Systematic study of the large-scale field-aligned current structures from large database

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Fast and automatic procedure is required in space weather research based on large database obtained satellite observations. Model used in the procedure should be descriptive and flexible enough to identify a phenomenon that is highly variable depending on various conditions. We applied first-order B-spline fitting with variable node positions to the DMSP-F12, 13, 14, and 15 magnetic field data, and identified large-scale field-aligned currents (LSFACs) for each orbit. To the list of LSFACs, we added solar zenith angles at the ionospheric altitude and solar wind conditions observed by IMP-8 satellite.