EGUsphere, author comment AC2
https://doi.org/10.5194/egusphere-2022-331-AC2, 2022

Reply on CC1

Masatoshi Yamauchi and Urban Brändström

Author comment on "Auroral alert version 1.0: two-step automatic detection of sudden aurora intensification from all-sky JPEG images" by Masatoshi Yamauchi and Urban Brändström, EGUsphere, https://doi.org/10.5194/egusphere-2022-331-AC2, 2022

Reply to comments by Christian Kehl (our plan toward revision)

Thank you for your detailed comments and for reminding that potential readers are much wider than the auroral observation community (main target readers). To cover wider readers, we will add more explanations and figures/table (as written in the reply to reviewer 1), e.g., explaining the aurora image, aurora activity itself, and how to interpret the aurora.

Also, we will make it clearer that the presented two step method is the first trial of "translation" of how auroral scientists actually judge "onset" of auroral activity in the sky: first evaluate the colour information to judge if it is aurora or not (just using green colour cannot distinguish diffuse aurora or cloud because the morphology is similar to each other, and this is why we need three-four colours), and then evaluate the activity level from both intensity and area within the field-of-view.

The main user is auroral community scientists and operators (they asked us to describe our method that is already in successful operation) who are familiar with classifying the auroral activity level and ready to apply this method (after modification of the parameters). This is why the old version 0 is already applied in Finland (private communication, 2022).

In the revision, we would stress that there is no automated identification scheme of "onset" in both machine learning method and expert system method. What so far exist is just "one" category each picture of types of aurora, without telling the activity level, although the activity level is the most important parameter. Thus this is the first trial of such, and evaluation of the method much be done against eye identification method but not machine learning method.

Even for just classification without intensity, there is no "up to date" automated classification scheme of the aurora better than human eye, which required training of many years. For example, Nanjo et al (2022, Figure 1) and its reference (Clausen & Nickisch, 2018, Figure 1) have three auroral categories "arc" "discrete" "diffuse" as one value for each picture (here "arc" is just only a special form of "discrete" from auroral science viewppoint), but "discrete aurora" and "diffuse aurora" always appears together for all active aurora or during the precursor of active aurora. Also, most of the auroral images are mixed with cloud (it is very rare to have clear sky during night), causing the

most updated automated classification end up "ambiguous" (Clausen & Nickisch, 2018) or "Aurora and cloud" (Nanjo et al., 2022). Contrary, our method gives in addition to the percentage of sky coverage for each category, the activity level discrete aurora as L3 parameter.

Thanks to your comment, we now realised that we have to explain this background in the introduction for wider audience than the auroral community.

Clausen, L. B. N., & Nickisch, H.: Automatic classificationof auroral images from the OsloAuroral THEMIS (OATH) data set usingmachine learning, J. Geophys. Res., 123, 5640–5647,
https://doi.org/10.1029/2018JA025274, 2018

Nanjo, S., Satonori Nozawa, S., Yamamoto, M., Kawabata T., Johnsen,M.G., Tsuda, T.T, Hosokawa, K.:
An a auroral detection system using deep learning: real-time operation in Troms{\o{}}, Norway,
https://doi.org/10.21203/rs.3.rs-1090985/v1, 2021.