2014 Workshop: Magnetically conjugate studies

Long title

Magnetically conjugate studies of ionospheric processes from low to auroral latitudes

Conveners

C. Martinis

J. Huba

L. Gentile

Description

Ionospheric processes are strongly dependent on the geomagnetic field characteristics. Some of these processes do not occur locally in one hemisphere but are also observed in the opposite hemisphere at magnetically conjugate locations. At low and midlatitudes, equatorial spread F (ESF) and Medium scale travelling ionospheric disturbances (MSTIDs) are clear examples of conjugate processes. At sub-auroral latitudes, where coupling with the inner magnetosphere is important, sub-auroral polarization streams (SAPS) and stable auroral red (SAR) arcs occur at both hemispheres, but few studies have discussed their conjugate characteristics. In the auroral region, do aurorae behave in the same way when they occur simultaneously in both hemispheres? Several questions can be addressed in order to understand the validity (or not) of inter-hemispheric simultaneity; for example: how the pre-conditioning of the ambient thermosphere-ionosphere affect the occurrence of these processes in both hemispheres?, or are there morphology characteristics of ionospheric processes that reveal, for example, the influence of the South Atlantic Magnetic Anomaly (SAA) in the American/Atlantic longitude sector? This workshop aims to provide answers to questions addressing these issues and to discuss studies of ionospheric processes when observations and/or models at both hemispheres are available.

Justification

The proposed workshop reflects the comprehensive focus described in the recent document “CEDAR: The New Dimension” that calls for the need to approach the study of coupling processes with a broader view that recognizes inherent linkages between different aspects of the Sun-Earth system. This ‘system approach’ is a common theme in the different stages of the workshop: from the Magnetosphere-

Ionosphere coupling to the ionosphere-thermosphere coupling to the latitudinal coupling (from high to midlatitudes), and finally inter-hemispheric coupling. The document also identified several ‘strategic thrusts’, and the workshop will address some of them, like (a) to undertake a ‘system perspective of geospace’; (b) to understand energy exchange processes at boundaries and transition regions; and (c) to conduct studies of observable parameters reflecting long-term changes in geospace conditions, and model outputs to improve our understanding of these changes.

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