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Ionosphere of Mars at Low and High Latitudes

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We present a global Analytical Yield Spectrum (AYS) model to calculate longitudinal distribution of electron density in the dayside ionosphere of Mars in which the ionization is produced by solar radiation in Extreme Ultraviolet (EUV) and soft X-ray regions of the spectrum. These calculations are carried out at solar zenith angle 75 degree for latitudes between 0-25oN and 60-70oN for spring equinox and medium solar activity condition. These conditions are appropriate for Mars Global Surveyor (MGS) phase 2 aerobraking period from which we are using both accelerometer and radio occultation data. In these calculations the neutral density are derived from mass density which was measured by MGS between orbits # P0588 to P0648 and P0790 to P0910 at high and low latitude region for one month period of October and December 1998 respectively. During these orbits thermosphere density exhibits tidal oscillations of wave 3. The ionosphere produced by EUV and X-ray radiations are compared with MGS radio occultation measurements carried at high latitude in December 1998 between solar zenith angle 78o to 81o. This measurement shows two prominent peaks whose value and positions are changing with east longitude corresponding to neutral density variations measured by accelerometer experiment. The longitudinal distribution of measured electron density is in better agreement with the global AYS model. The secondary ionization peak produced by this method is more visible at low latitude as compared to those obtained at high latitude. In order to compare these calculation and measurements with other model calculation we have run Mars Thermosphere Global Circulation Model (MTGCM) which calculates neutral densities and ion/electron densities self consistently at few points for same observational period. The neutral and electron densities produced by MTGCM are not changing significantly with longitude.