THE EVOLUTION OF THE MARS ATMOSPHERE AND IONOSPHERE OVER CONSECUTIVE MARS EXPRESS ORBITS FROM RADIO OCCULTATION. M. Pätzold[1], S. Tellmann[1], K. Peter[1], B. Häusler[2], T. Andert[2], M. Hahn[1], D. P. Hinson[3,4]

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The Mars Express Radio Science (MaRS) occultation experiment sounds the Mars atmosphere and ionosphere since 2004 at two coherent radio frequencies at X-band (8.4 GHz) and S-band (2.3 GHz) in order to derive vertical profiles of temperature, pressure, neutral number density and electron density, respectively. Occultations occur in seasons depending on the constellation Earth-Mars-MEX orbit plane. Operational constraints onboard the spacecraft and/or on ground usually do not allow the sounding of the atmosphere/ionosphere in consecutive orbits (orbit period about 6.5 hours). There are, however, a few occasions over the past 15 years when near-consecutive orbits occultations were achieved. Radio sounding has the advantage to resolve the profile structure by 500m – 600m altitude while spectrometer usually resolve by an atmospheric scale height (many kilometers). The behavior of the neutral atmosphere that is the temperature profile between the surface and about 50 km altitude and the ionosphere, that is the peak electron densities and altitudes of both the M1 and M2 layers, the topside and their diffusion region and their plasma scale heights, the total electron content shall be described as a function of time. The repeatability of the profiles shall be compared along a Martian rotation and over 11 orbits above the same area.