

Knowledge discovery from large-scale dataset: Automatic identification of large-scale field aligned current systems

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The objective of this paper is to report a new procedure that we developed to automatically identify the spatial structure of large-scale field-aligned currents (LSFAC) systems from satellite magnetic field measurements. Depending on the number of LSFAC sheets crossed by a satellite and also on the intensity and flow direction (upward/downward) of each LSFAC, a plot of the east-west (E-W) magnetic component can have any shape. The required task is to automatically fit line segments to the plot. The procedure is based on the concept of the first-order B-spline fitting with variable node positions. The number of node points, which determines the number of FAC sheets, is optimized for each orbit so that the Akaike Information Criterion (AIC) is minimized.

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