Latitudinal distribution of the Field Aligned Current estimated from SWARM constellation

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We make use of the estimated Field Aligned Current (FAC) data provided by SWARM constellation A/B/C, we study the FAC footprint and strength in the northern hemisphere region. Through 398 day of good FAC data of SWARM-A, we got a profile not only of the FAC intensity footprint at the subaurotral region but also a profile of the FAC intensity in the northern geographic from the equator until the polar cap region at different Magnetic Local Time (MLT).
Results showed that the maximum and minimum dayside FAC intensities shifted to higher latitudes, while the nightside FAC shifted to lower latitudes. The latitudinal difference between the dayside and nightside FAC intensity is approximately 3 degrees. Near the duskside the minimum FAC intensity is stronger than the maximum FAC intensity.
The mean absolute FAC value each 10^{o} latitude in the northern geographic hemisphere 0^{o}-80^{o} showed that; close to the equator [0^{o},40^{o}] latitude] the mean absolute FAC increases within [1000-1600] MLT increases. This daytime enhancement decreases at latitudes >40^{o}, and reverses its signature at the sub-auroral region [50^{o}, 60^{o}] where the nightside FAC intensity increases dramatically in comparison to dayside FAC. Again Dayside FAC intensity maintains its strength at latitudes >70^{o}. The largest FAC intensity is observed at latitudes larger than 60 ^{o} which is comparable at all longitudes. The seasonal FAC variations showed the same behavior as the longitudinal variations. It has small amplitude within latitudes [20^{o}, 50^{o}], but dramatically jumps at latitudes larger than 50^{o} . The seasonal FAC showed two crests at spring and autumn. The latitudinal profile of the FAC at different MLT showed that dayside FAC is stronger than nightside FAC intensity within latitude [0^{o} -50^{o}] and >70^{o} and nightside FAC intensity is stronger than dayside FAC within latitudes [50^{o}-70^{o}], while the duskside and dwanside FAC showed a parallel correlation.

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