



## **ST5 observations of the imbalance of Region 1 and 2 field-aligned currents and its implication to ionospheric closure currents**

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A major unsolved question in the physics of ionosphere-magnetosphere coupling is how field-aligned currents (FACs) close. In order to maintain the divergence free condition, overall downward FACs (carried mainly by upward electrons) must eventually balance the overall upward FACs associated with the precipitating electrons through ionospheric Petersen currents. Although much of the current closure may take place via local Pedersen currents flowing between Region 1 (R1) and Region 2 (R2) FACs, there is a generally an imbalance, i.e., more currents in R1 than in R2, in total currents between them. The net currents may be closed within R1 via cross-polar cap Pedersen currents. In this study, we use the magnetic field observations from Space Technology 5 mission to quantify the imbalance of R1 and R2 currents. We will determine the net R1-R2 currents under various solar wind conditions and discuss the implication of such imbalance to the ionospheric closure currents.