## A STUDY OF THE SEMI-ANNUAL ANOMALY AND ANNUAL ASYMMETRY

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## Key words:

## Abstract.

During the first decades of ionospheric research, the physical description of the ionospheric free electron vertical density was mainly given by the Chapman theory in which the main driving parameters were the solar irradiance level and the solar zenith distance from the observation point. Whatever a new observed phenomenon that could not be explained by the Chapman theory was considered an anomaly. After more than 50 years of continuous aeronomic research, many of these phenomena then called anomalies were physically explained but some of them are still open to discussions, like the so called Semi-annual Anomaly that produces global mean TEC values larger for Equinoxes than for Solstices; and the Annual Asymmetry that causes larger mean global TEC during the December than June solstice (far larger than that 7% that would be expected from the change on the Sun- Earth relative distance). Several works of the specialized literature have analyzed these anomalies as separate effects and proposed explanations that are mainly associated to interactions between the neutral and the ionized atmosphere. Using the high-precision TEC 13-year data series provided by the TOPEX/Poseidon mission, we have found a mean global TEC annual pattern that accurately quantifies the combined effect of both anomalies. Besides, we present evidences that both, the Semi-annual Anomaly and the Annual Asymmetry are consequences of one unique phenomenon associated to interactions between the Solar wind, the ionized atmosphere, the Interplanetary Magnetic Field and the Earths magnetic field.