

SWARM observation of small scale field-aligned currents generated by acoustic waves and their signature on the ground

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From the SWARM satellite observations during the initial two months after the launch, we could confirm that the small magnetic fluctuations with apparent period about 10-30 seconds along the orbit observed in middle and low latitudes are the manifestation of small spatial scale (50-250km) field-aligned currents. We estimated the temporal scale of the variation of the field-aligned currents to be roughly 200 - 350 seconds or less. That is, the source of the current is suggested to be the acoustic mode atmospheric waves. In this paper, we show the method of the estimation, its results and a comparison with the ground magnetic and micro-barometric observations.

Keywords: acoustic gravity wave, ionospheric dynamo, field-aligned current, SWARM satellites, micro-barometric oscillation, magnetic oscillation