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The low-latitude dynamo: An event study

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The cross polar potential drop is normally generated almost exclusively by magnetic reconnection in the polar cap, low-latitude dynamos such as viscous interaction or magnetic reconnection in the LLBL only contribute to 1-2 kV (less than 3% of the total potential) for the average case. At rare occasions however, the low-latitude dynamo can become a significant contributor. In the present study, we present a few events in the DMSP F13 data where the potential generated by the low-latitude dynamo is of the order of 20 kV (about a third of the total cross polar potential drop). The background conditions in the magnetosphere and the solar wind are studied and compared to the characteristics of the events. Several driving mechanisms that have been suggested as possible low latitude dynamos are discussed and evaluated based on the data set. We also study the time evolution of the events.