An additional plasma density peak at poleward of the equatorial ionization anomaly crests observed by Swarm

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The equatorial ionization anomaly (EIA) is one of the most important phenomena at equatorial and low latitudes, which is caused by the daytime eastward electric field via E×B effect. The well-developed EIA at dayside is thought to be a quite large structure with two crests extending to ±15° magnetic latitude, and the plasma density distributes quite smooth along the magnetic fluxtube. However, an additional density peak at poleward of the EIA crests is sometimes observed from the high-resolution plasma density measurements of Swarm. The additional peak is observed at the poleward of EIA crest only in the summer hemisphere, and shows a local time preference between 09:00 and 24:00. From a global view, the additional peak has relatively large occurrence at the northern hemisphere in the pacific longitudes. From the perspective of constellation, the Swarm B can revisit the same longitude of Swarm A/C, though with a certain time day. The delay time gradually increases from a few minutes to a few hours. By comparing the location of the additional peak observed by Swarm B and Swarm A/C, we found the peak keeps at a rather constant latitude irrespective of the delay time between Swarm satellites. Possible drivers for causing such additional peak have been further discussed.