# 磁気赤道上空における下層大気起源の沿磁力線電流の検出

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# Detection of FAC effect over the dip equator having the lower atmospheric origin

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By the CHAMP magnetic data analysis though a high-pass filter with period around 40 seconds, it is found that magnetic fluctuations with period around 20 - 30 seconds exist in the middle and low latitudes at any local time and almost all the time. We ever have showed that from characteristics of the magnetic fluctuations they may be attributed to spatial structures of FACs having the lower atmospheric origin through the E-layer dynamo (Nakanishi et al. 2014). Especially, there is a noticeable characteristic that, as latitudes decrease to the dip equator, the period and the amplitude get longer and smaller respectively. Ever we showed that the dependence of the period on the latitude can be explained by the model of the spatial structures of the FACs with both edges on the ionosphere. About the amplitude, we interpret that, as the latitude gets smaller, the amplitude gets attenuated by the high-pass filter because of the longer period than the cutoff period, which is called a filtering effect. In addition, by the analysis of the magnetic data observed by the SWARM satellites which are composed of three satellites, the existence of the objective magnetic fluctuations is confirmed. In addition, the fact that it is attributed to the spatial structure of the FACs is also made sure. Moreover its temporal scale is estimated to be 4 -5 minutes (Iyemori et al., 2014).

This time we will verify the filtering effect. For it, we must make sure whether or not, as the cutoff period gets longer, the amplitude over the dip equator due to the objective magnetic fluctuations gets larger. But, many previous works have reported that, in this case, the equator electrojet and magnetic anomalies be seen. Therefore, we must separate the objective magnetic fluctuations with these phenomena.

Here, we focus on the two following points. Firstly, in the initial data since the launch of the SWARM satellites, the two satellites flew on almost the same orbits with slight temporal difference (around 10-30 seconds). Secondly, the temporal scale of the objective magnetic fluctuation is much smaller than those of the equatorial electrojet and magnetic anomalies. Therefore, from these points, the difference of the magnetic fluctuations observed by the two satellites at the same latitude may be mainly contributed to the objective magnetic fluctuations. Taking this advantage, we shall verify the filtering effect.