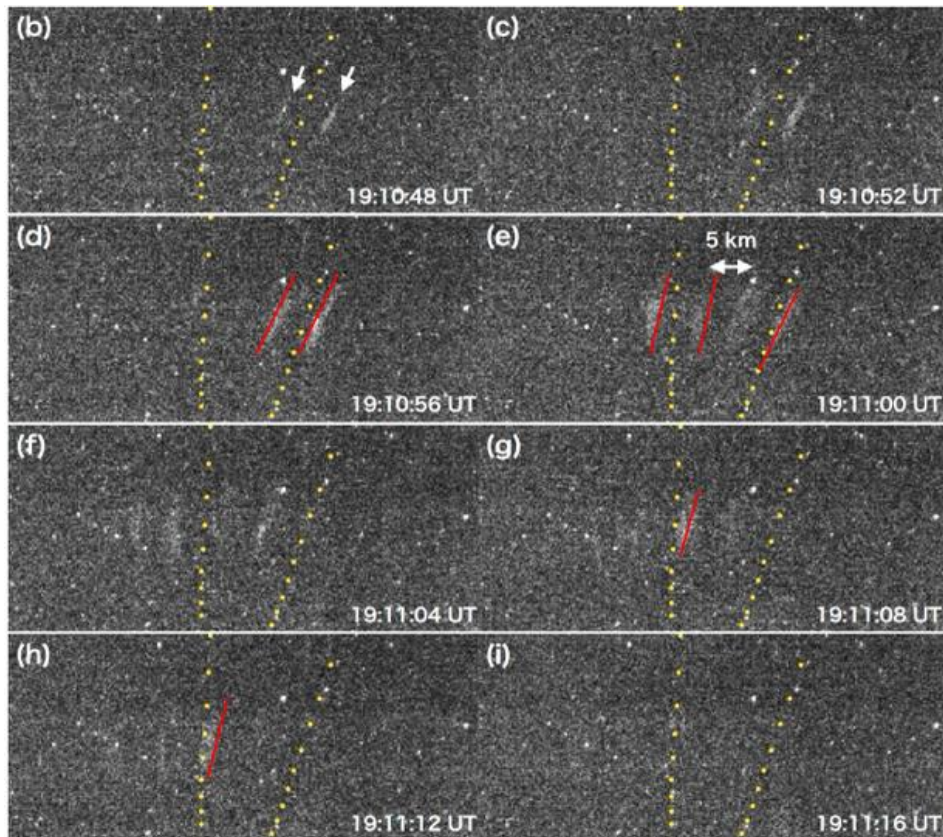


The paper by Nanjo et al. reports the first observations of the FAEs and picket fence in auroral latitudes. The authors show that the FAEs are field-aligned and appear simultaneously at multiple locations. The FAEs follow the motion of red auroras. They suggest that the FAEs are caused by local acceleration of electrons. I think the observations in the paper are interesting and worth publication. However, the paper has several major issues, particularly regarding its claim about the first observation, field-aligned nature, Swarm data interpretation, and data availability. I suggest considering the comments described below before recommending publication in ANGEOS.

Major comments

Line 4, 280, 357. The authors should note that the figures in Partamies et al. (2025) do show green emissions below the continuum emissions, for example in their Figure 1a, 11a, and 12c. Their spectrograph data shows evidence of strong 557.7 nm emissions. While the simultaneous presence of the continuum and picket fence does not appear to be Partamies et al.'s focus, this information, which is available within your author team, should be acknowledged, and the claim of "first observation" should be removed.

Line 175 The authors claim that the picket fence is field-aligned. It appears to be true for some pickets, but a significant part of the picket fence is not field-aligned. See the figure in the PDF version of the comments. The ones marked in red are tilted away from the magnetic field lines. (a) The authors should mention that a significant part of the picket fence is not field-aligned. (b) The magnetic field lines depend on the assumed emission altitude. Please describe the assumption used to draw the magnetic field lines, and discuss uncertainties of the field-alignment considering uncertainties in the altitude.



Line 190-202. Several issues exist regarding the results from Swarm. (a) Swarm did not cross FAE, and therefore the FAC, density and temperature from Swarm cannot be used to discuss the generation conditions of FAE. Swarm provides background plasma conditions at best. This limitation should be mentioned explicitly. (b) Downward region 2 FACs on the red aurora is inconsistent with the converging electric field deduced from Figure 3. The converging electric field should be connected to upward FACs, likely where the region 1 is. (c) Looking at Figure 4a, Swarm crossed the latitude of the FAE before 19:10:30 UT. The FAE location in Figure 6 should be corrected. (d) It is difficult to compare Figure 6 and 4a. Add more tick marks along the satellite trajectory of Figure 4a. Then make the location of the red aurora and FAE in Figure 6 consistent with Figure 4a.

Data availability. Some data in this research are only available upon request, which it does not meet ANGEOS's data policy: "Copernicus Publications requests depositing data that correspond to journal articles in reliable (public) data repositories...If the data are not publicly accessible at the time of final publication, the data statement should describe where and when they will appear...Nevertheless, authors should make such embargoed data available to reviewers during the review process in order to foster reproducibility." This data availability issue must be corrected before publication of this paper.

https://www.annales-geophysicae.net/policies/data_policy.html

Minor comments

Line 4, 278, 357 Line 4 and 357 state that FAEs are in the oval, but line 278 states the FAEs are poleward of the auroral oval. Please be consistent.

Line 24 Please provide references that show the picket fence is “usually” field-aligned. I’m only aware of the case studies by Semeter et al. If there are no references showing the usual field-aligned occurrence of the picket fence, this sentence should be rewritten to “Semeter et al. suggested that the picket fence is field-aligned.”

Line 38 Nanjo et al. (2024) did not demonstrate that the emission similar to STEVE is aurora. “Aurora” should be removed.

Section 2 should provide references to each of the instruments, unless this is the first paper that uses the data from the instruments.

Line 137 Auroral explosion is not a widely used term in auroral physics. Change this to “poleward expansion.”

Figure 3 and 4. It is unclear why Figure 3 presents many images without FAE. FAE is shown in only one image in Figure 4 with a gap in time from Figure 3. Please show more images between 19:08:33 and 19:11:06 UT, and describe how the red aurora changes during the FAE appearance.

Line 221 Describe what assumptions were used to determine the latitude.

Line 278. Change “poleward side of” to “near the poleward edge of.” The poleward side means near but poleward of the auroral oval, but it is not what the authors say in the conclusion.