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Altitude dependent empirical modeling of the topside ionosphere and plasmasphere using GPS- TEC from Swarm, GRACE-FO and the Sentinel satellites.

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Slant Total Electron Content (sTEC) measurements can be obtained by dual-frequency GPS onboard Low Earth Orbiting (LEO) satellites. Within the last few years, a fleet of LEO Satellites at altitudes ranging from 450 km (Swarm A/C) to 815 km (Sentinel 3) became operational. With Swarm B, the recently launched GRACE-FO, and the Sentinel 1 and 2 satellites orbiting at intermediate altitudes, we gain insight into the altitude dependent profile of the topside ionosphere and plasmasphere.

We make use of this constellation to estimate a global three dimensional model of the electron density distribution and will also carefully asses the impact of different profile functions, geometry-free phase center variation maps and the P1-P2 receiver biases. Since the absolute value of the P1-P2 biases are generally unknown, we focus on a consistent estimation for the whole LEO constellation.

We will present first results for selected months in 2019 and investigate the day to day variability of the topside ionosphere and plasmasphere. We also intend to make use of COSMIC-2 data to improve local time coverage in equatorial regions.