

Using the UAM-P model to specify the additional magnetic field generated by the system of the ionospheric currents

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The ionospheric currents are a part of the highly variable coupled Magnetosphere – Ionosphere – Thermosphere (MIT) system. These currents generate an additional portion to the main magnetic field. The ionospheric currents as well as its impact to the Earth's magnetic field depend on the solar wind, IMF, and geomagnetic conditions and have significant seasonal and UT variations.

The first aim of this investigation is to obtain the global 3D system of the ionospheric currents. For this purposes, we use the Potsdam version of the Upper Atmosphere Model (UAM-P). This is a first-principle, time-dependent, and fully self-consistent numerical global model. It describes the thermosphere, ionosphere, plasmasphere and inner magnetosphere as well as the electrodynamics of the coupled MIT system for the altitudinal range from 80 (60) km up to the 15 Earth radii.

The second aim is to calculate the contribution of the ionospheric current system calculated with the UAM-P model to the Earth's magnetic field. This contribution is calculated using the Biot-Savart law. The magnetic field generated by the system of the ionospheric currents is compared with measurements of the Earth's magnetic field variations.