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PEM021-16 Room: Function Room A Time: May 24 14:30-14:45

Empirical field-aligned current model and its application for space weather

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One of the most important subjects in space weather research is understanding of the closure of the ionospheric potential/currents and the field-aligned currents (FACs) flowing between the ionosphere and the magnetosphere. In particular, their large-scale spatial structure is a crucial part of the nowcasting of space weather. The ionospheric potential/currents are monitored remotely with magnetometers and radars, while the FAC can be derived almost directly, with the Amperes law, from the magnetic field observations made by satellites on the low Earth orbits. There have been several empirical models of large-scale FAC structures developed on the basis of the satellite data. Recently an empirical FAC model has been developed as a product of the GEMSIS project. This model was derived from FAC data derived by the fitting method developed by Higuchi and Ohtani [JGR, 2000], with unique procedures to express the statistics as a model. The resultant model can give sharper boundaries of FAC sheets as well as more realistic values of FAC density as compared with the past models. In this talk, we present details of the results provided by our new FAC model. In addition, combining it with the potential solver, which has also been developed under GEMSIS, can provide a way to model the ionospheric potential/current structure over the whole sphere. We discuss them in the context of the closure of the magnetosphere-ionosphere-coupled current system.

Keywords: field-aligned current, space weather