The continuing Cassini orbiter mission to the Saturn system has provided high-quality radio occultation data on the vertical structure of the Saturn ionosphere at various latitudes from 2005 to the present (c.f. A.F. Nagy, et al., J. Geophys. Res., 111, A06310, doi:10.1029/2005JA011519, 2006; A.J. Kliore, et al., J. Geophys. Res., 114, A04315, doi:10.1029/2008JA013900, 2009). The results showed a terminator ionosphere with high variability in the region of the main peak, but displaying a degree of ordering of the topside structure with latitude at mid- and high-latitude electron density profiles. At low latitudes, the profiles are highly variable on the topside, and show a much lower vertical extent compared to mid- and high-latitude profiles, with distinct differences between dusk and dawn observations.

The Galileo observations are derived from a single S-band frequency signal at much lower signal-to-noise ratio, and consequently are of lower quality than the Cassini data. Nevertheless, vertical profiles of electron density were derived at different latitudes, affording an opportunity for a comparison between Jupiter and Saturn ionospheres. The Jupiter profiles show a greater degree of variability, both in the peak density and the vertical extent, possibly caused by a greater degree of upper-atmosphere dynamics.