

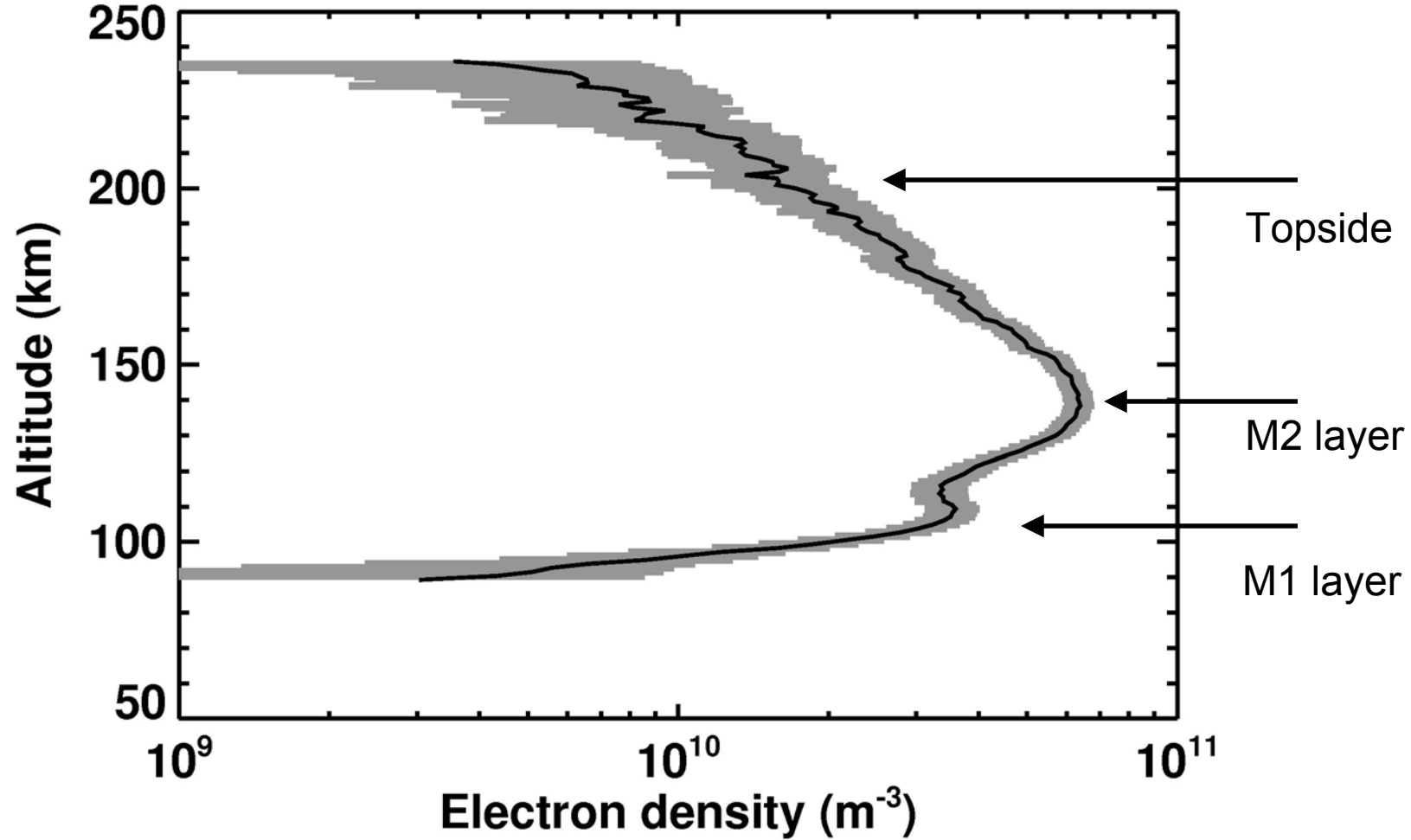
Unusual martian ionospheric features

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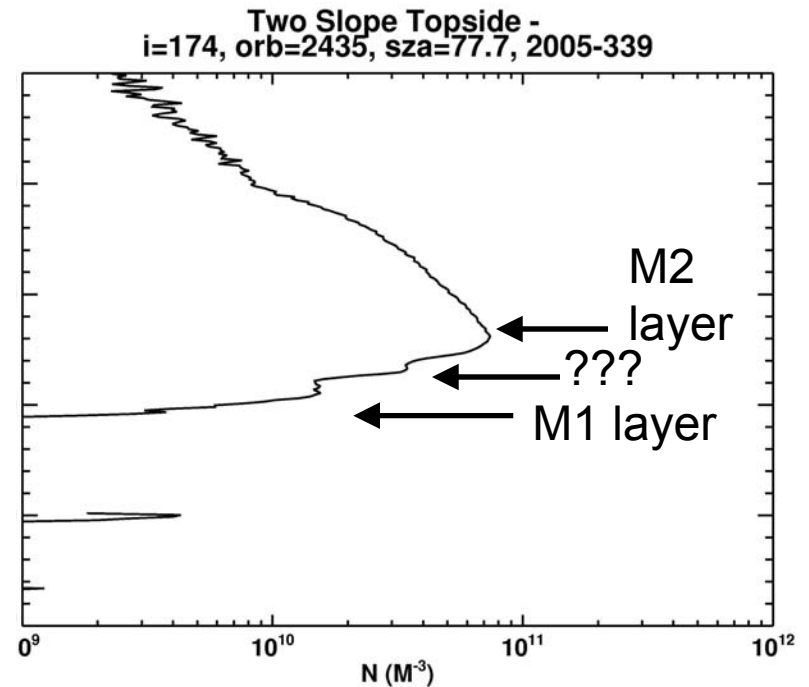
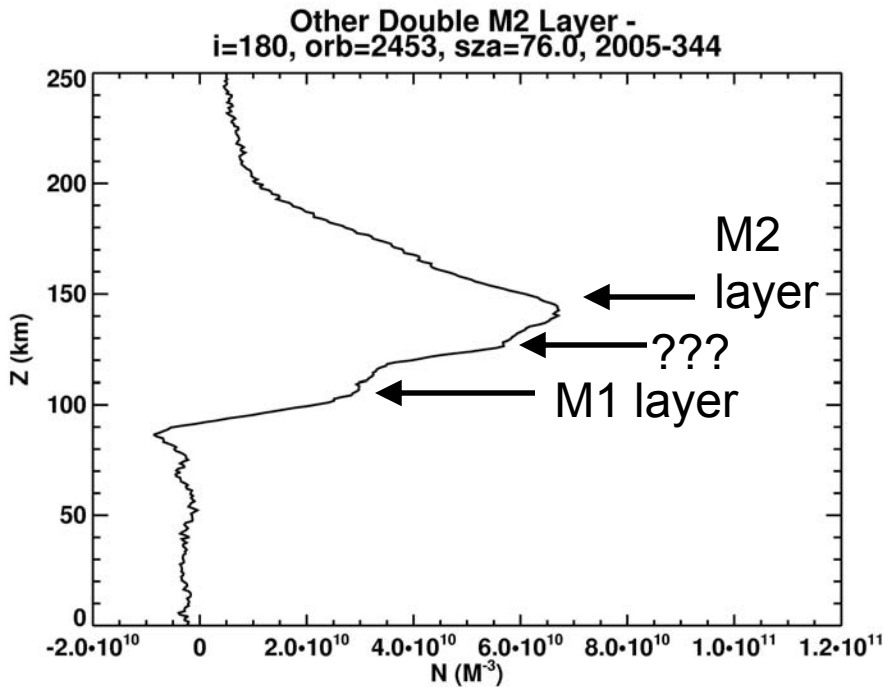
MEX/VEX Radio Science Meeting
2010.08.03-04
Sugarbowl, Nevada

Typical description of vertical structure

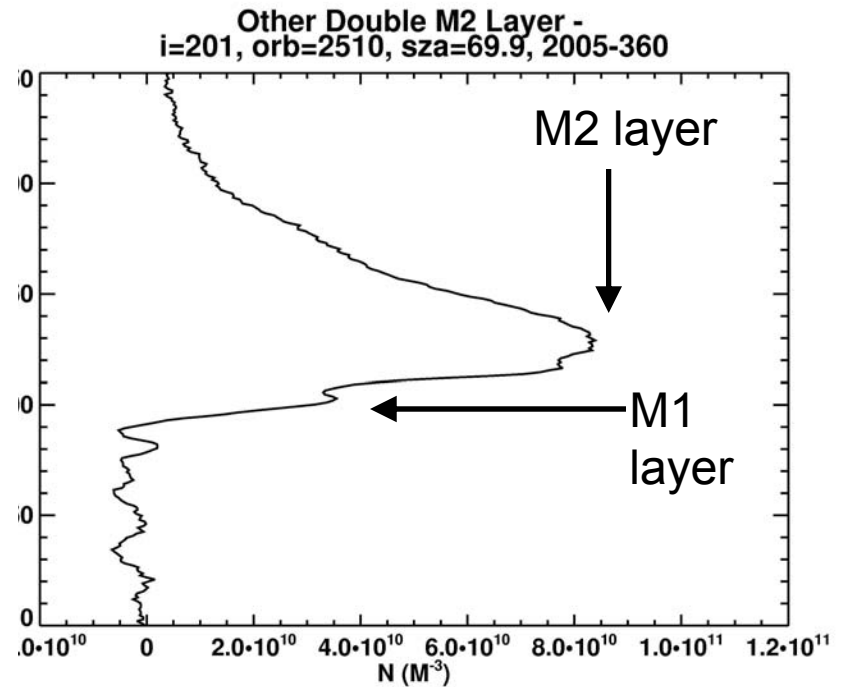
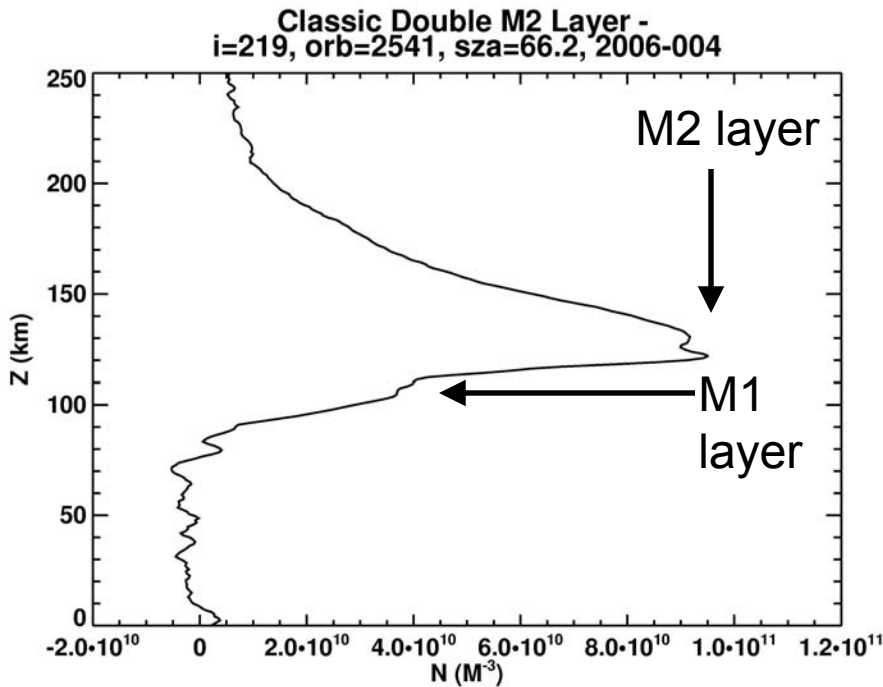


MGS profile 0337M41A

Structure between M1 and M2

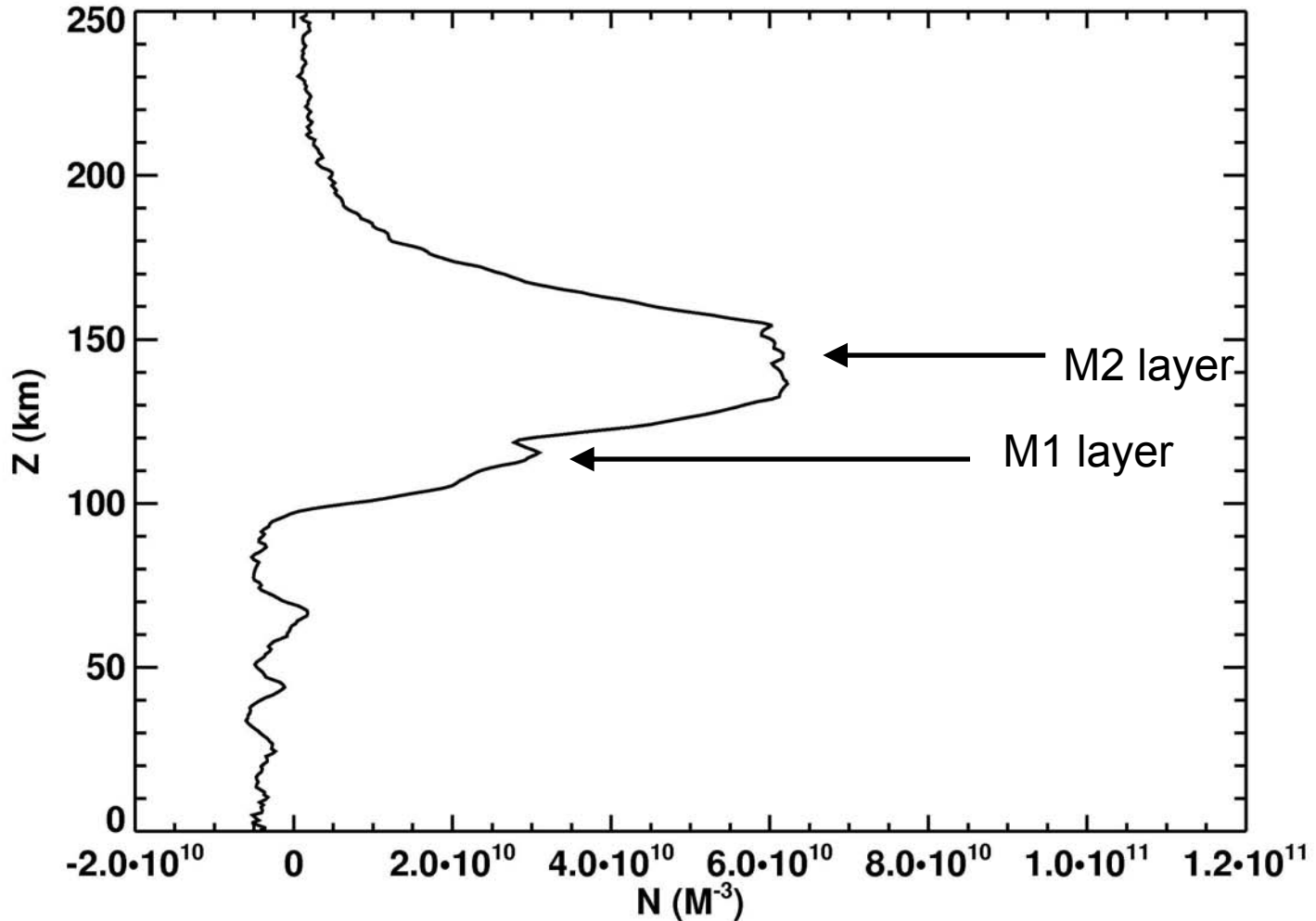


Structure in M2 layer

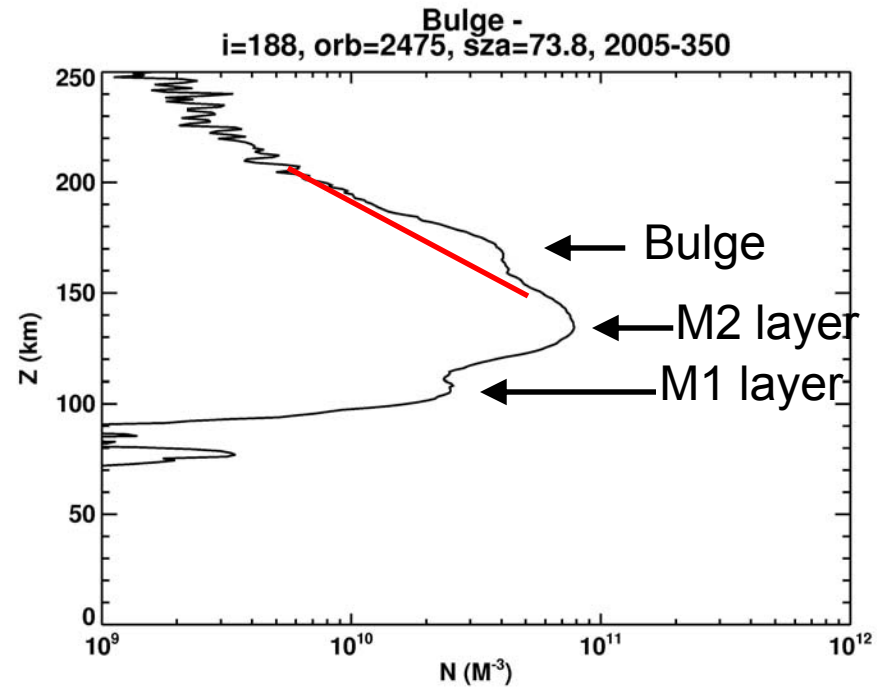
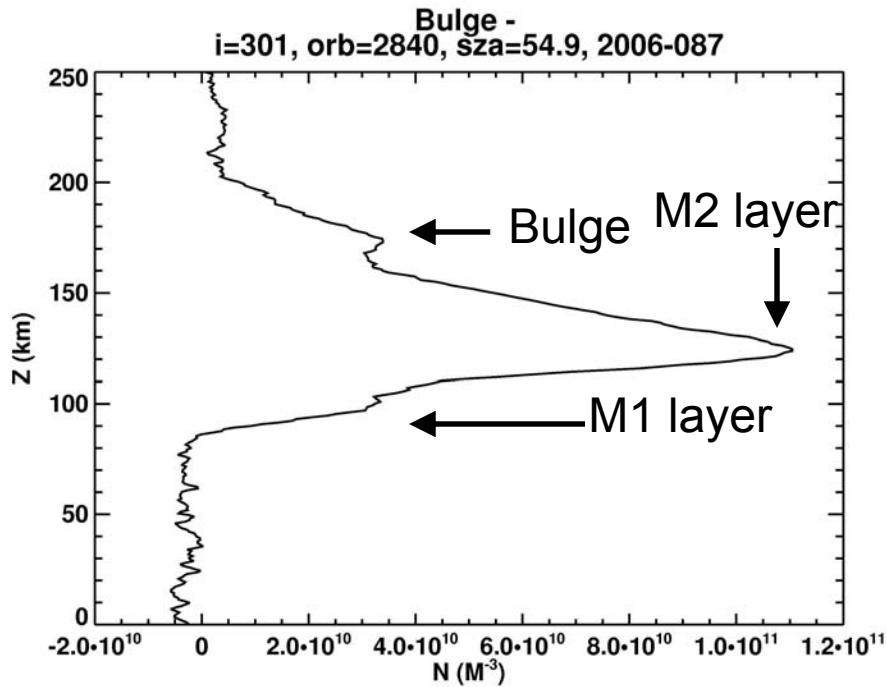


Flat top on M2 layer

Flattop M2 layer -
i=167, orb=2416, sza=79.4, 2005-334



Bulge in topside



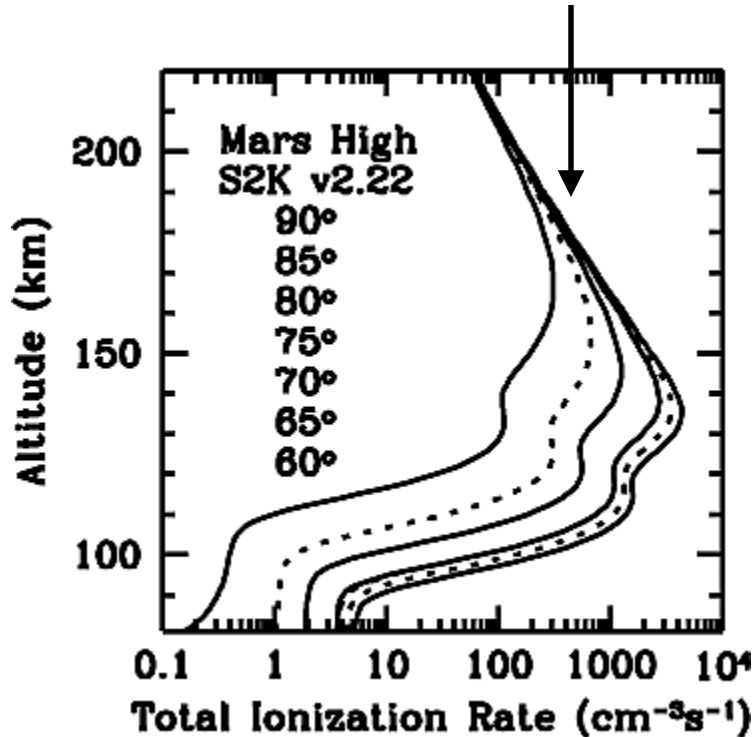
Predictions of bulge

Feature not addressed in text of paper

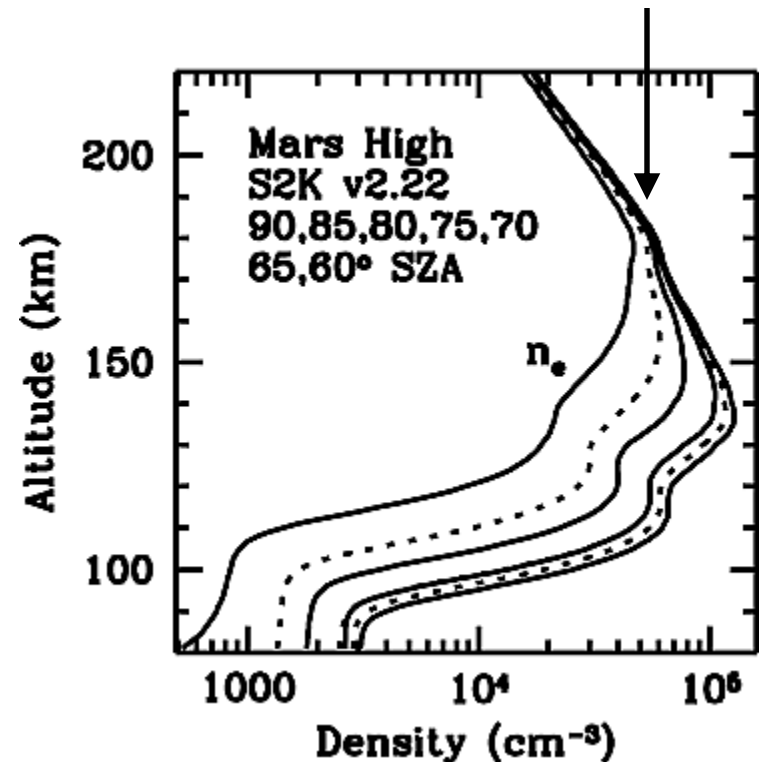
I'm not sure what physical mechanism is responsible

Model says O₂⁺ is dominant species at all altitudes

No bulge in ionization rate



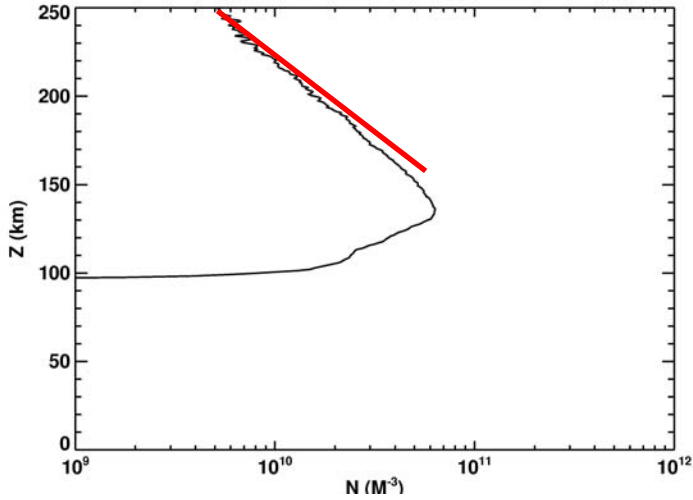
Bulge in electron density



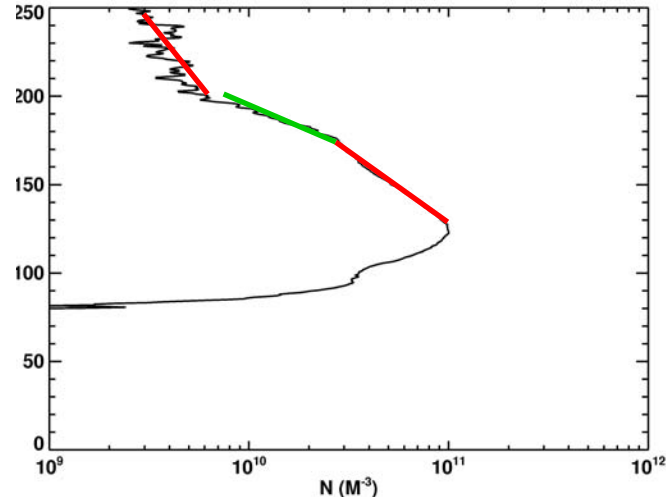
Figures 9 and 10 from Fox and Yeager (2006)

Topside regions

One Slope Topside -
i=165, orb=2411, sza=79.9, 2005-332

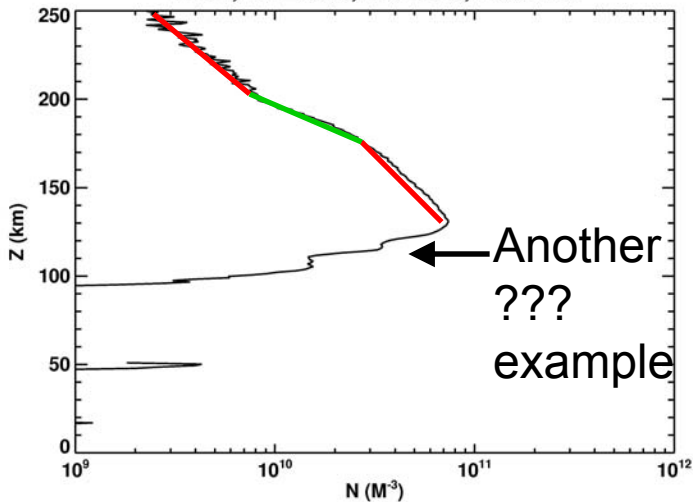


Three Slope Topside -
i=312, orb=2929, sza=62.0, 2006-112



One slope?
Two slopes?
Three slopes?

Two Slope Topside -
i=174, orb=2435, sza=77.7, 2005-339



Two Slope Topside -
i=258, orb=2664, sza=54.2, 2006-038

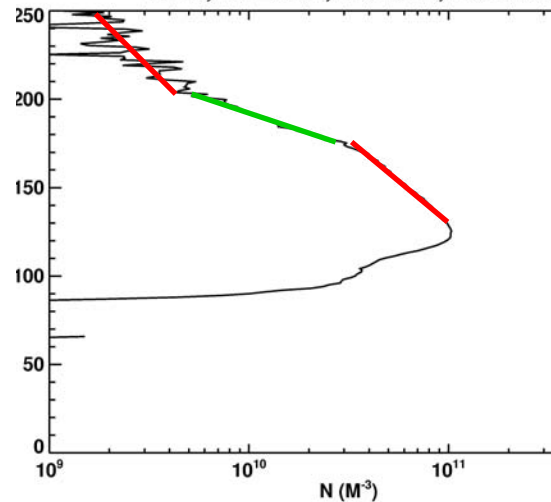
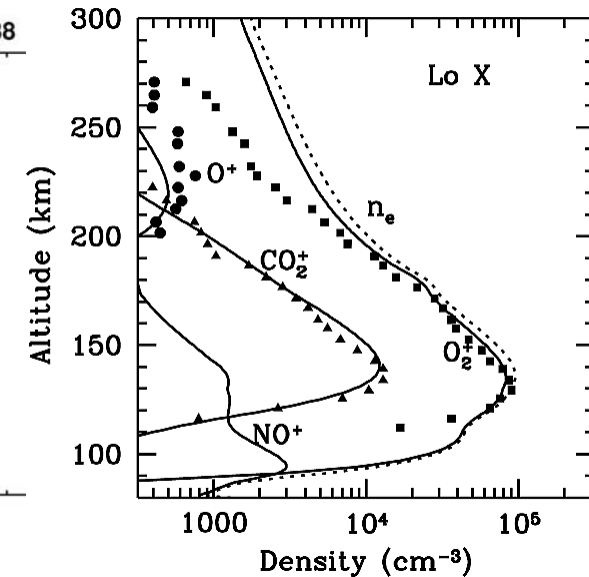


Figure 7 from
Fox (2004)



- Structure between M1 and M2
 - Not in other datasets, theoretical models
- Structure in M2 layer (oscillations and flat top)
 - Not in other datasets, theoretical models
- Bulge
 - Not discussed in papers, but perhaps visible in VL1 and some MGS profiles. Present but not discussed in Fox's theoretical model
- Three regions (distinct slopes) in topside
- The presence and physical characteristics of M1 and M2 peaks are routinely used to infer properties of solar irradiance or conditions in neutral atmosphere or ionosphere
- What do the presence and physical characteristics of these other features reveal? Diagnostic?
- Possible high profile “discovery paper”?
- “Vertical structure of the ionosphere of Mars”
- Need to collaborate with a theorist for interpretation