

Interactive comment on “Retrieval of ionospheric profiles from the Mars Express MARSIS experiment data and comparison with radio-occultation data” by B. Sánchez-Cano et al.

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The authors sincerely thank to the referee 1 all his comments and suggestions to improve our manuscript. Every suggestion has been considered and introduced into the text. Similarly, more detailed information on the subsurface mode and a small comparison between radio occultation and radar sounding techniques have been added.

AC: “However, as the instrument has other modes of operation (the main one is the subsurface mode which objective is to map the Martian subsurface to study the distribution of water in the upper layer of the Martian crust [Picardi et al., 2005]), it is very common to find AIS for 10 minutes, then subsurface mode around the pericenter, and

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then AIS again”.

AC: “This procedure is completely different to the sounder method. In general terms, MARSIS sounder sends a sweep of vertical downward radio-signals and take direct measures of the delay time of those frequencies. In its turn, MaRS sends a radio-signal at two frequencies (described below) through the upper atmosphere along the spacecraft-Earth line just at the moment when the spacecraft is occulted to the Earth antennas by Mars. From the change in the propagation path and the Doppler Effect on the signals it is possible to retrieve the electron density profiles. Due to these differences in the technique, the profiles from MaRS are different from those given by MARSIS. While MaRS allows obtaining the full profile of the ionosphere, MARSIS only allows obtaining profiles from the topside to the maximum ionization peak. In addition, as MaRS requires an occultation, which occurs only during limited periods, and only once per orbit in the case of Mars Express, MARSIS provides a better planet coverage and horizontal spatial resolution, and can work in a larger solar zenith angle range”.

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