**ABOUT THIS DATA SET**

This is a collection of Saturn ionospheric profiles obtained by radio occultations of the Cassini spacecraft. They cover a range of dates from the first occultation on orbit 7 on May 5, 2005 until the occultation occurring on the 191st orbit on May 31, 2013 (See accompanying index). These have been previously published in the references given below. All occultations after orbit 151 were done in two-way mode, while the obits 7 - 151 occultations were done in one-way mode. All of these profiles were taken directly from Arv Kliore's original files found after his death and are unchanged except for the following.

In reproducing some of these results while developing and resurrecting our own software to continue producing ionospheric profiles from more recent radio occultation data, we discovered that we didn't know what altitude scale was used. The publications vaguely mention "altitude above 1-bar", but when we computed the electron density profiles the profiles were approximately the same, but the peaks were frequently shifted in altitude from Kliore's results, often by a significant amount. Eventually we reproduced every Saturn ionospheric profile using 2 different methods for the 1-way occultations, and both techniques (ray tracing using an oblate atmosphere and the differential frequency technique using an Abel transform) agreed with each other in so far as the altitude of the peaks and the electron density structure. So, in converting Kliore's original files to the .TAB files archived here; we have introduced an altitude shift. The shifted altitudes are now above the NAIF 1 bar reference ellipsoid with polar radius 54364 km and equatorial radius 60268 km. The NAIF 1 bar reference ellipsoid can differ by up to 200 km at mid latitudes from the actual 1 bar surface we find doing inversions of occultation data for the neutral atmosphere, but we use the NAIF ellipsoid here as a simple easily reproduced reference altitude. The shift can be undone to get back to the original altitude scale by subtracting the Altitude Shift found in accompanying index file.

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References

Moore, L., Galand, M., Kliore, A. J., Nagy, A. F., & O'Donoghue, J., 2017, arXiv:1701.05178, Chapter 8 of a forthcoming multi-volume work entitled "Saturn in the 21st Century"

Kliore, A. J., Nagy, A., Asmar, S., et al., 2014, GeoRL, 41, 5778

Fifty-nine ionsopheric radio occultation observations of the vertical electron density profile in the Saturn ionosphere were included showing significant orbit-to-orbit variations, but with a general trend of increasing electron densities with increasing latitude.

Nagy, A. F., Kliore, A. J., Marouf, E., et al., 2006, Journal of Geophysical Research (Space Physics), 111, A06310

The first set of near-equatorial occultations of the Saturn ionosphere was obtained by the Cassini spacecraft between May and September of 2005. The occultations occurred at near-equatorial latitudes, between 10°N and 10°S, at solar zenith angles from about 84° to 96°. The entry observations correspond to dusk conditions and the exit ones to dawn.