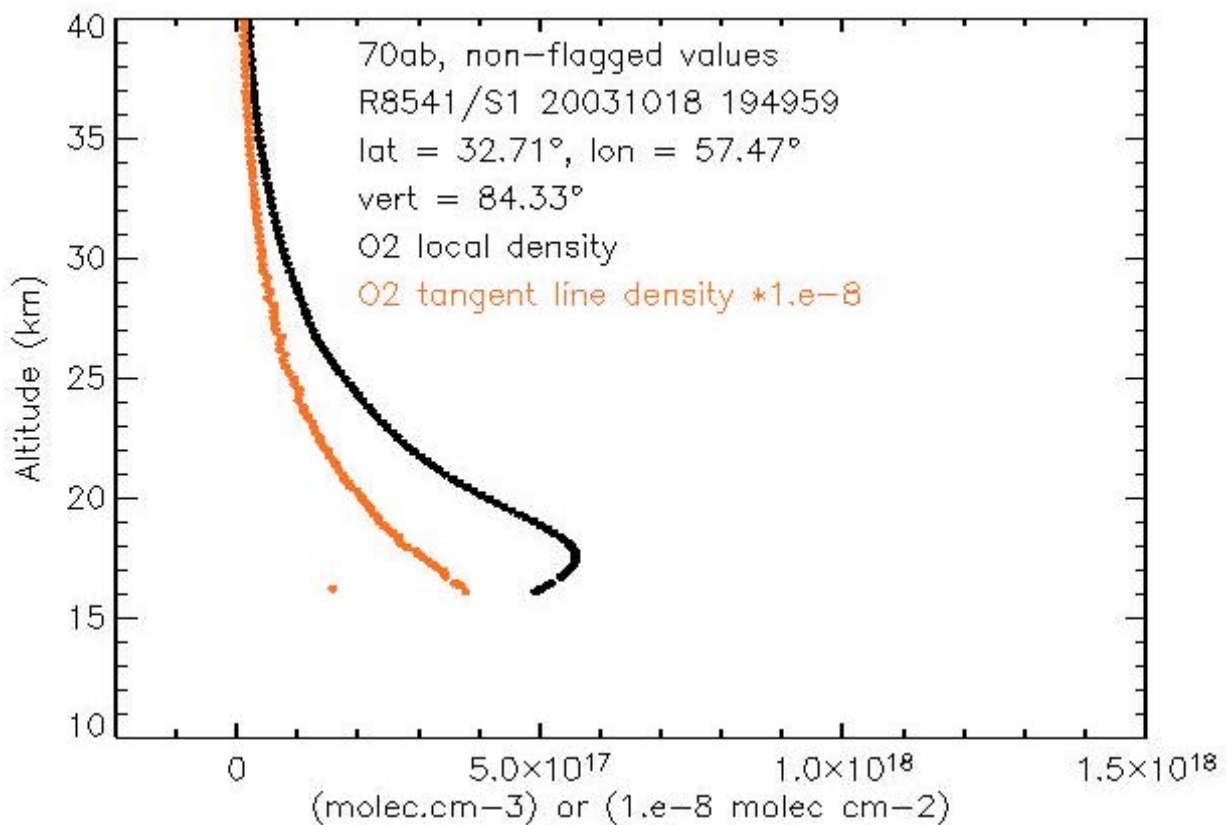
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



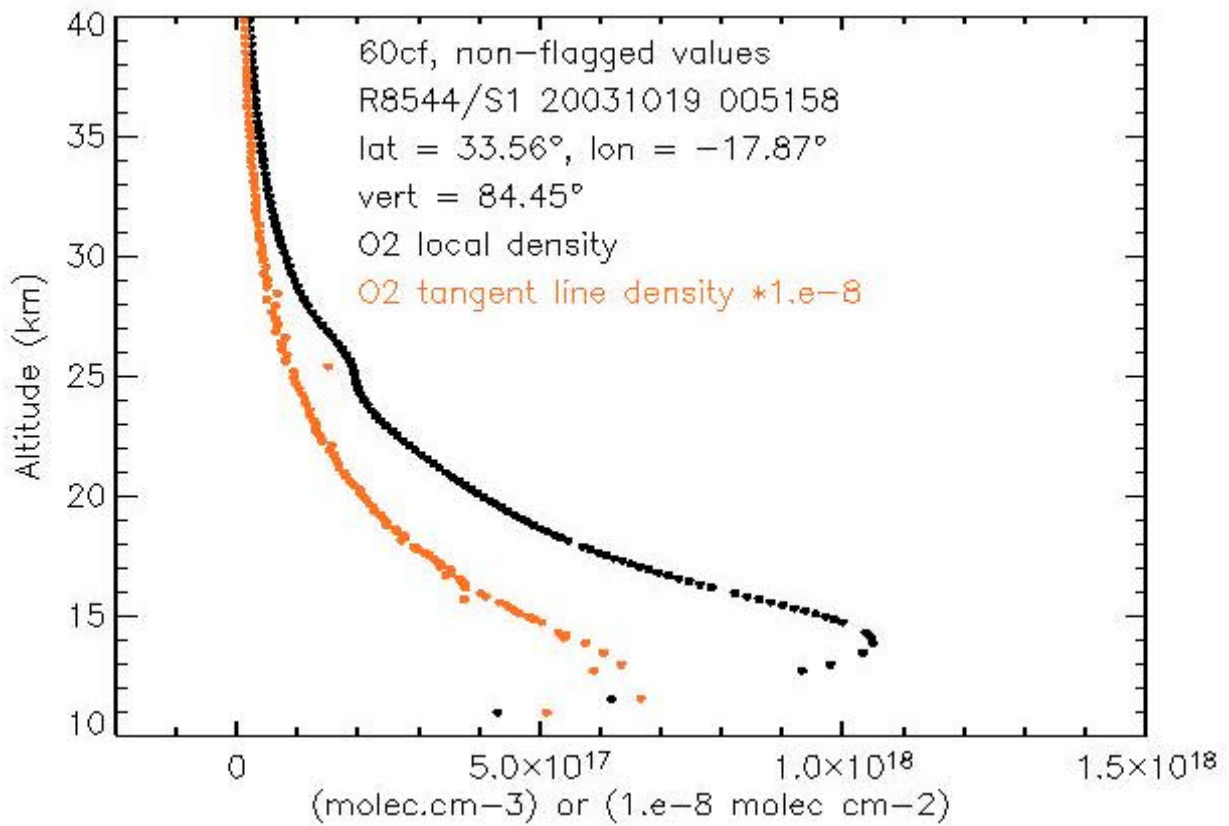
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



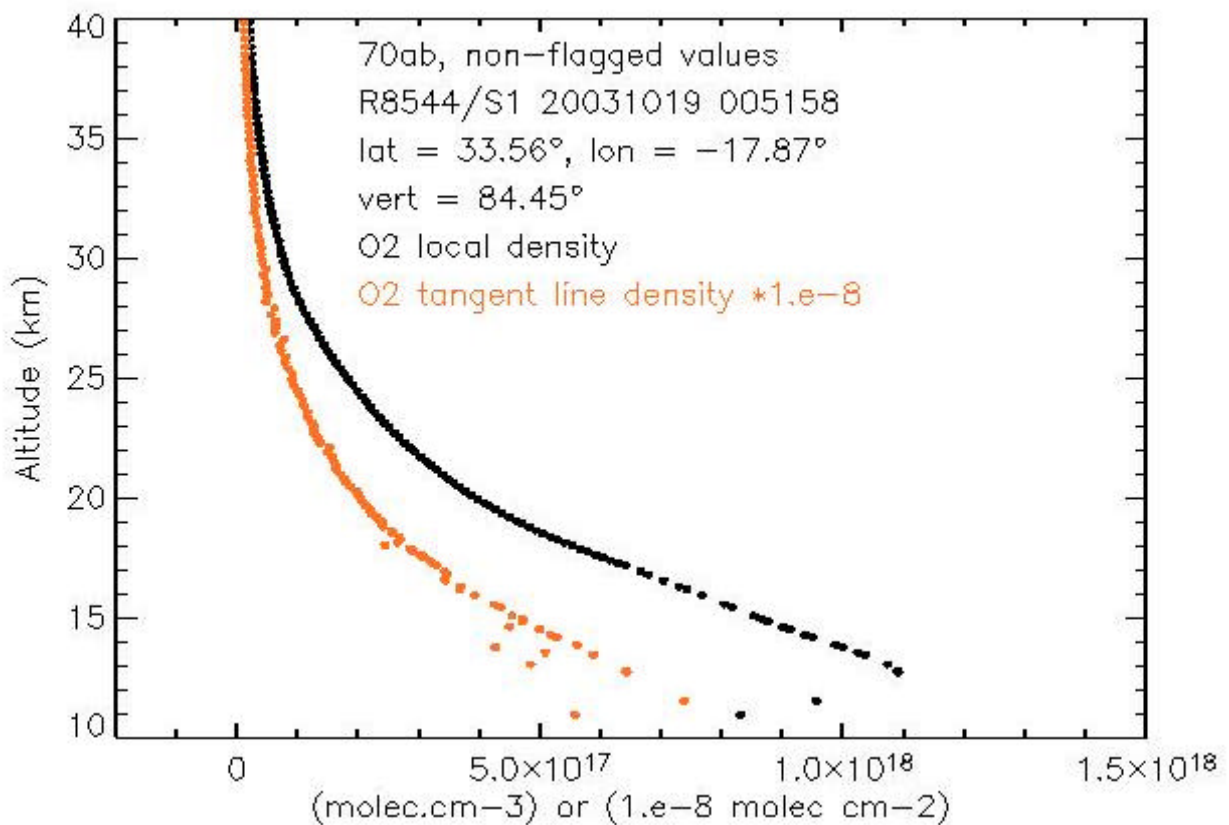
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



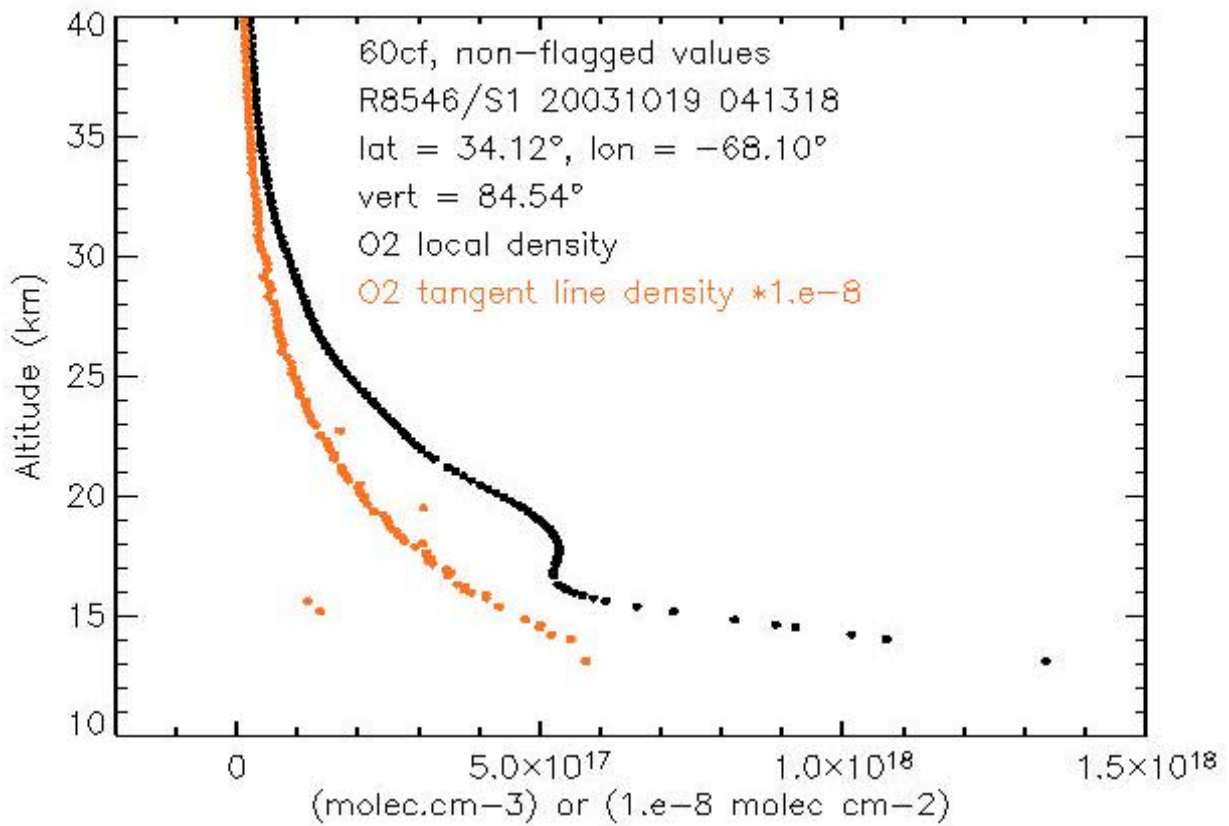
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



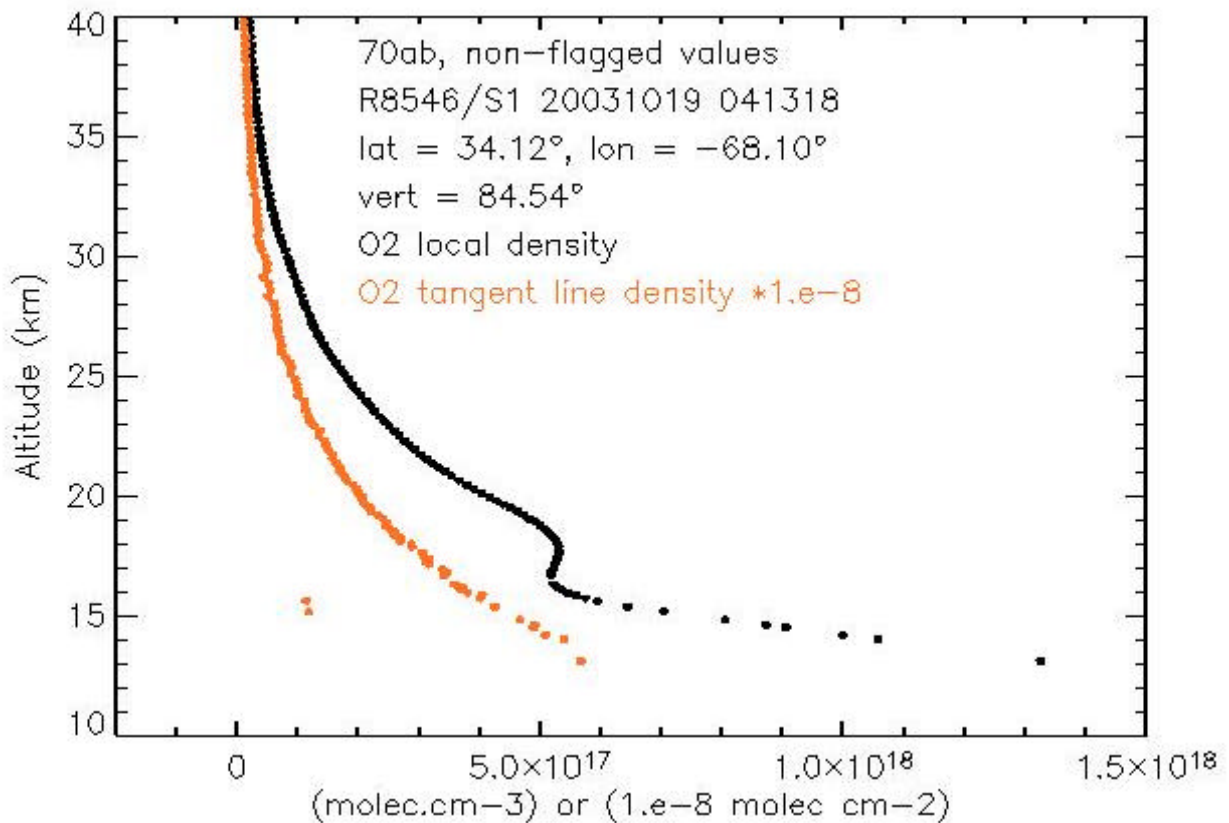
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



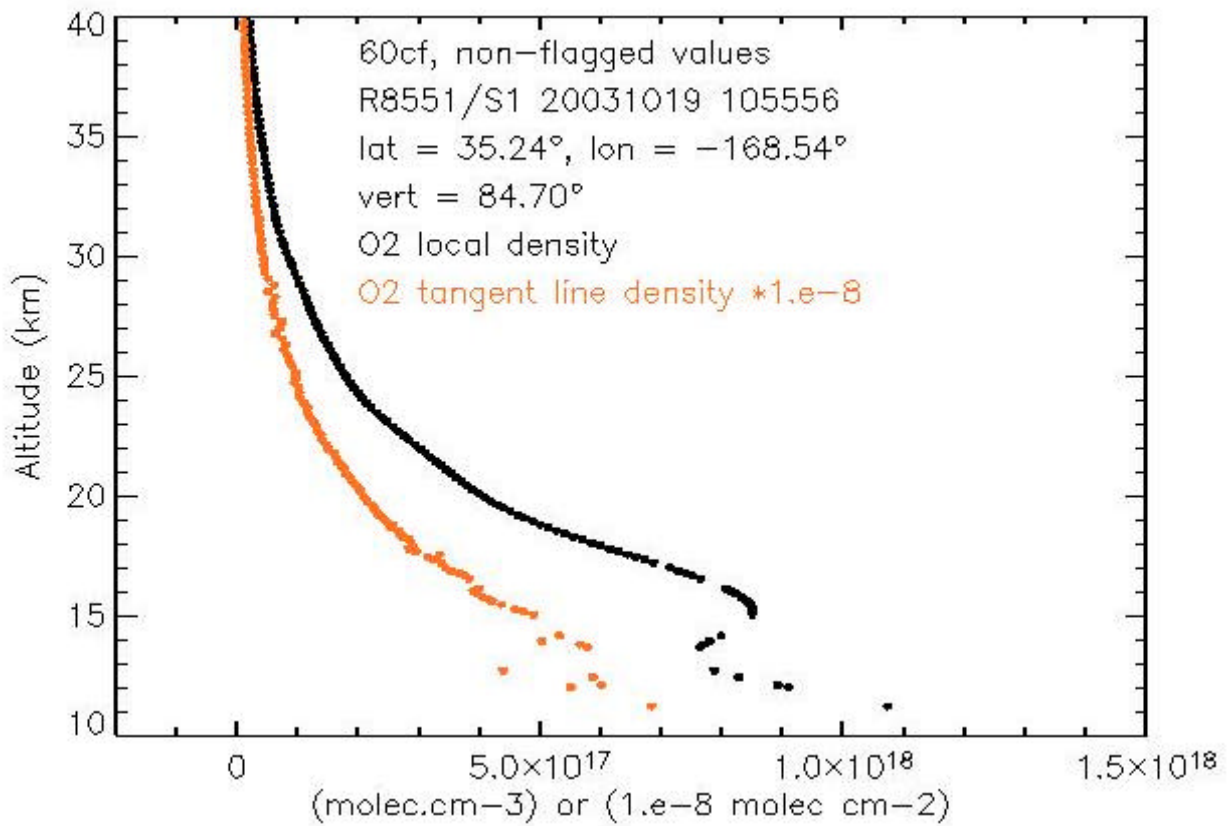
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



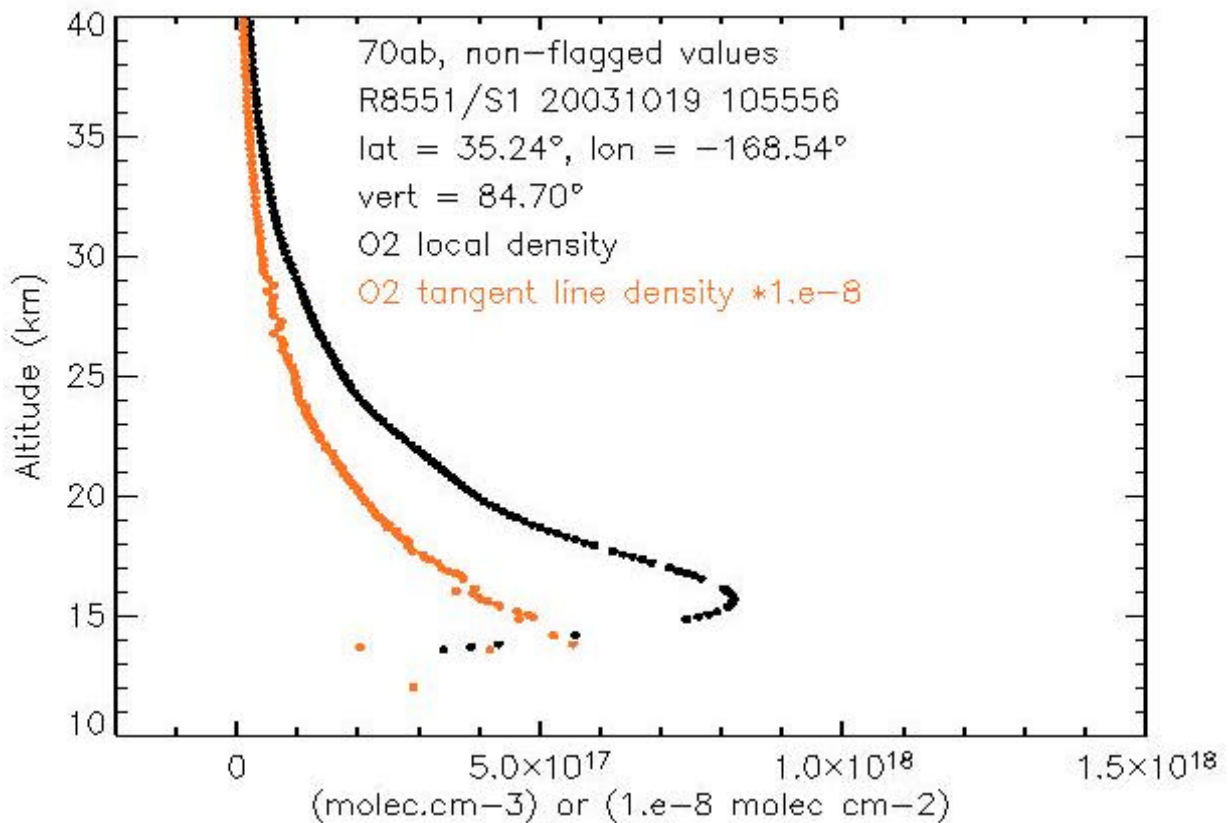
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



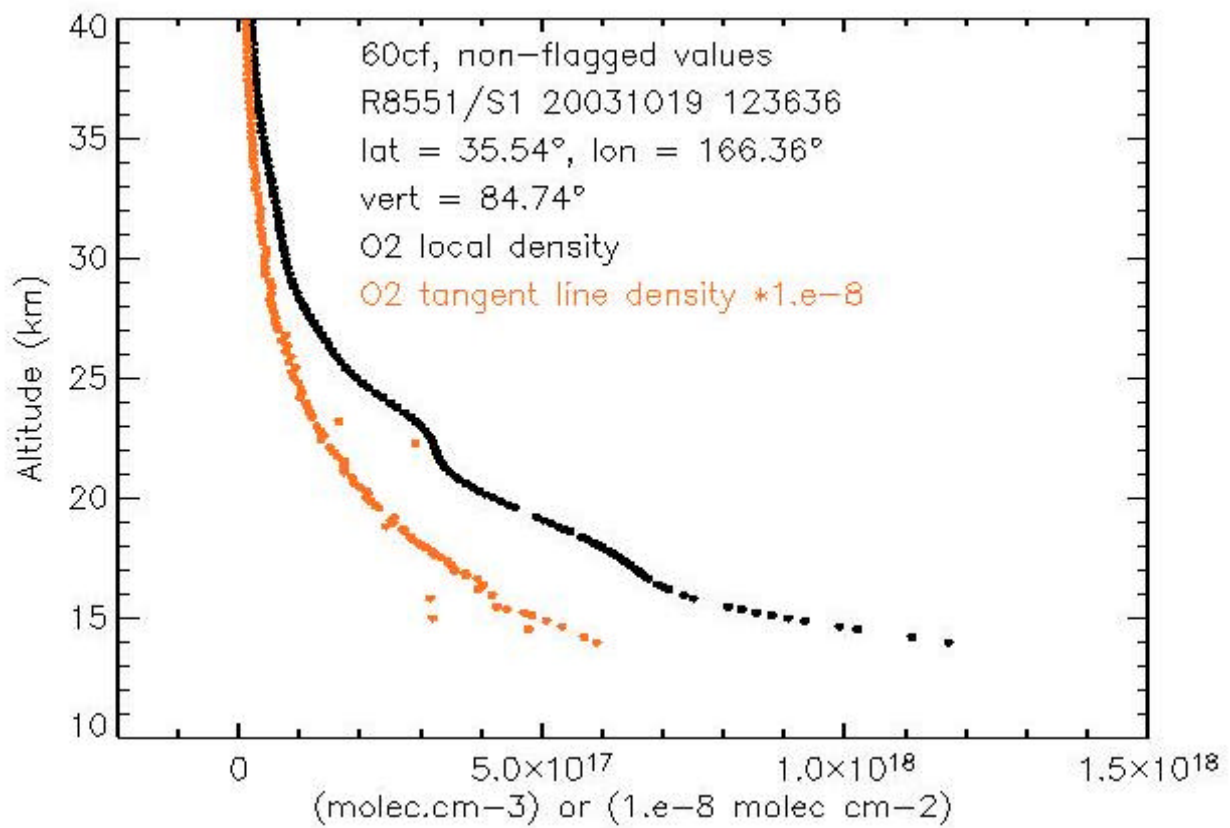
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



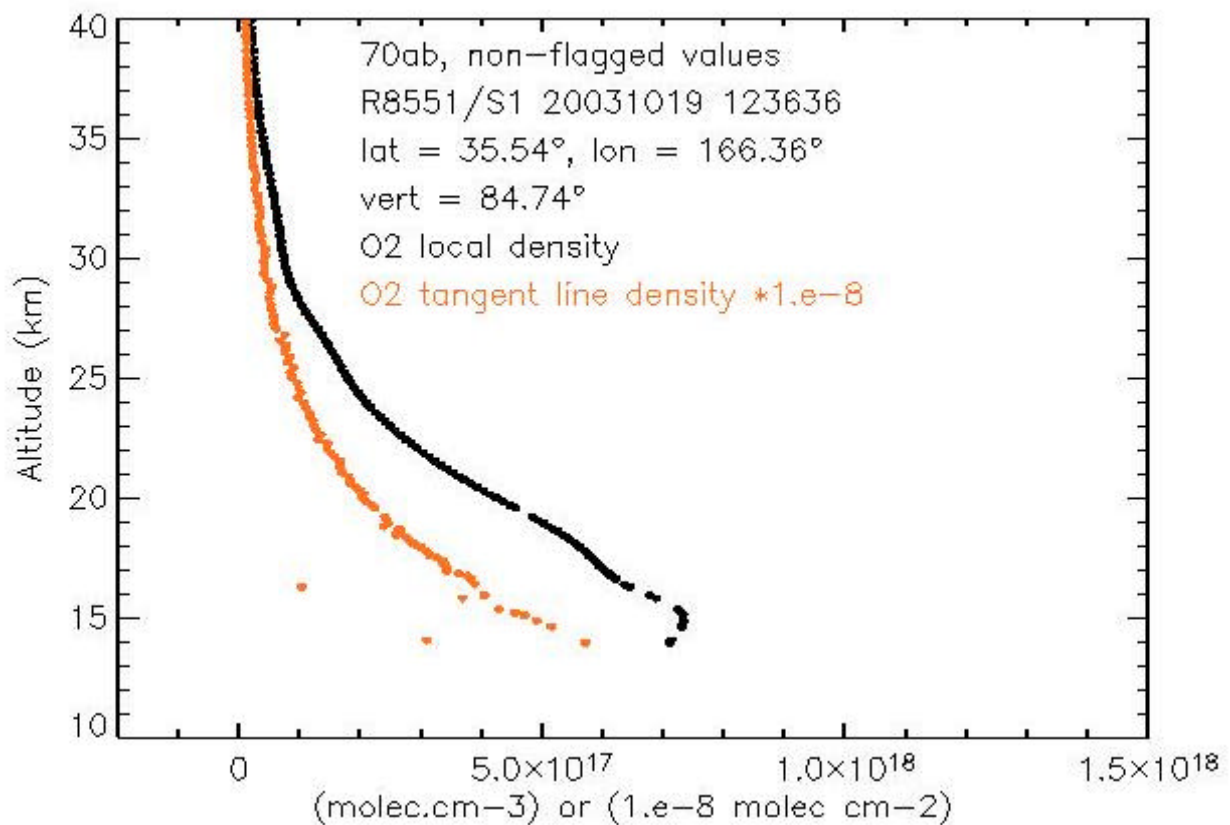
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



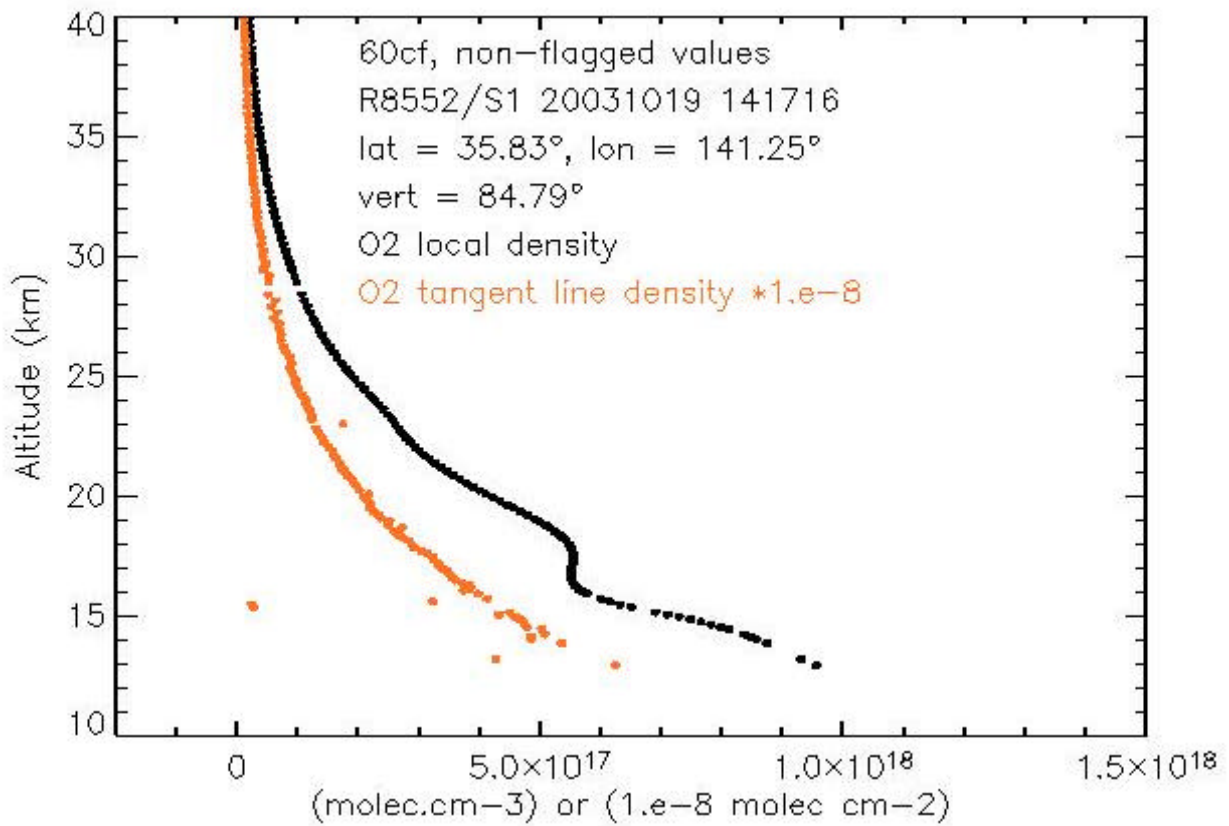
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



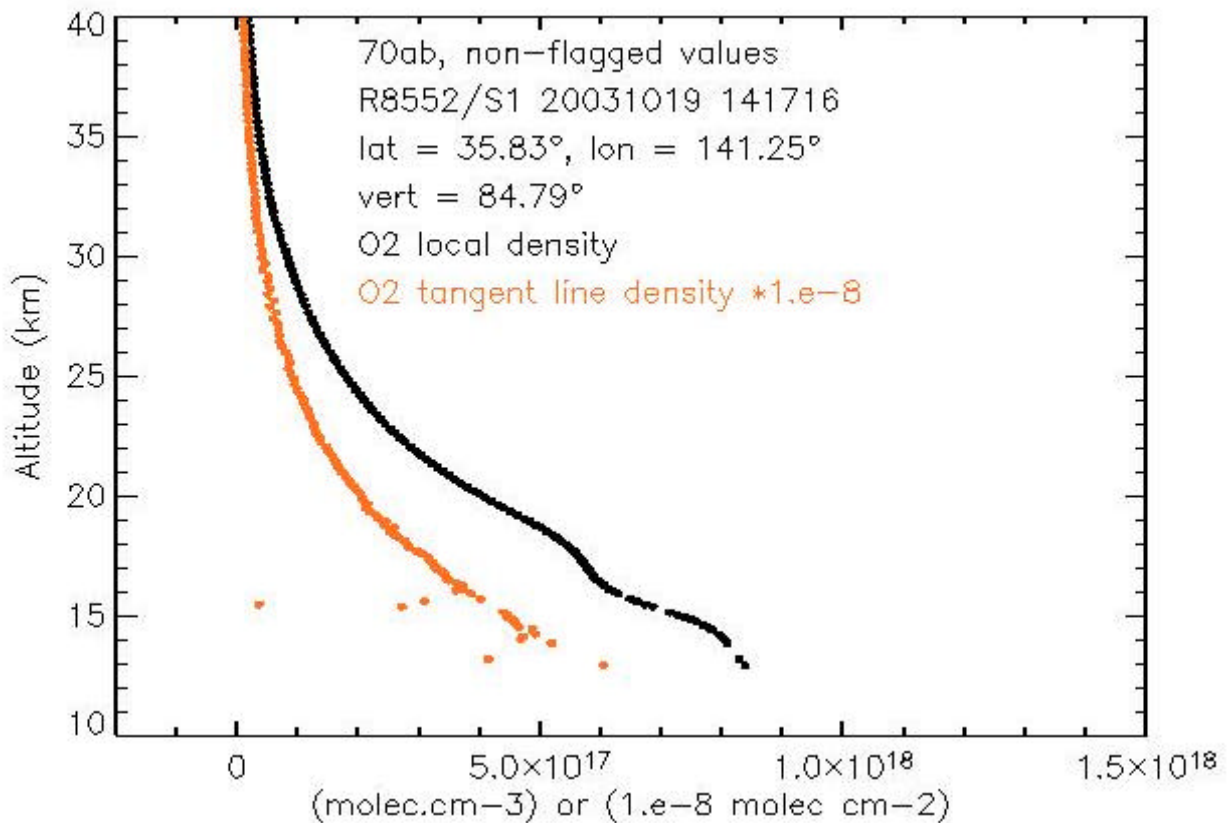
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



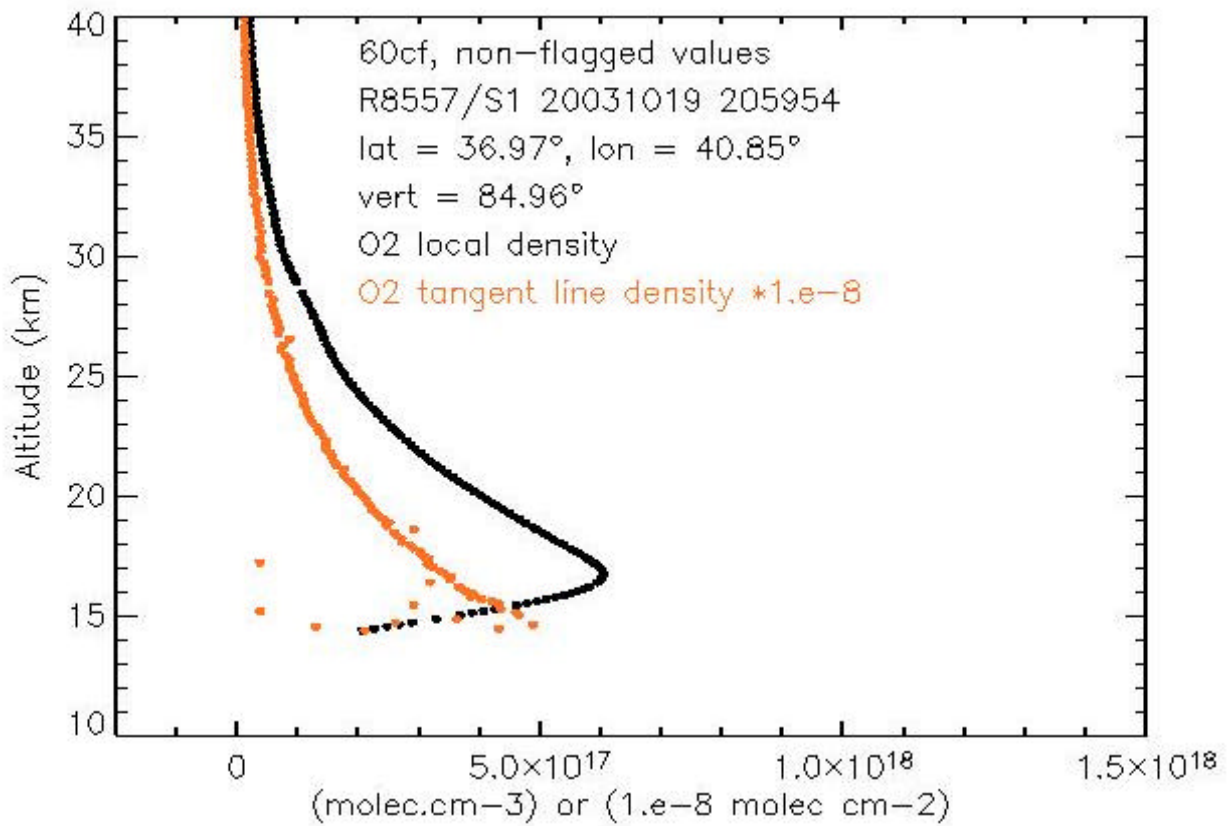
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



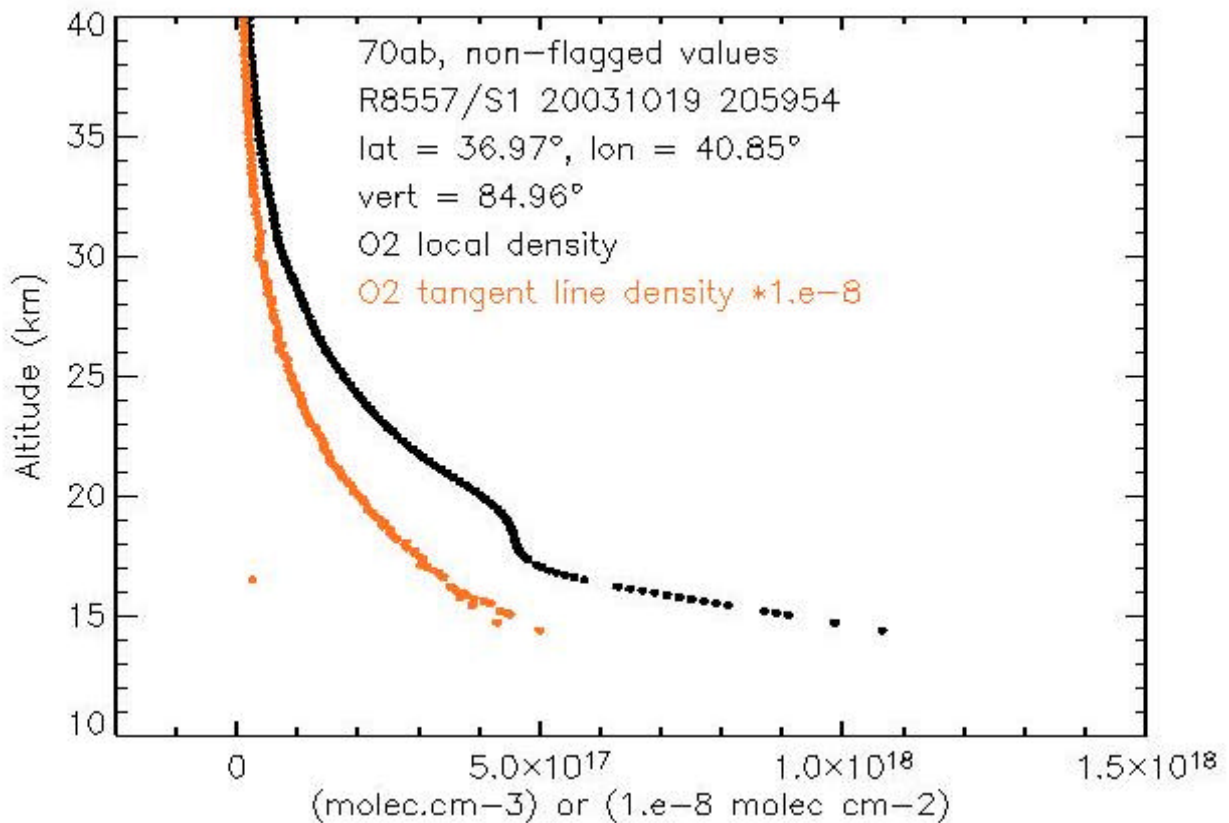
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



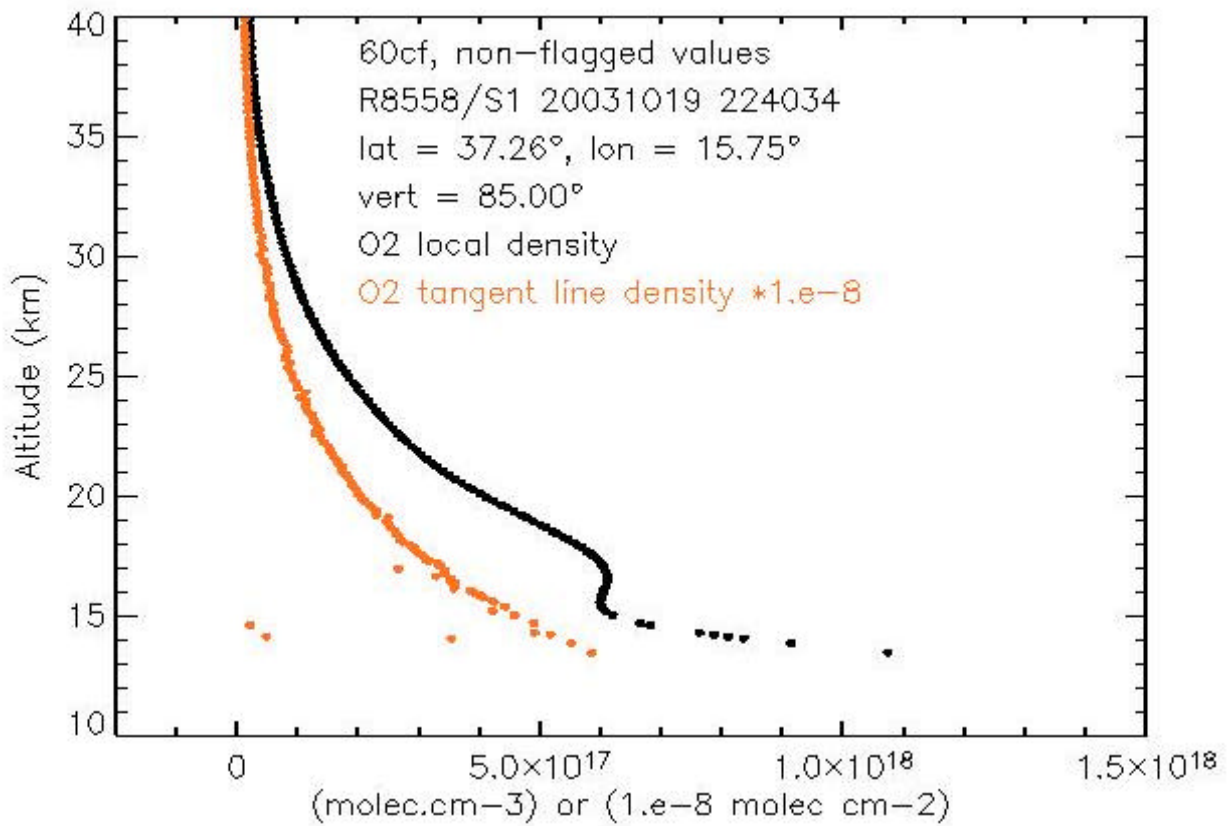
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



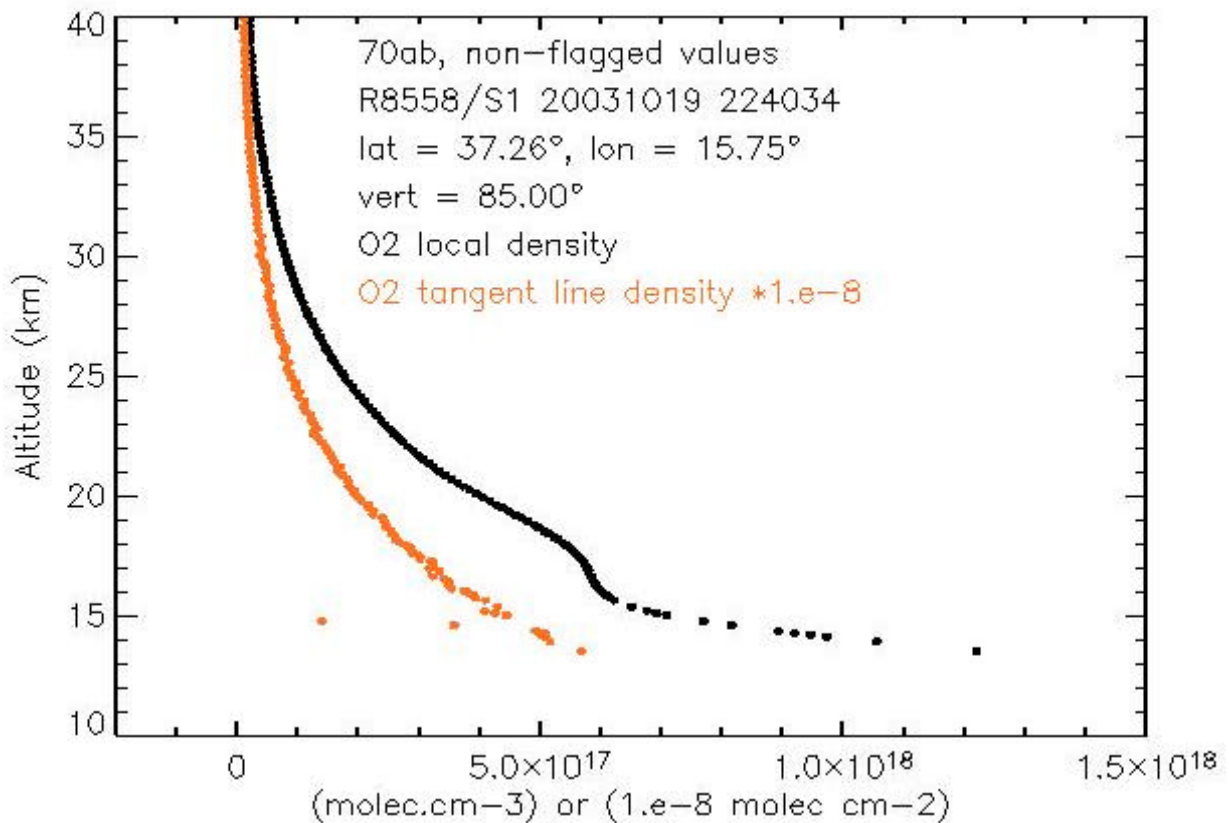
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



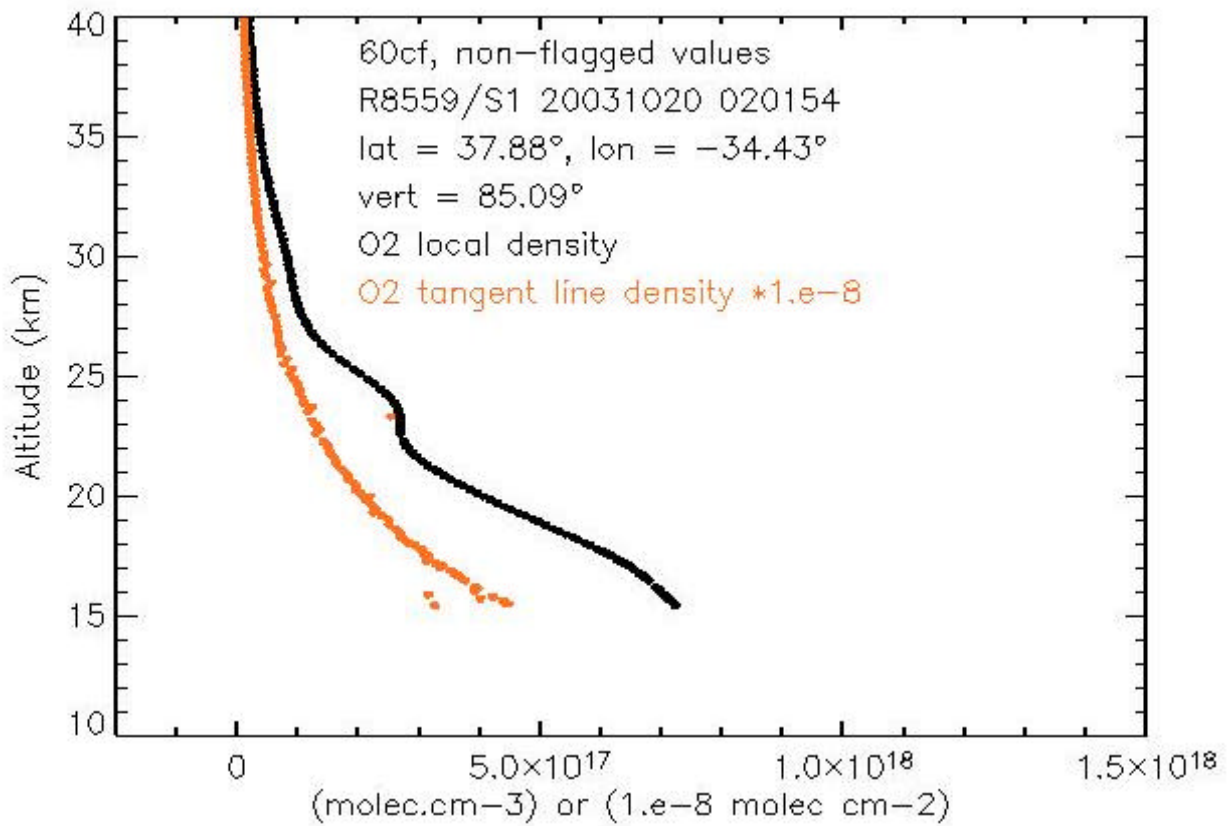
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



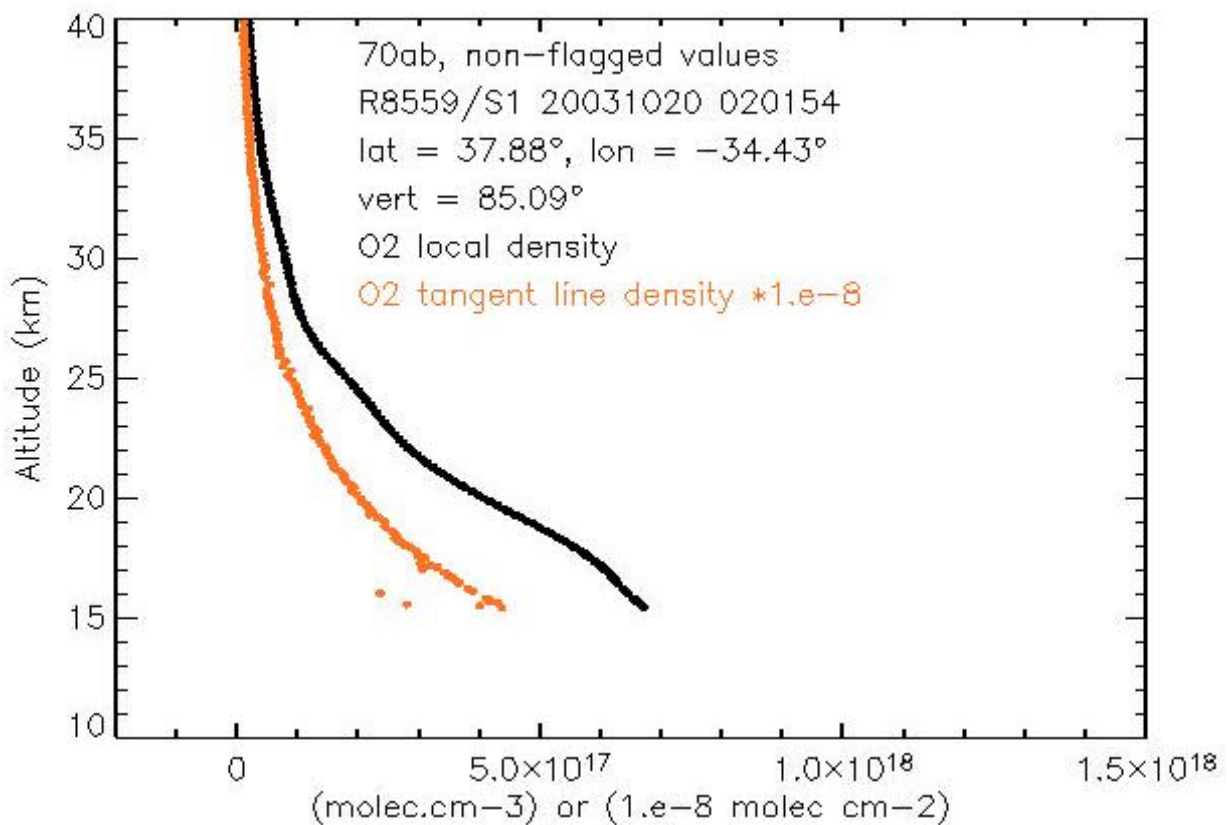
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



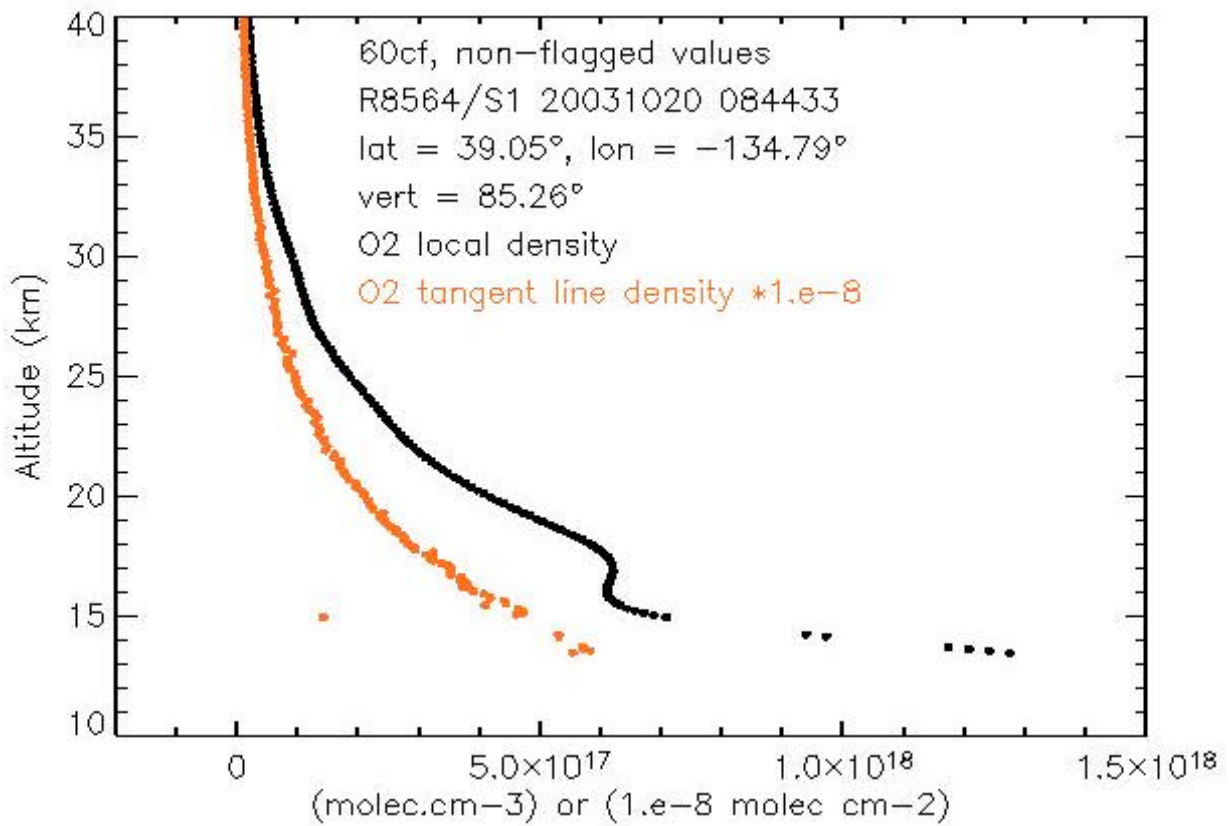
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



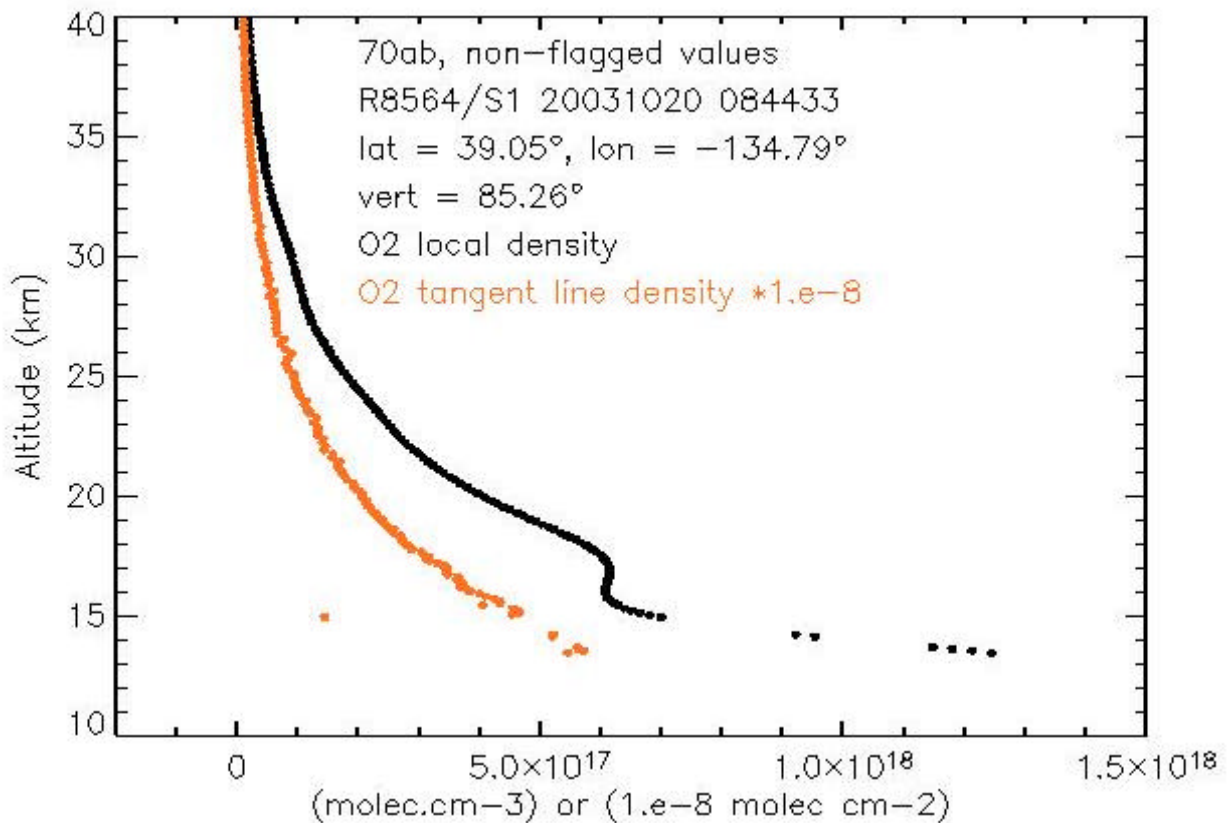
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



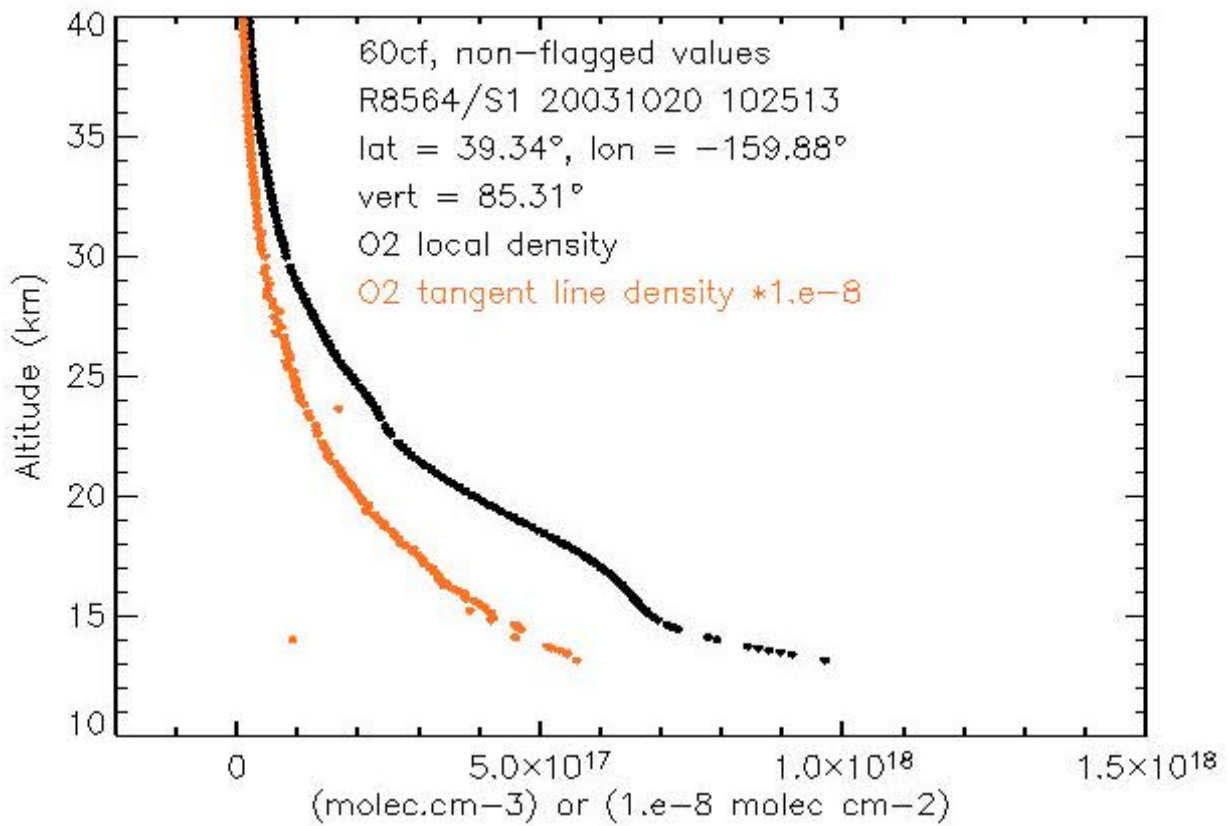
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



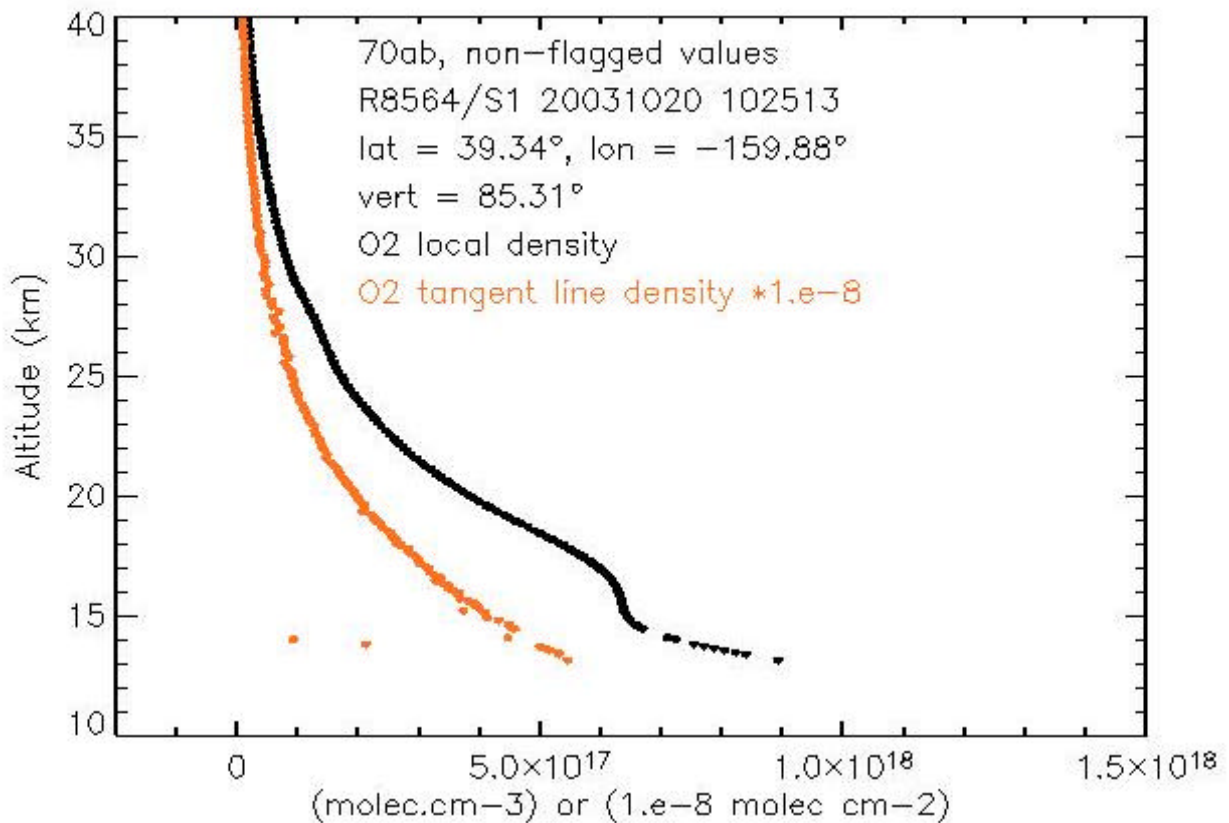
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



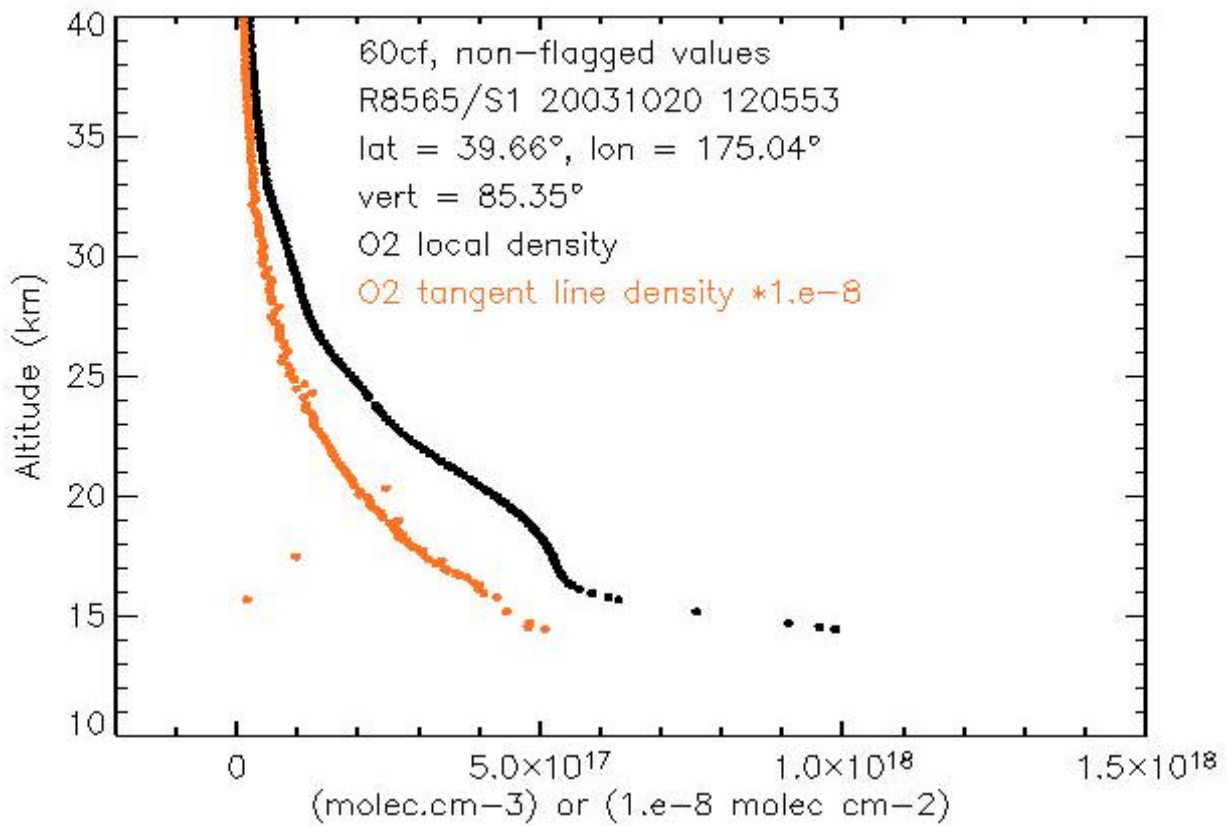
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



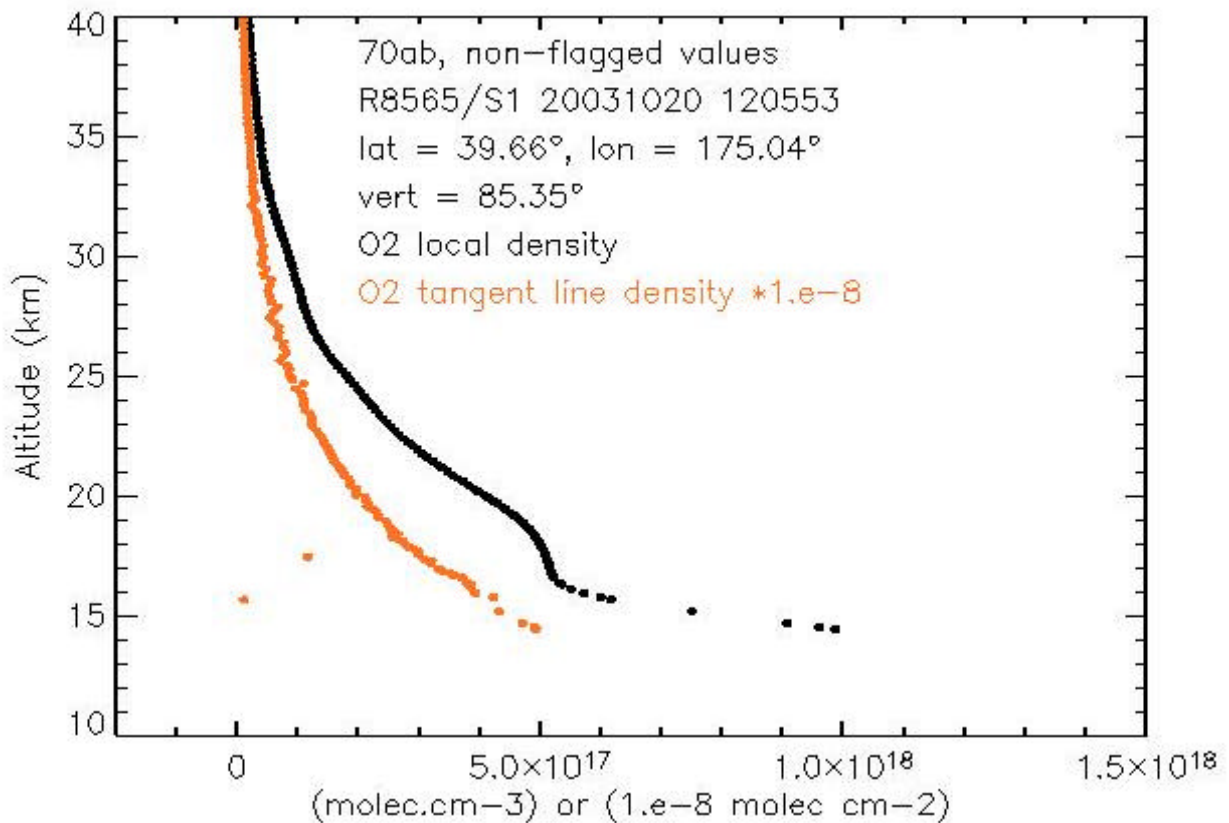
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



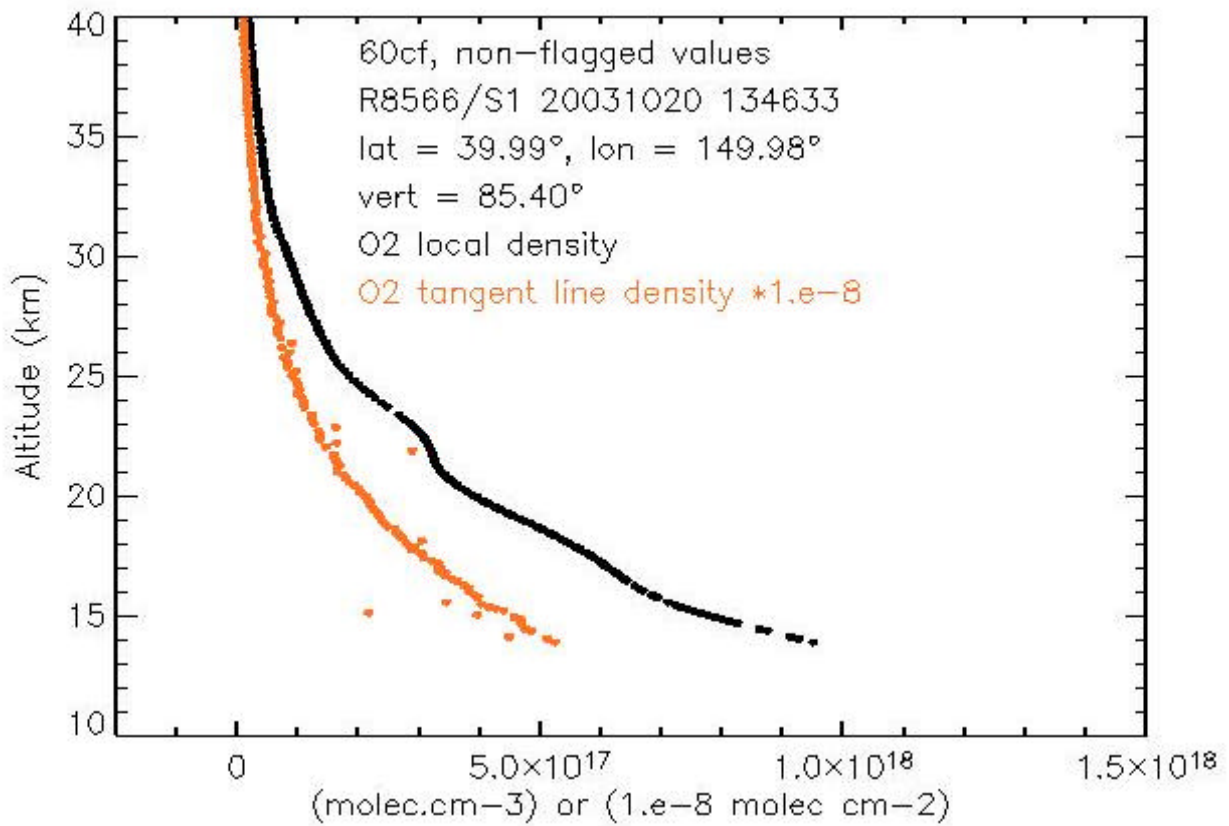
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



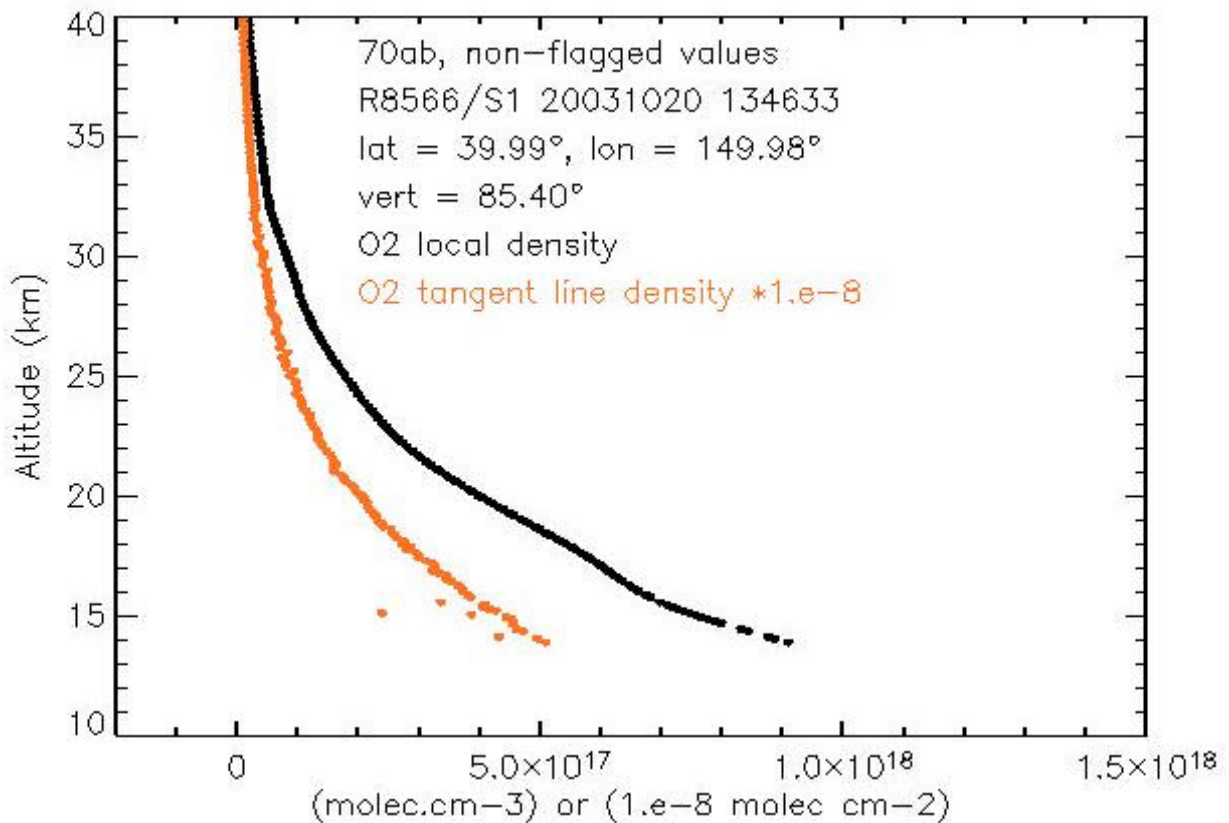
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



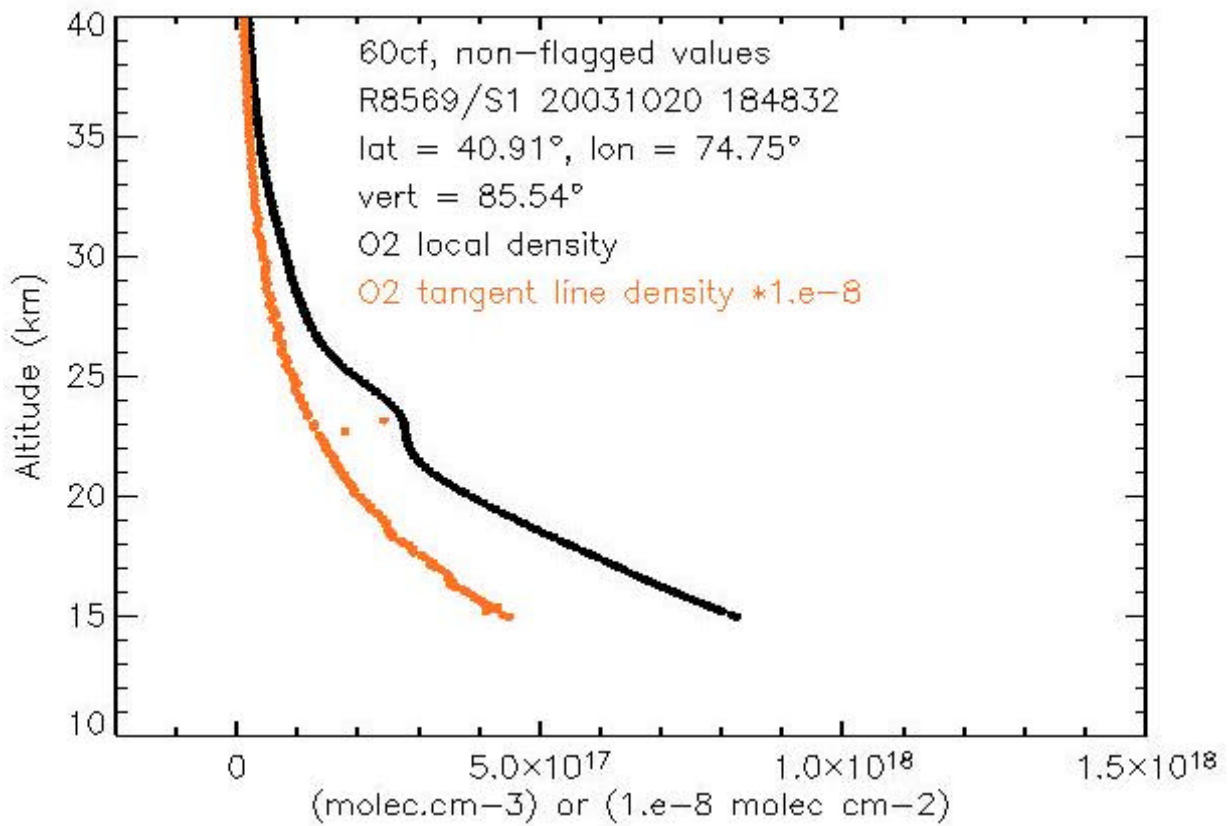
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



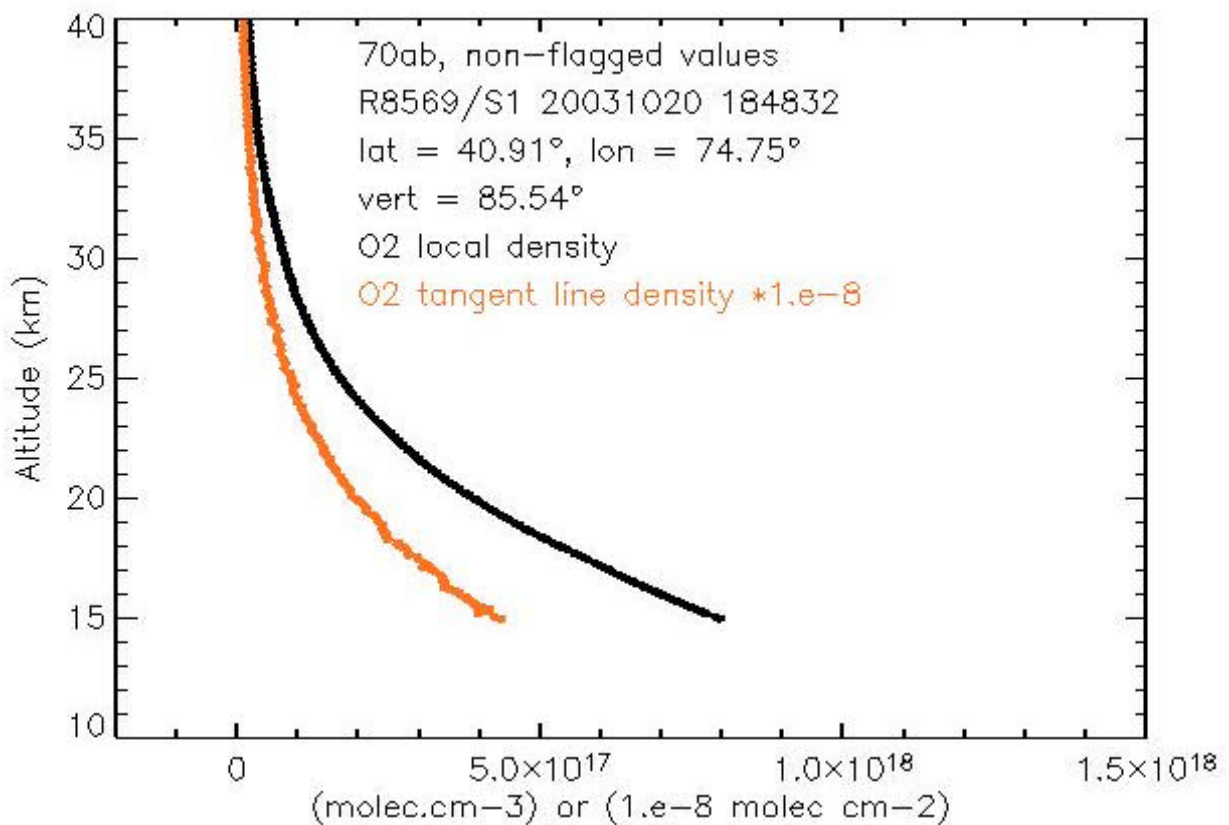
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



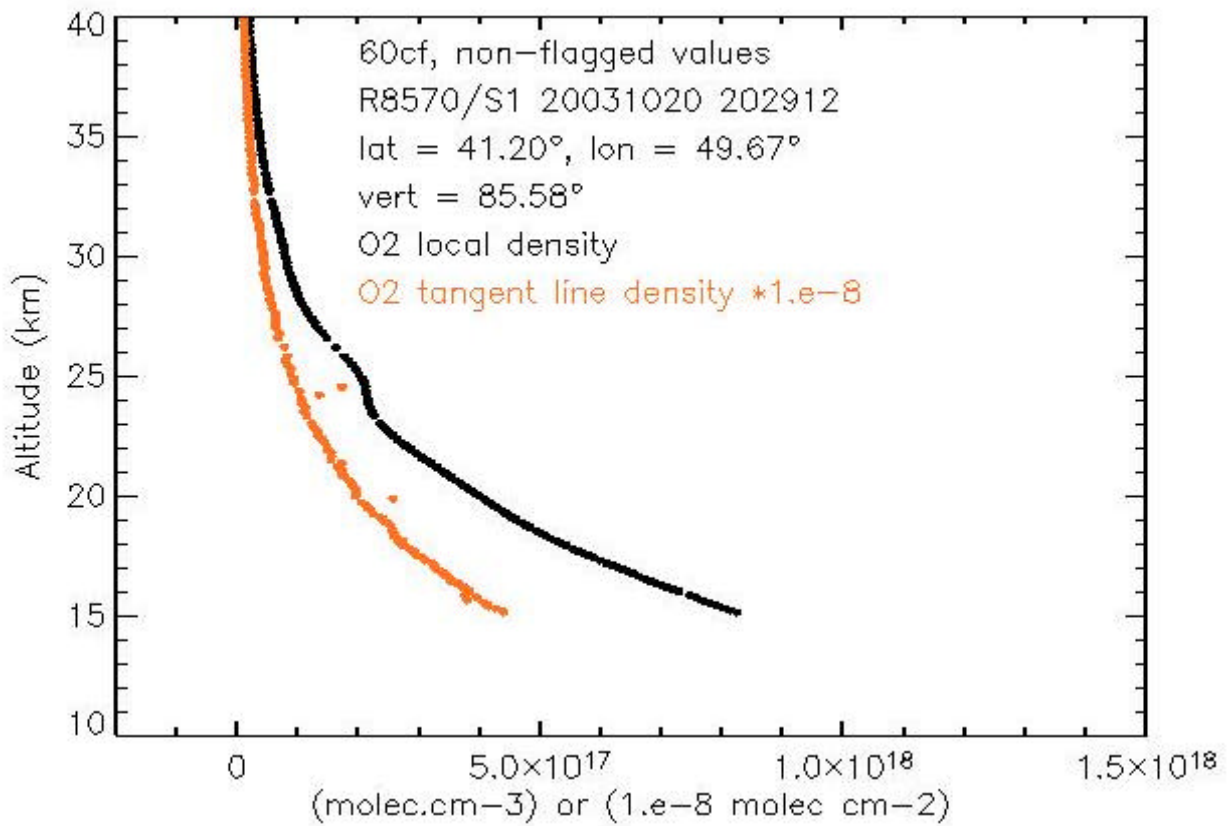
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



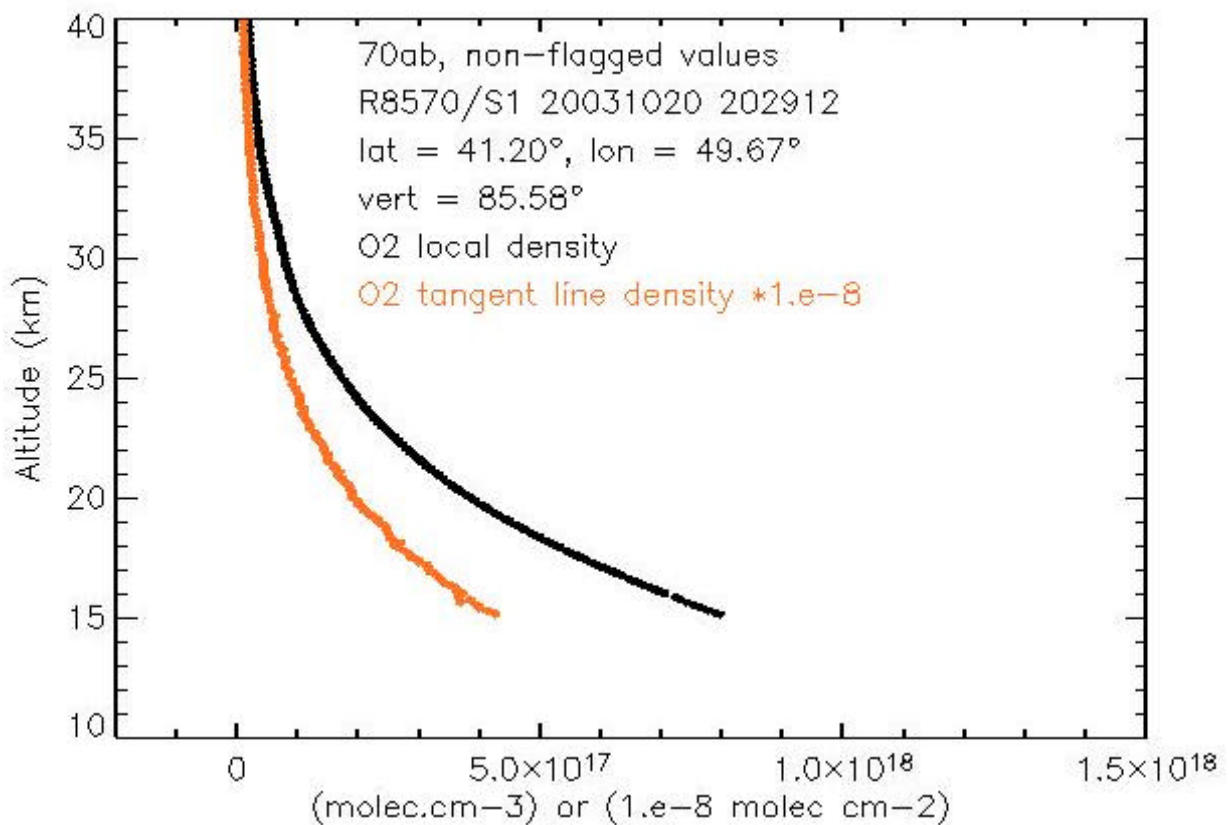
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



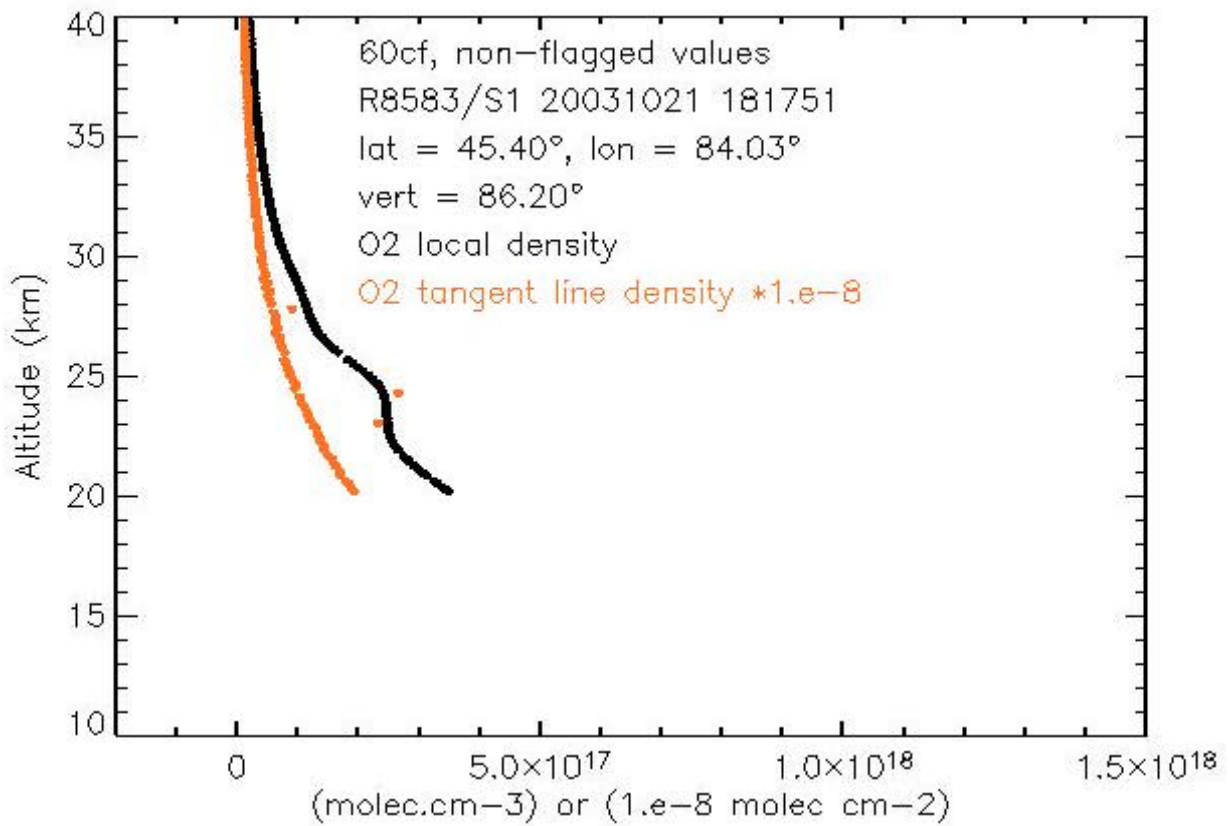
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



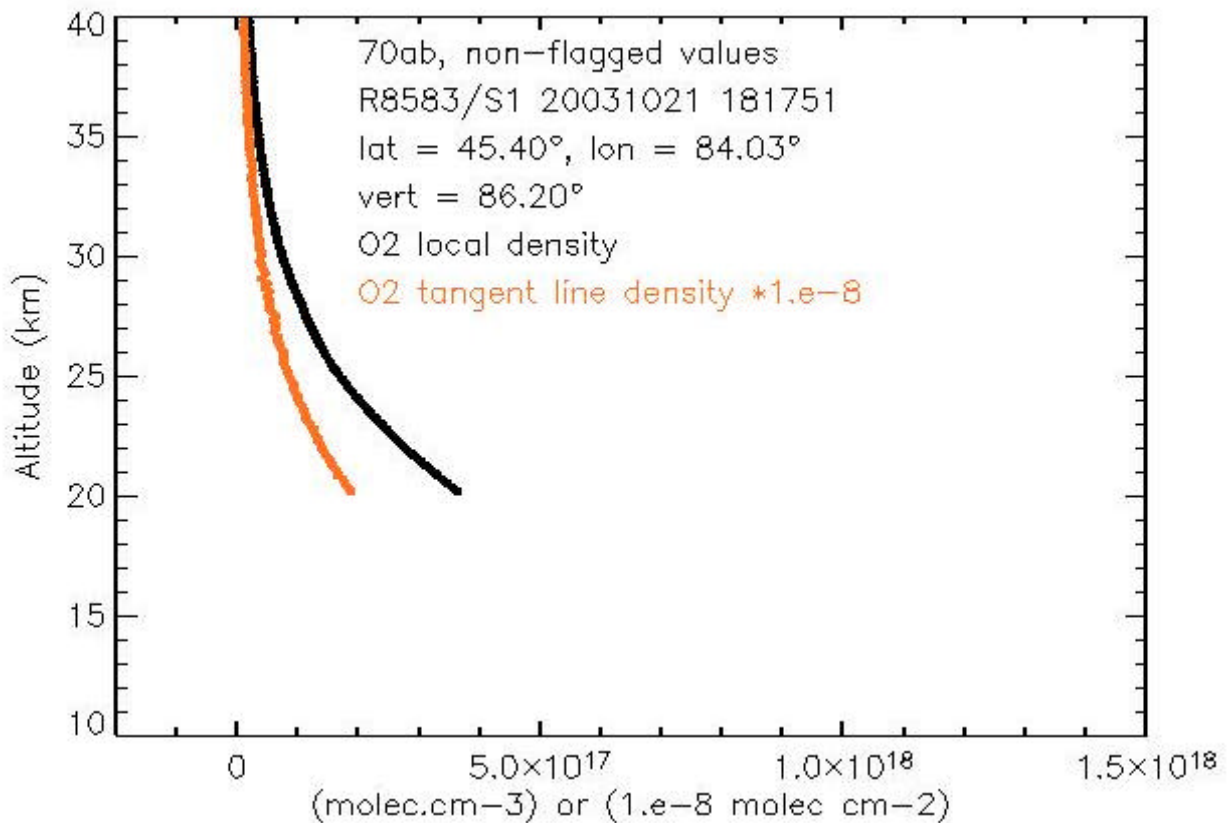
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



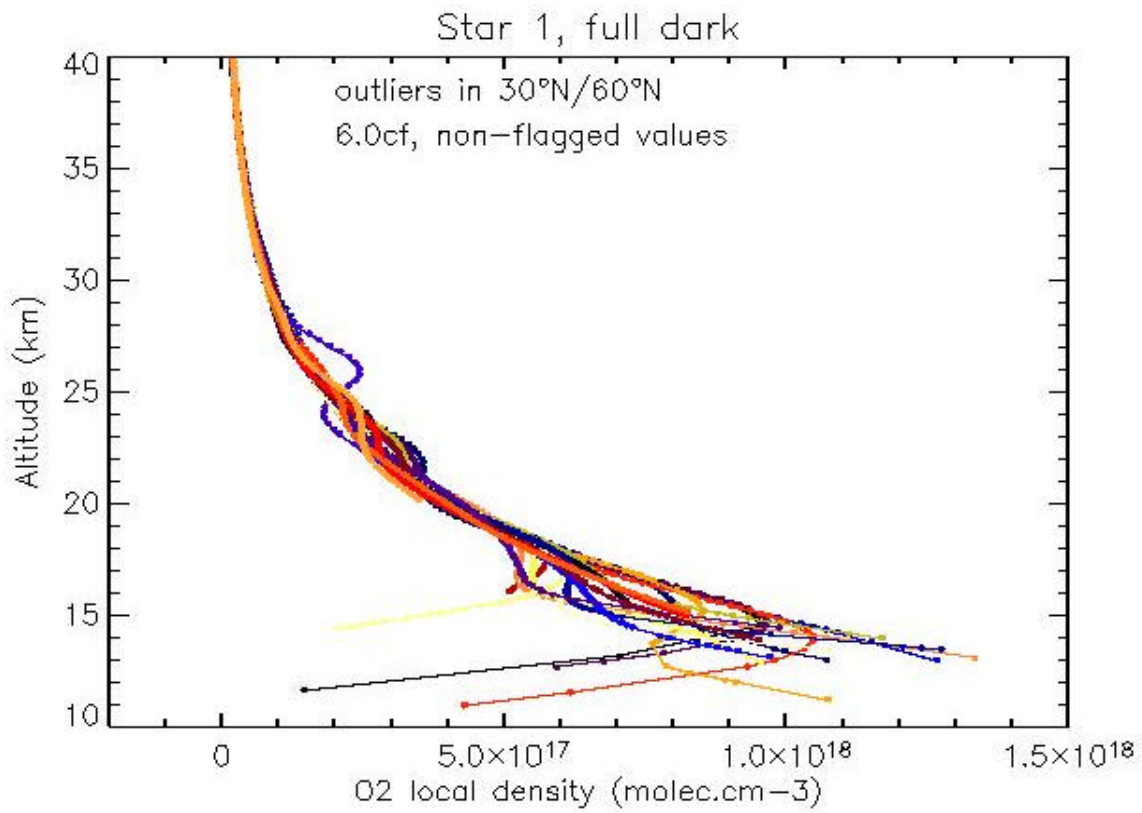
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)

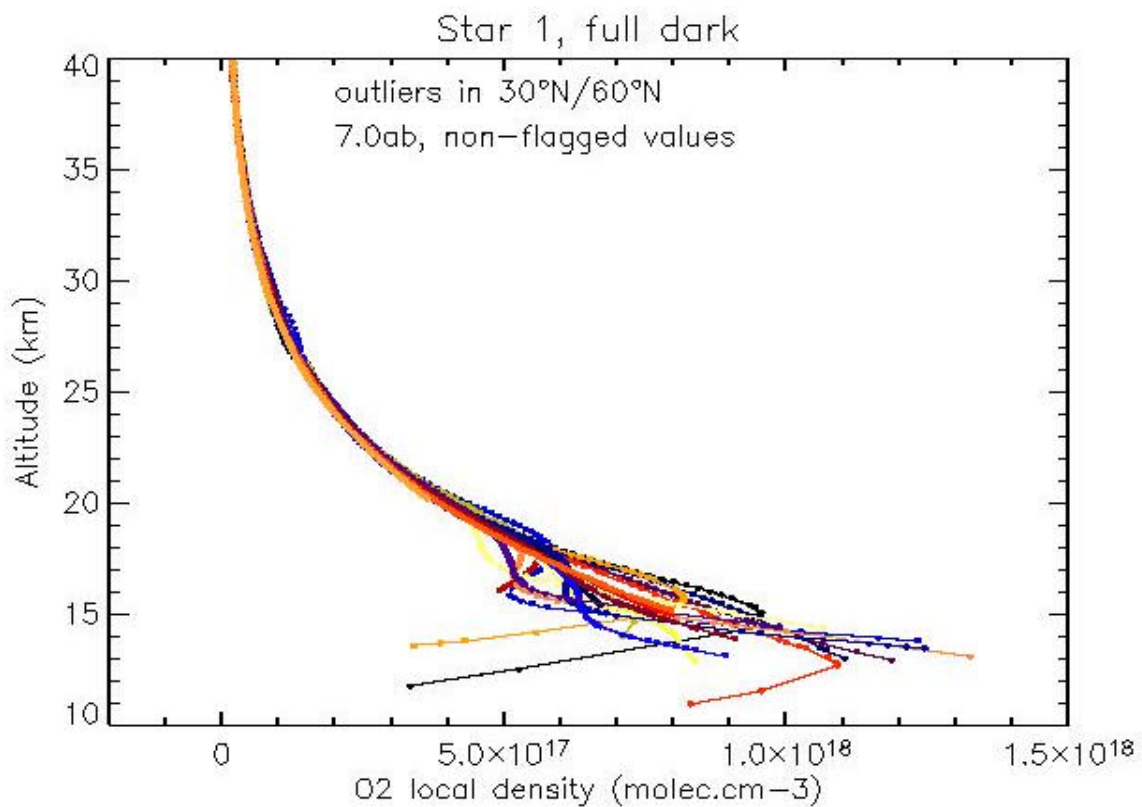


Star 1 – Vertical profiles of O₂ local density for several products
10km-40km

6.0cf

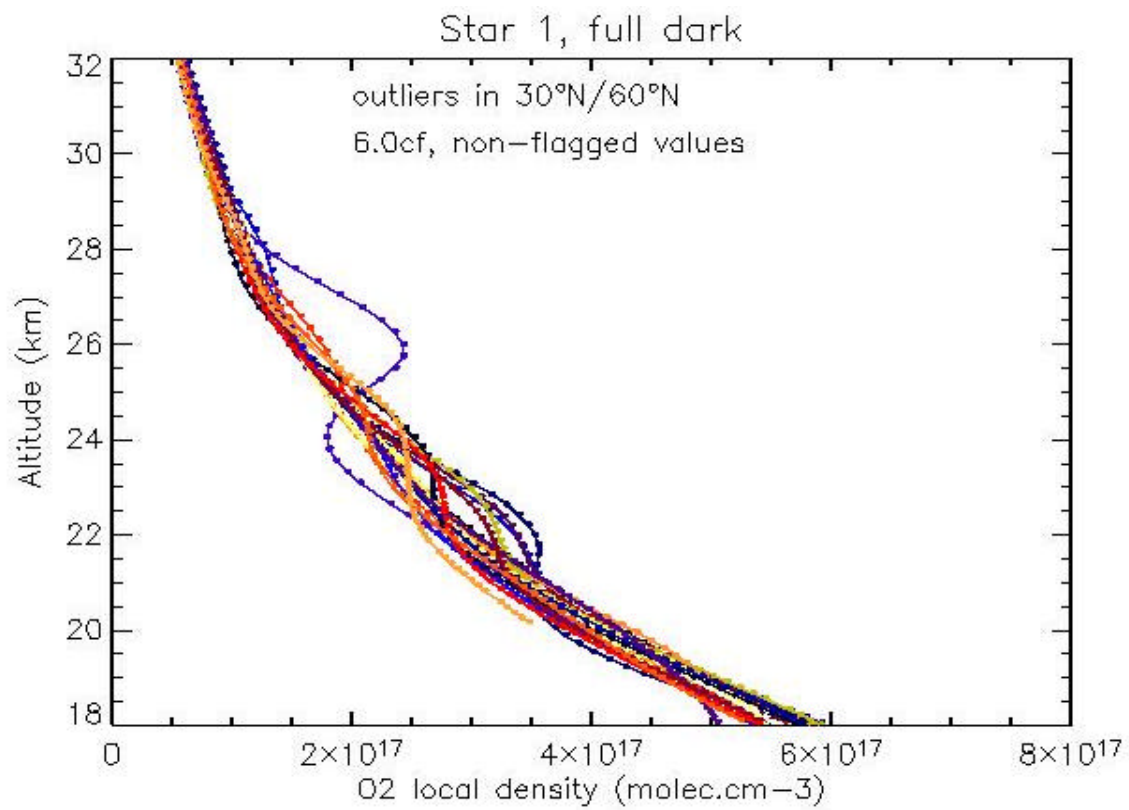


7.0ab

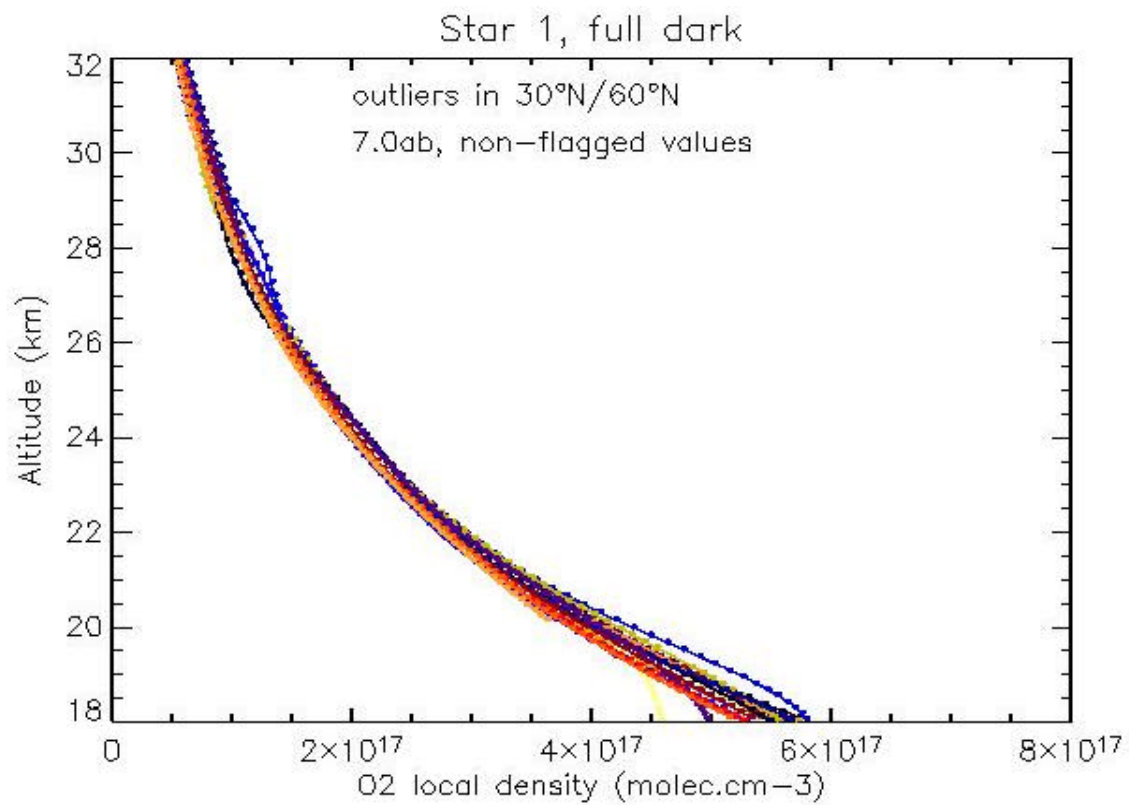


Zoom in 18km-32km

6.0cf

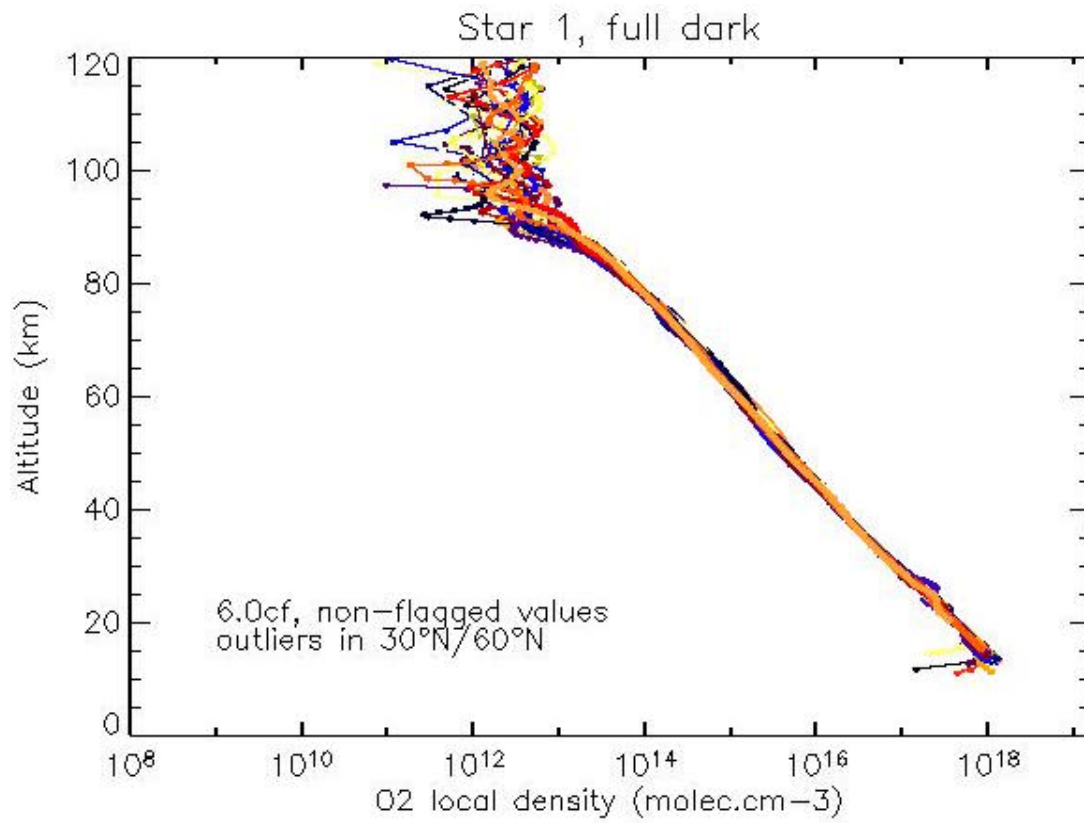


7.0ab

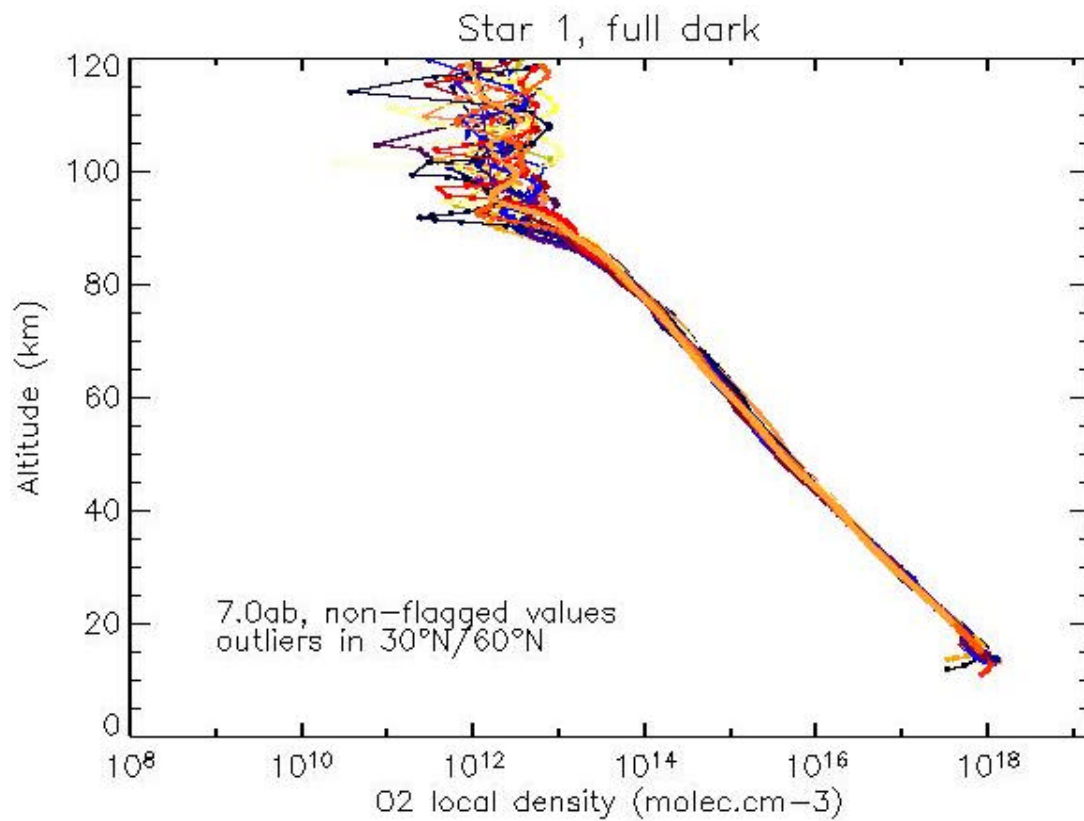


0-120km (log scale)

6.0cf

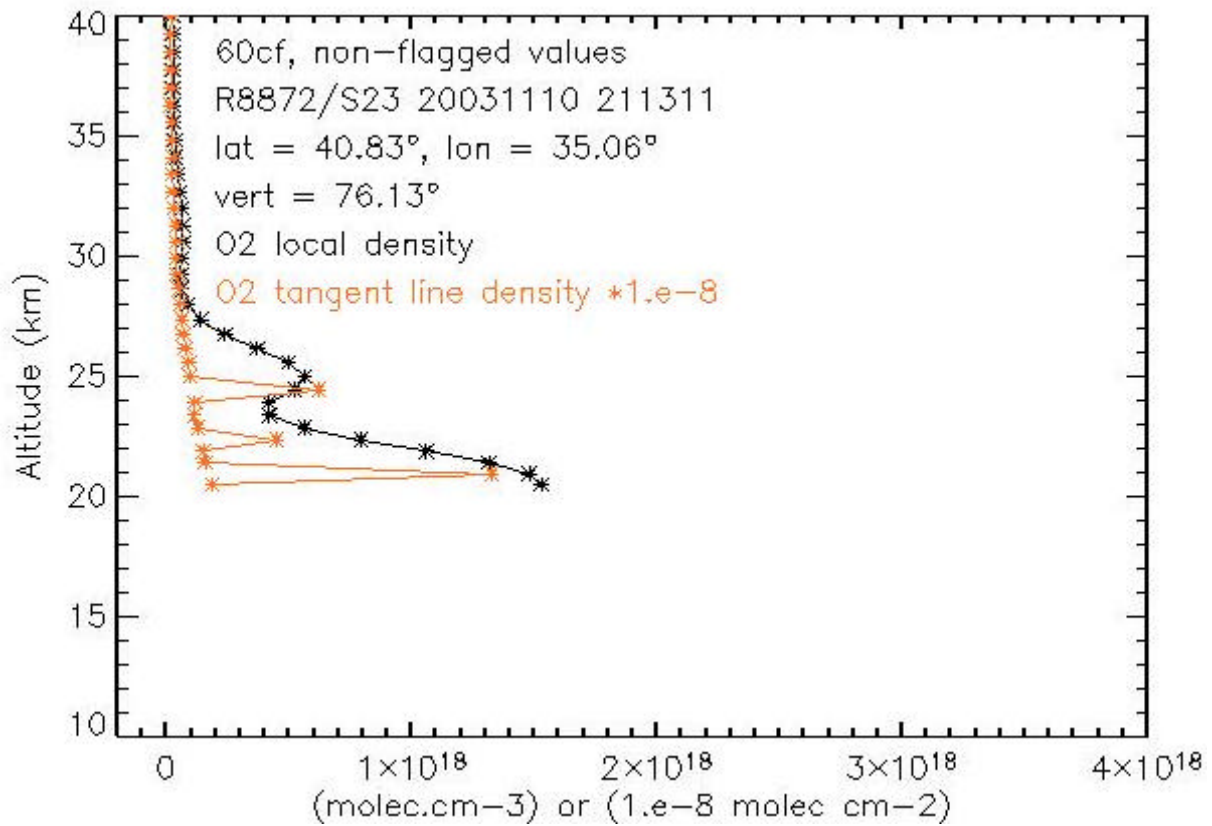


7.0ab

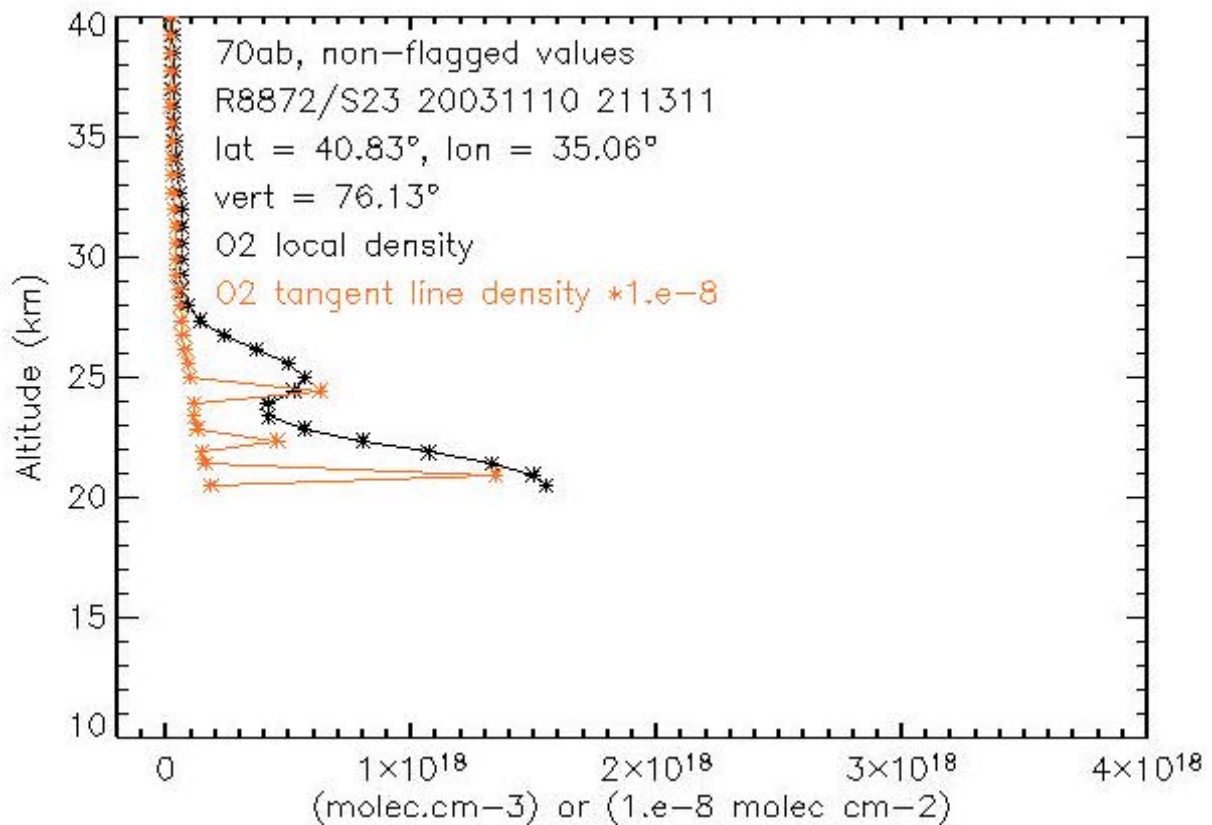


Star 23 – Dataset for noisy O_2 profiles in $30^\circ N$ - $60^\circ N$, 10/11/2003-10/12/2003

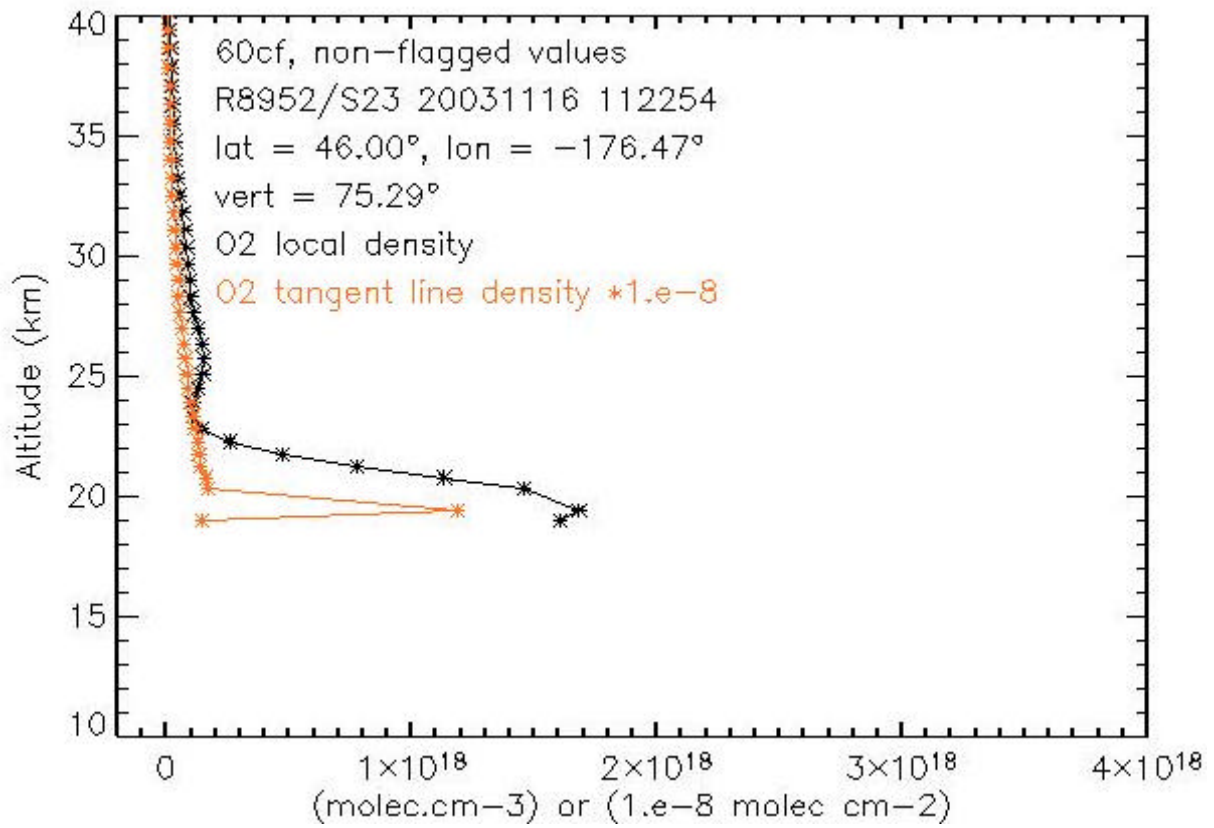
6.0cf line density * 10^{-8} (molec cm^{-2}) local density (molec cm^{-3})



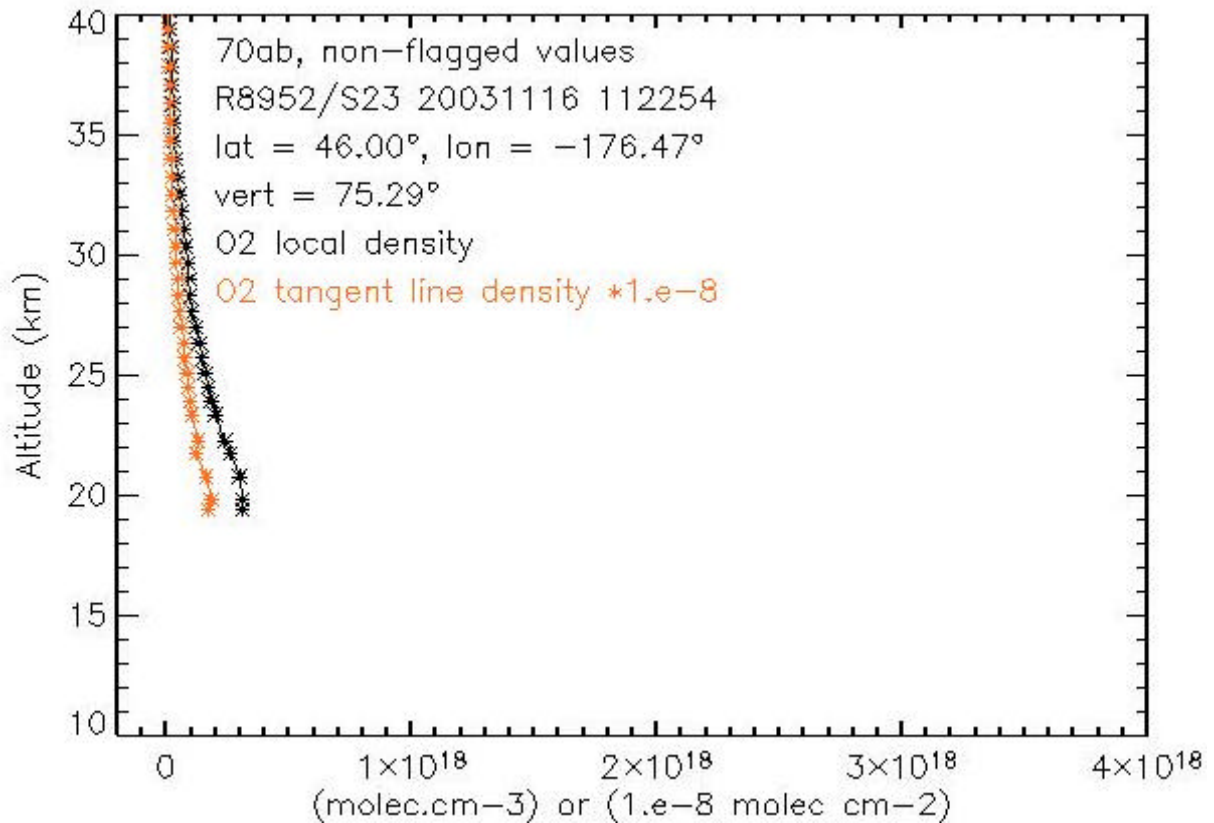
7.0ab line density * 10^{-8} (molec cm^{-2}) local density (molec cm^{-3})



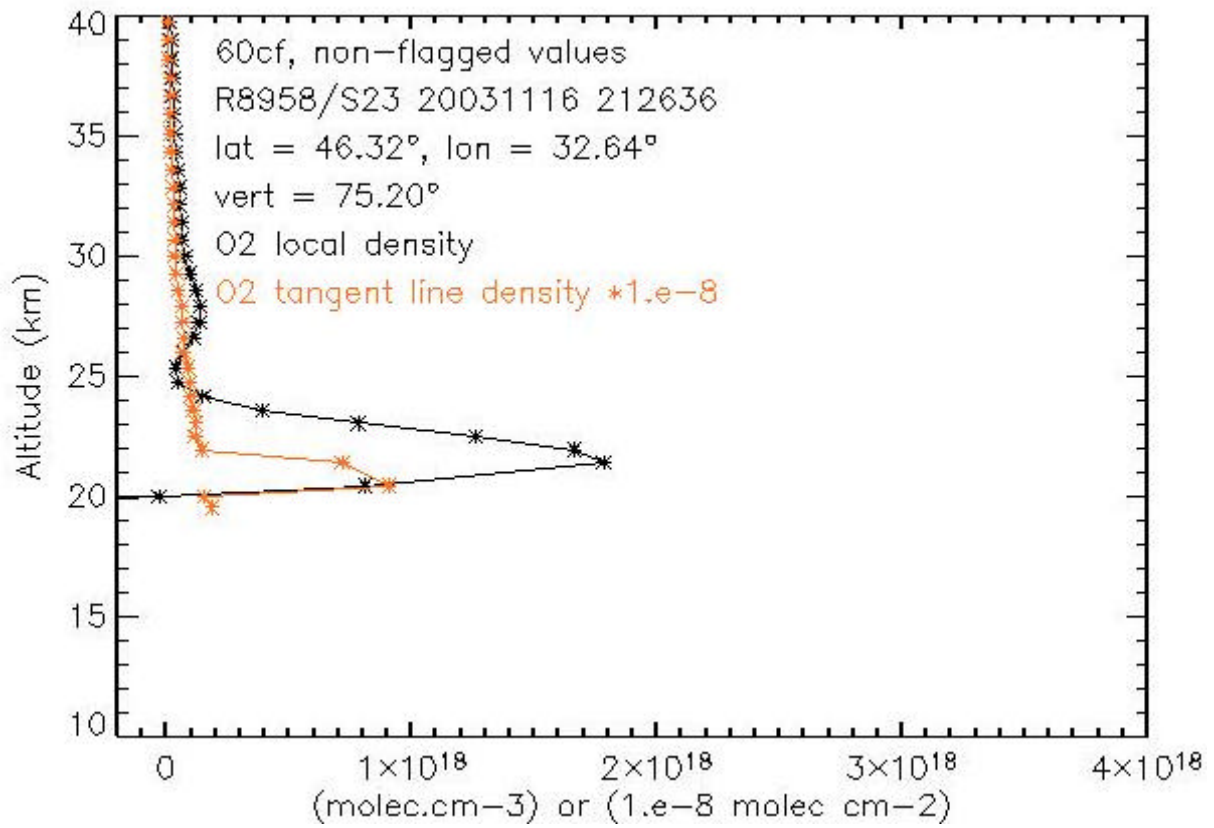
6.0cf line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



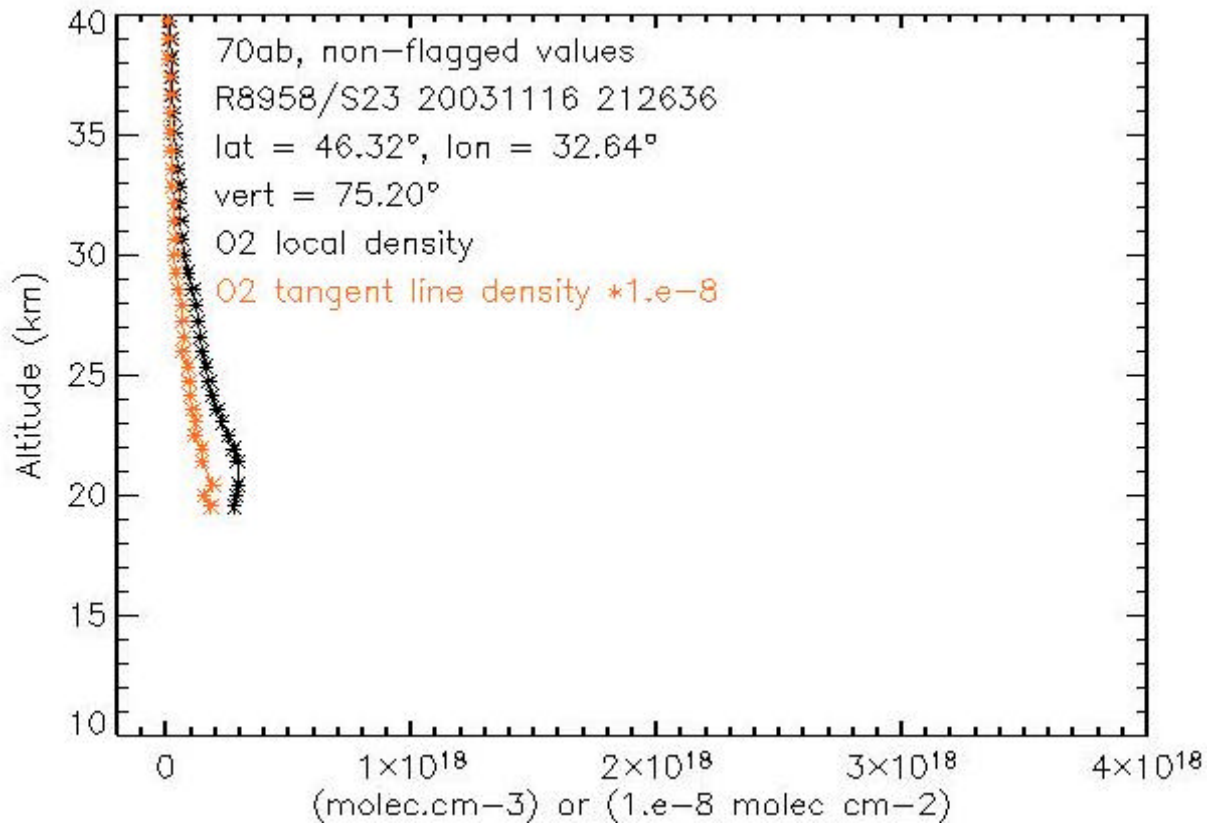
7.0ab line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



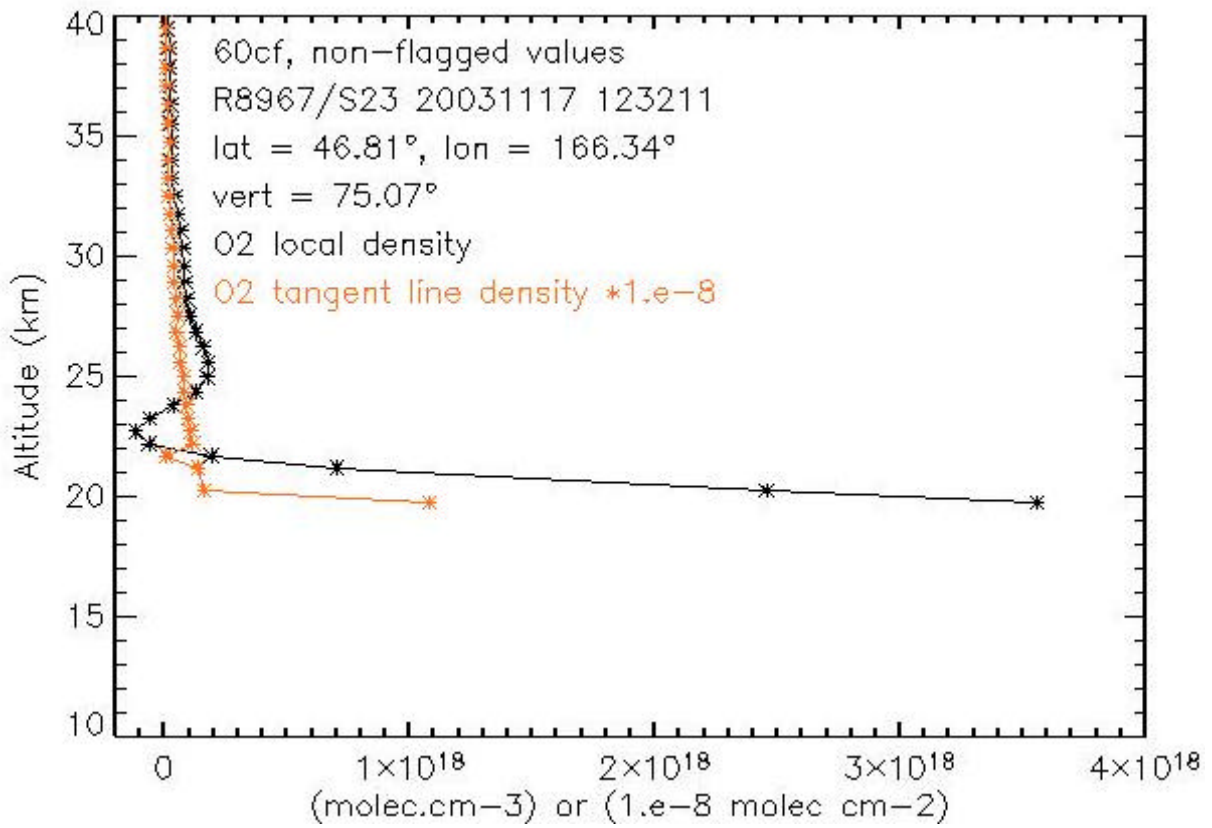
6.0cf line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



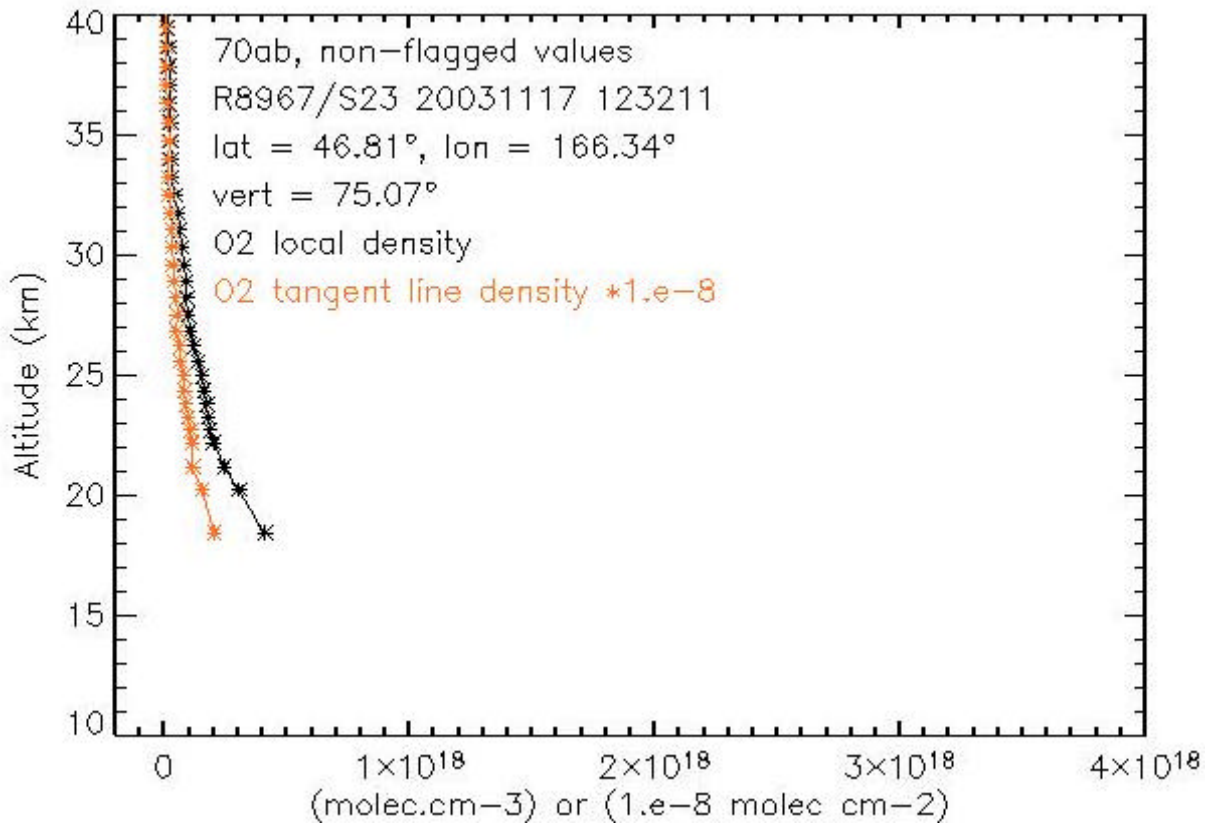
7.0ab line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



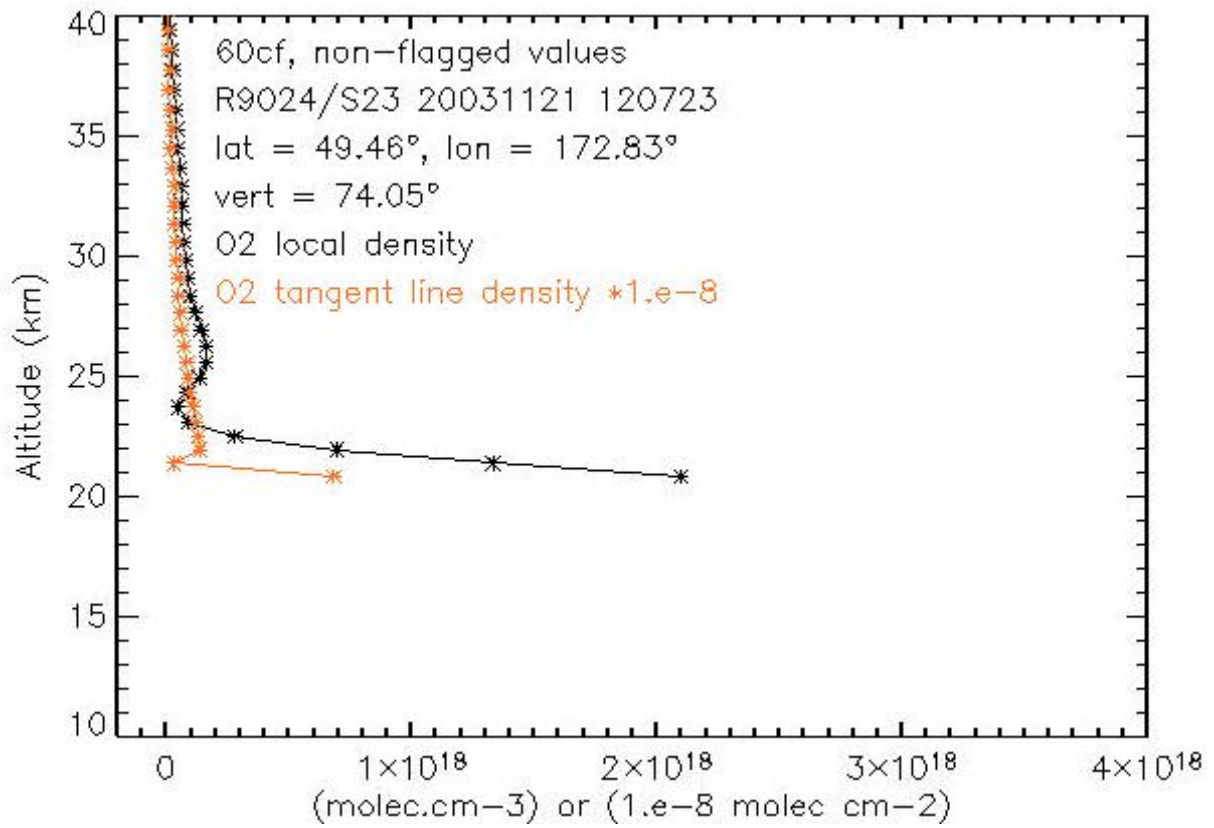
6.0cf line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



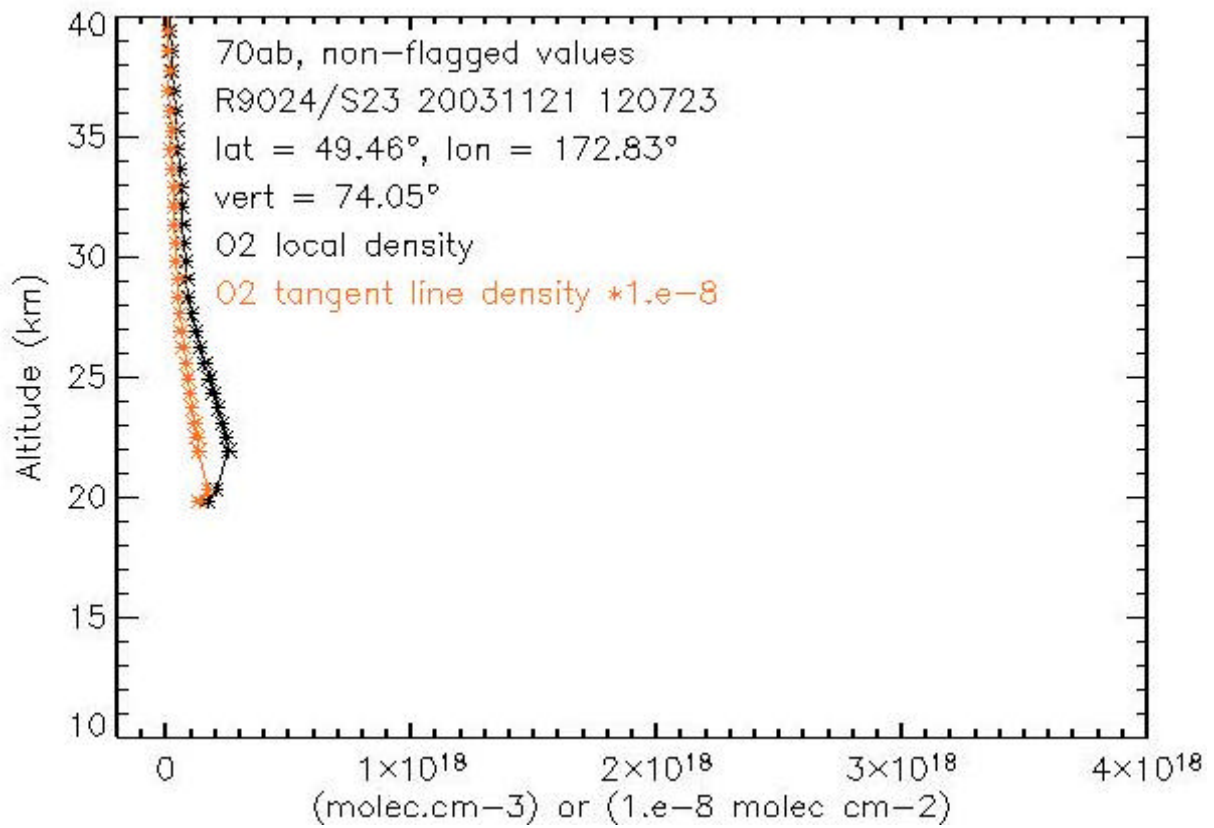
7.0ab line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



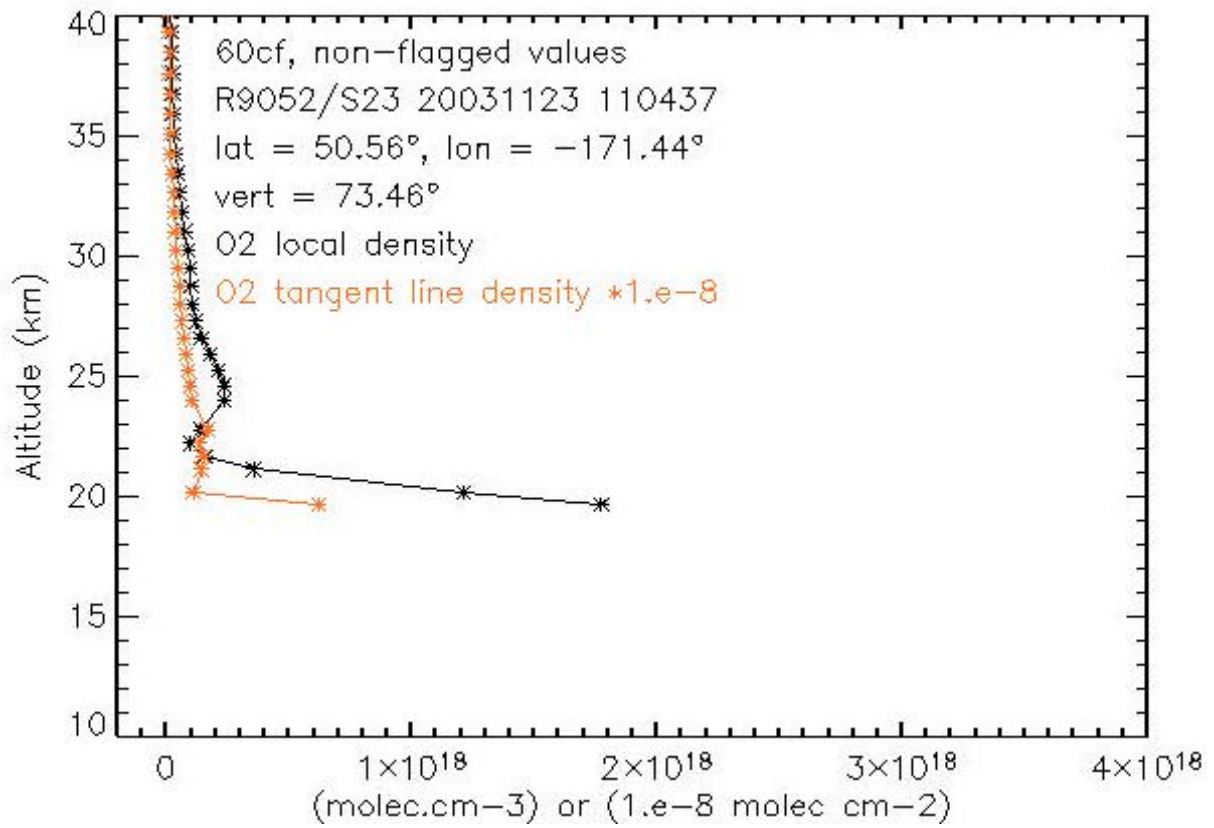
6.0cf line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



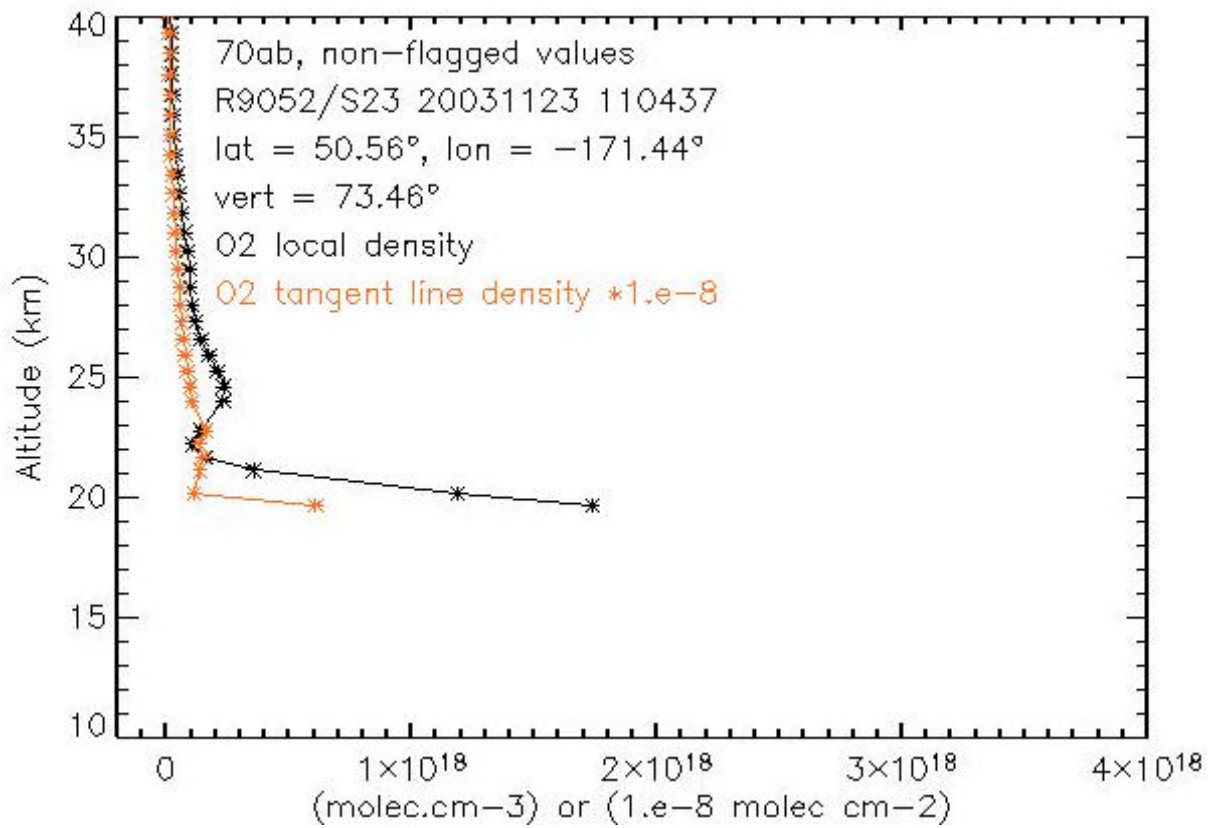
7.0ab line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



6.0cf line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)

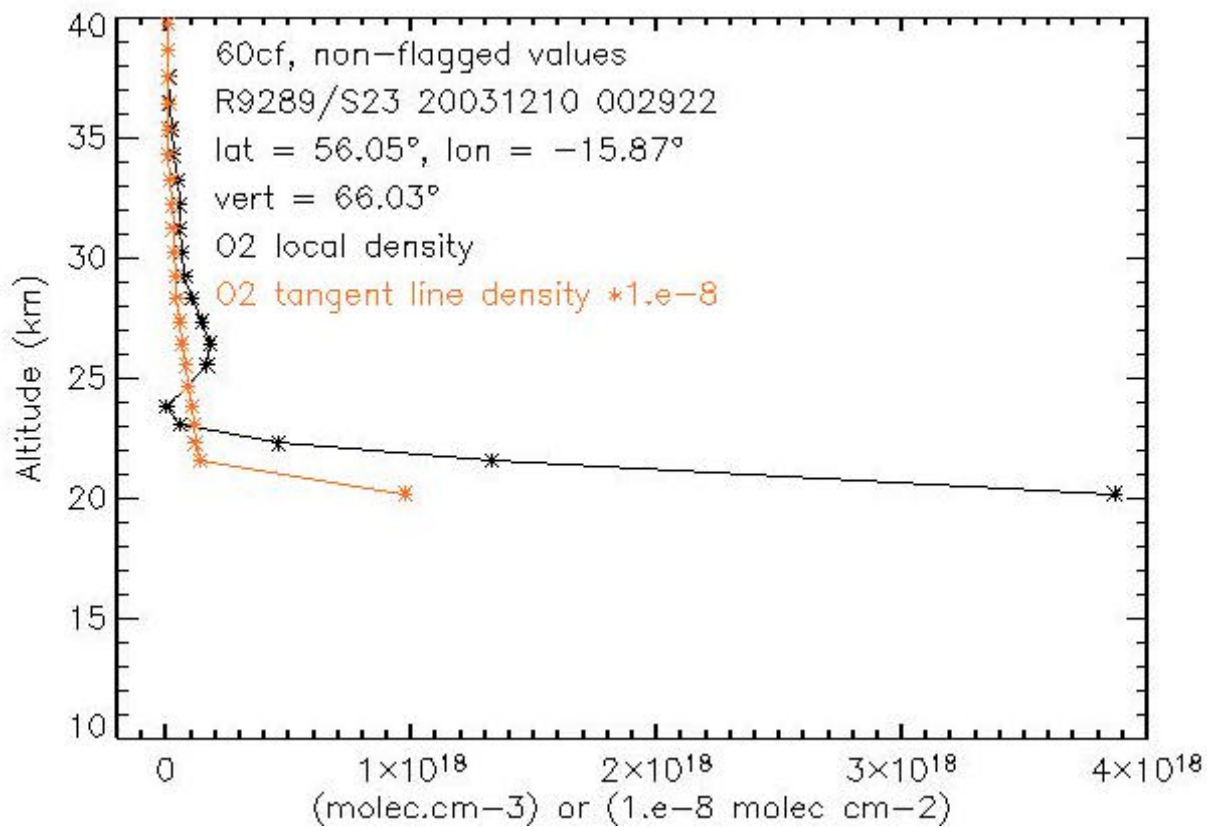


7.0ab line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



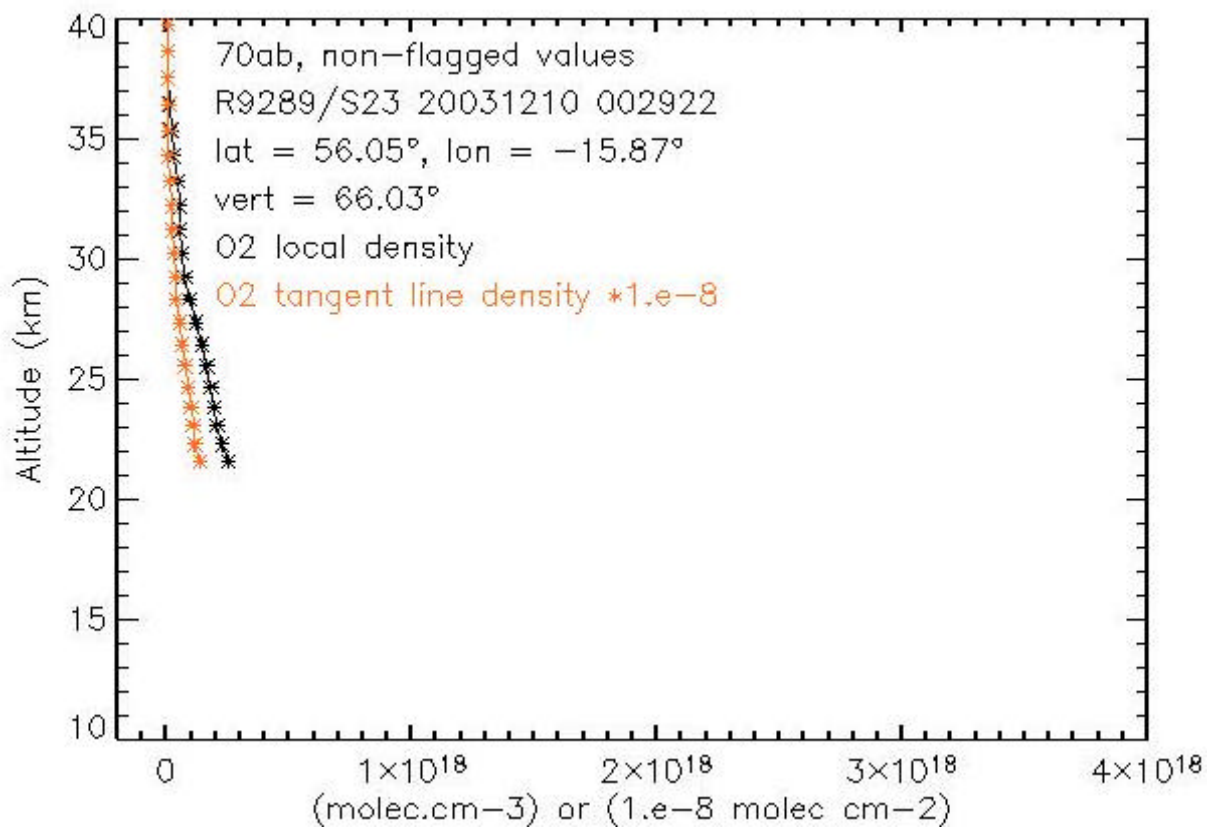
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



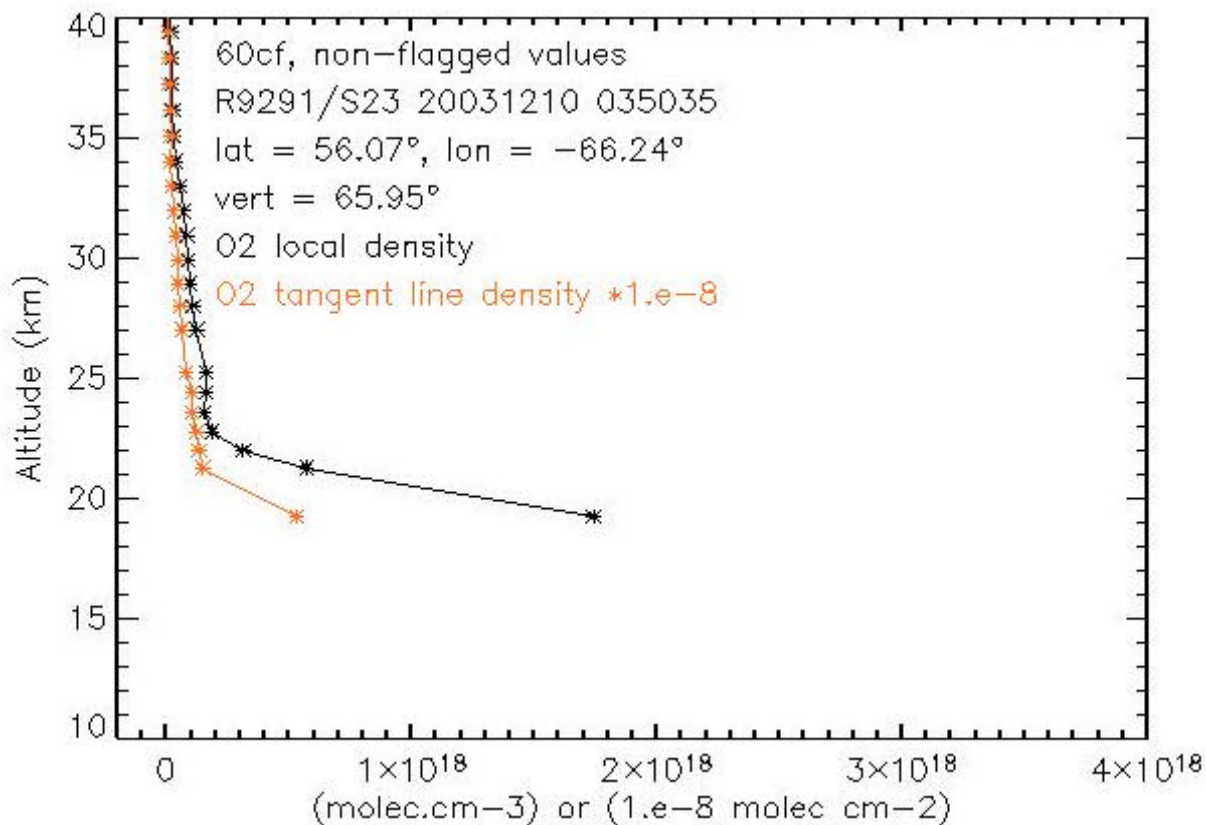
7.0ab

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



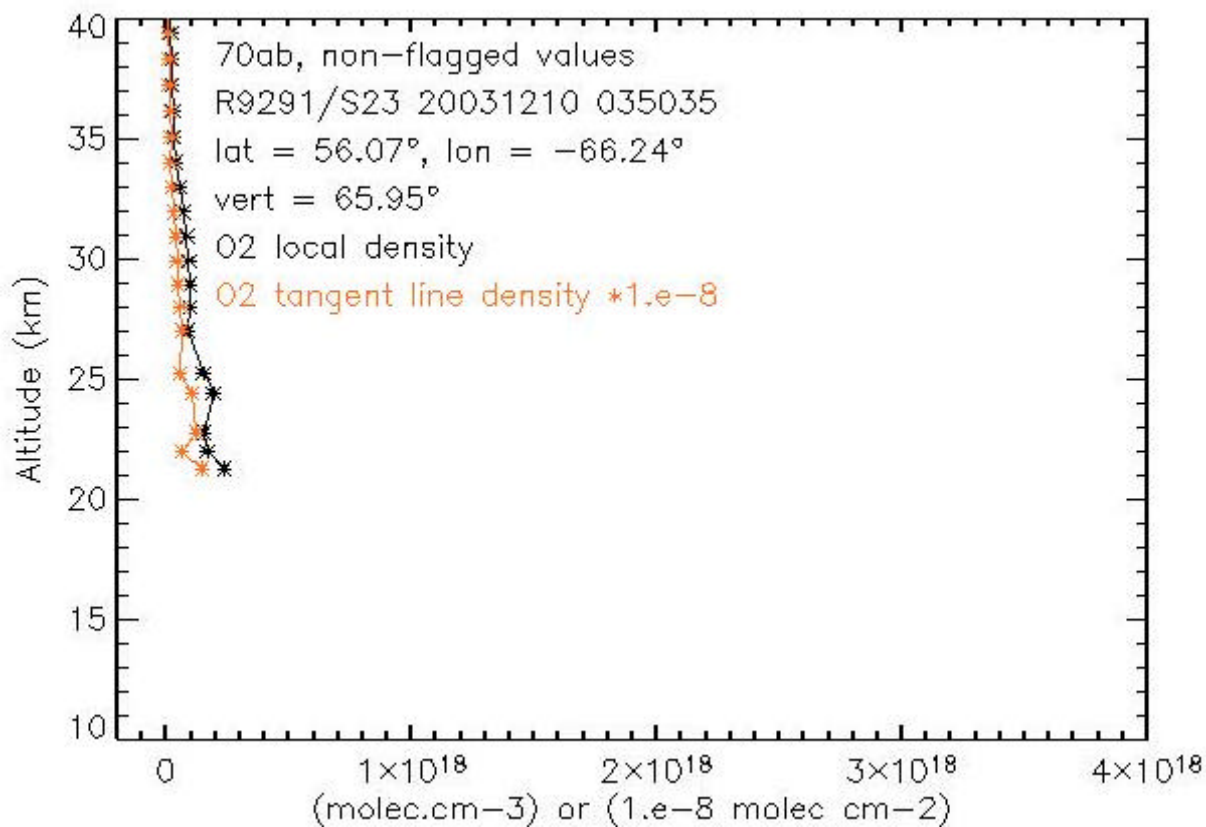
6.0cf

line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



7.0ab

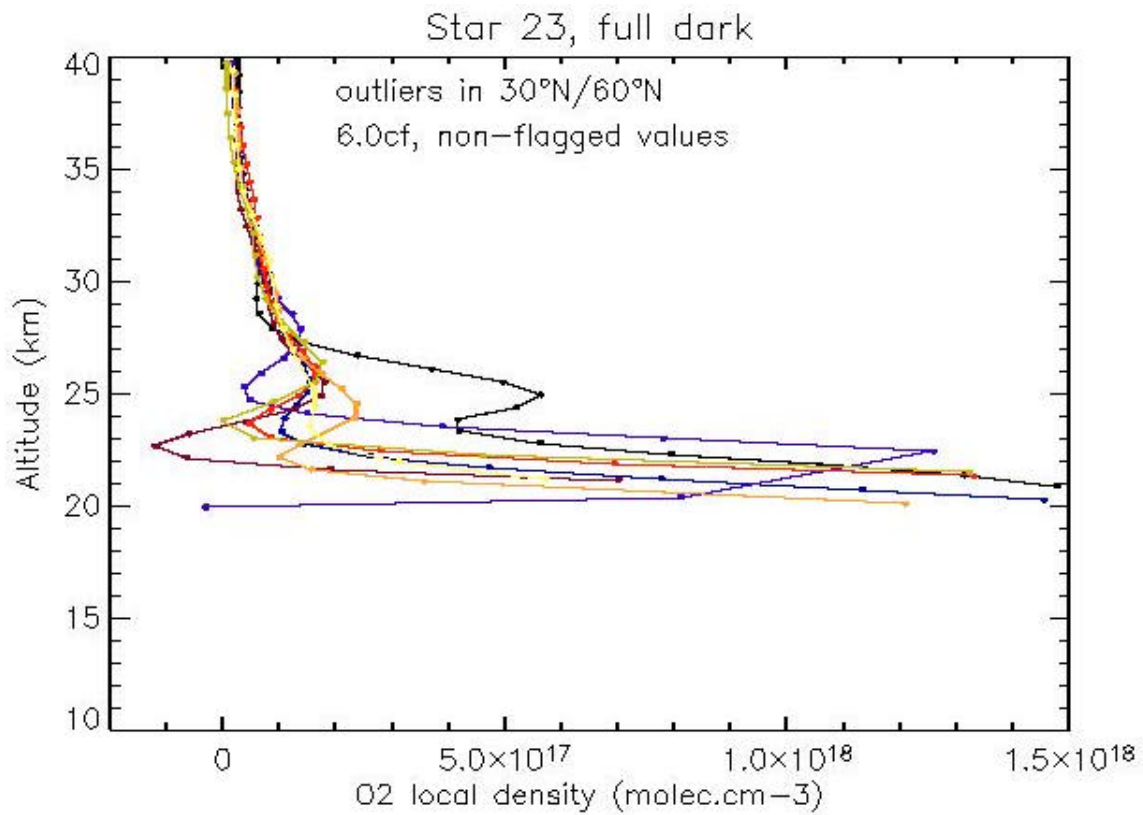
line density * 10⁻⁸ (molec cm⁻²) local density (molec cm⁻³)



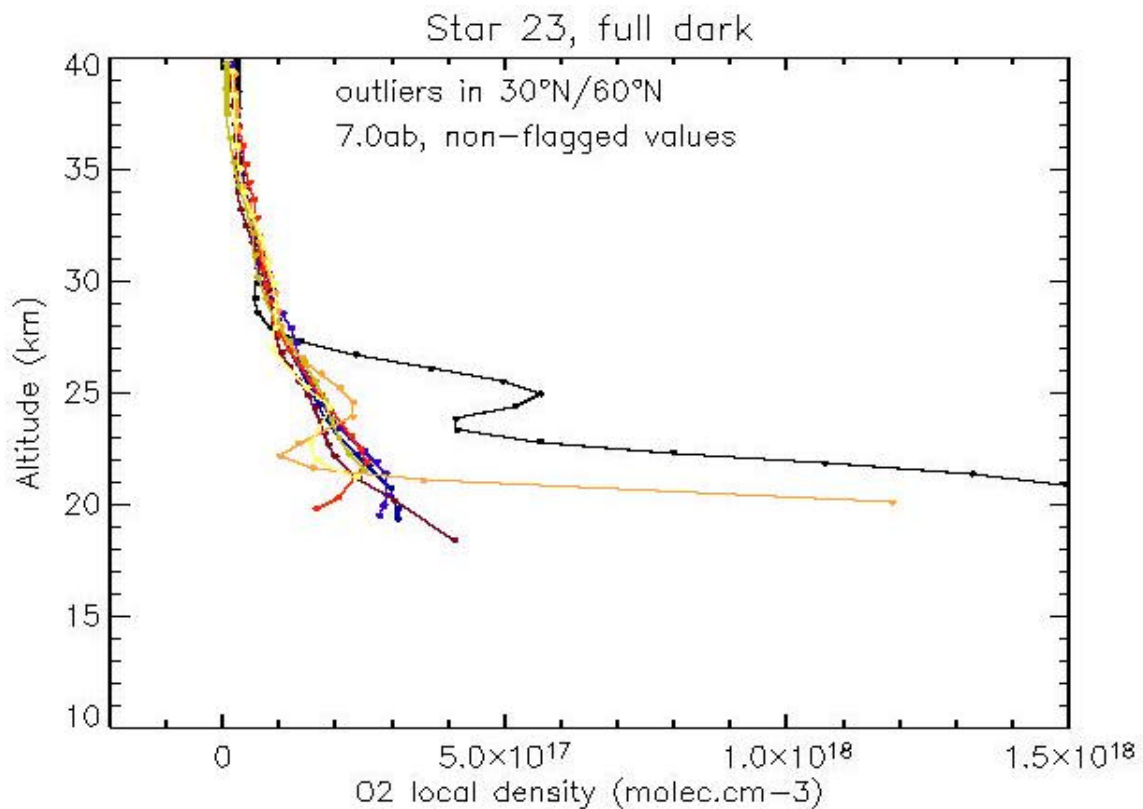
Star 23 – Vertical profiles of O₂ local density for several products

15km-40km

6.0cf

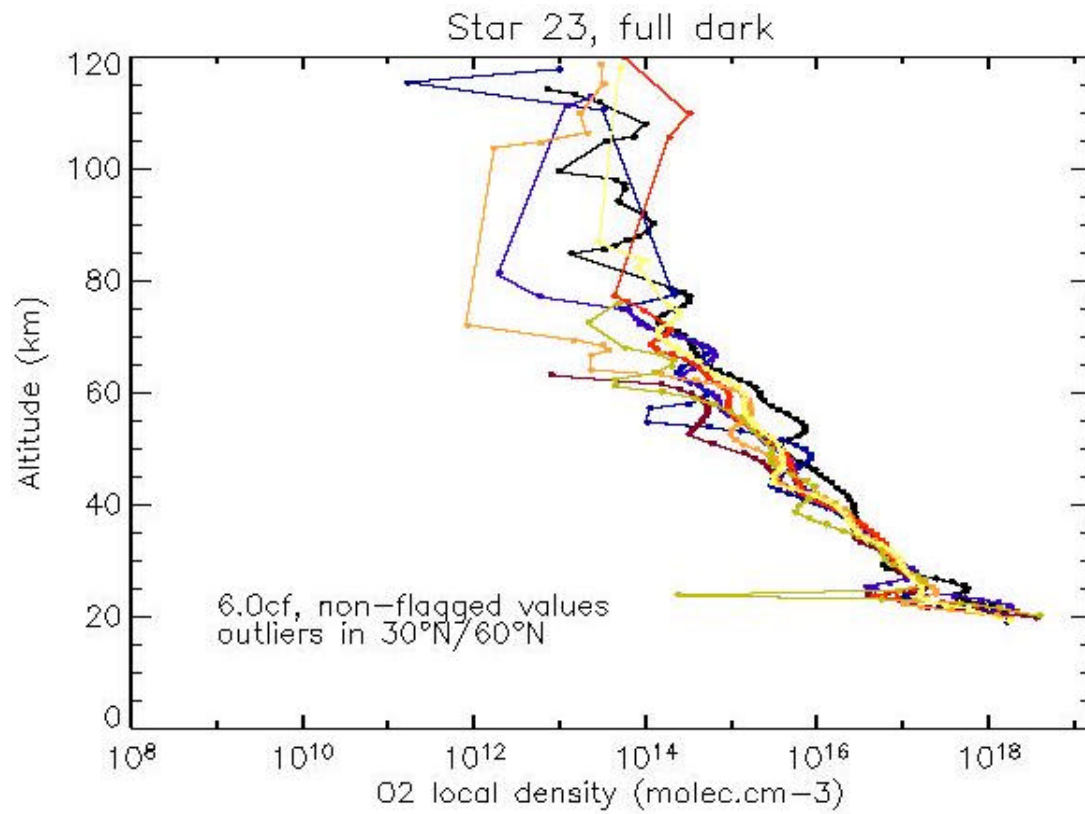


7.0ab



0-120km (log scale)

6.0cf



7.0ab

