

Interactive comment on “Multi-scale auroral observations in Apatity: winter 2010–2011” by B. V. Kozelov et al.

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Author's response to Referee 2 comments.

1) RC: Four cameras are used with different field views and two observation sites to enable the stereographic measurements of the aurora altitude. A satellite is successfully used to calibrate the altitude measurement. However, the equation for calculating the altitude could be given and, if possible, the accuracy of the method could be estimated.

AC: The cameras have angular resolution $\simeq 0.04^\circ$ per pixel. The satellite is very sharp object, so from stereo pairs of images the visual parallax was estimated as 7.5 ± 0.5 pixels, that corresponds to $\alpha = 0.30^\circ \pm 0.02^\circ$. Then distance from observational point to the satellite is $d/\sin \alpha$, where $d = 4.12$ km is distance between observational points.

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Taking into account the angle between direction to the satellite and to the horizon, ψ , for considered event we deduce:

$$H = d \sin \psi / \sin \alpha = 4.12 \sin 76^\circ / \sin 0.30^\circ = 760 \pm 50 \text{ km}$$

The measurements of auroral altitude by the camera system is possible if there is a structure with sharp luminosity gradient in East-West direction. For such case the accuracy of the method is limited by 1-2 pixels discrepancy for visual parallax estimation, that for altitudes 100-120 km corresponds to 2-5 km.

2) RC: Detailed comments p32 Abstract. and p41 Fig. 1: Different values of the field views of the lenses are given in the text and on the Fig 1.

AC: The different values are due to different fields of view: “horizontal” or “diagonal”. Possible, it will be better to use diagonal field of view in all cases.

3) RC: p34 line 18: What is the meaning of the word “original”. Remove?

AC: We agree, the word “original” could be removed; it means simply that the program was written by us.

4) RC: p41 Fig. 1: The geographic direction should be given on the figure.

AC: New version of the Fig.1 attached. The observational points are located in East-West direction, as it is marked in the Figure. Also the fields of view for all cameras were corrected to diagonal values according to comment 2.

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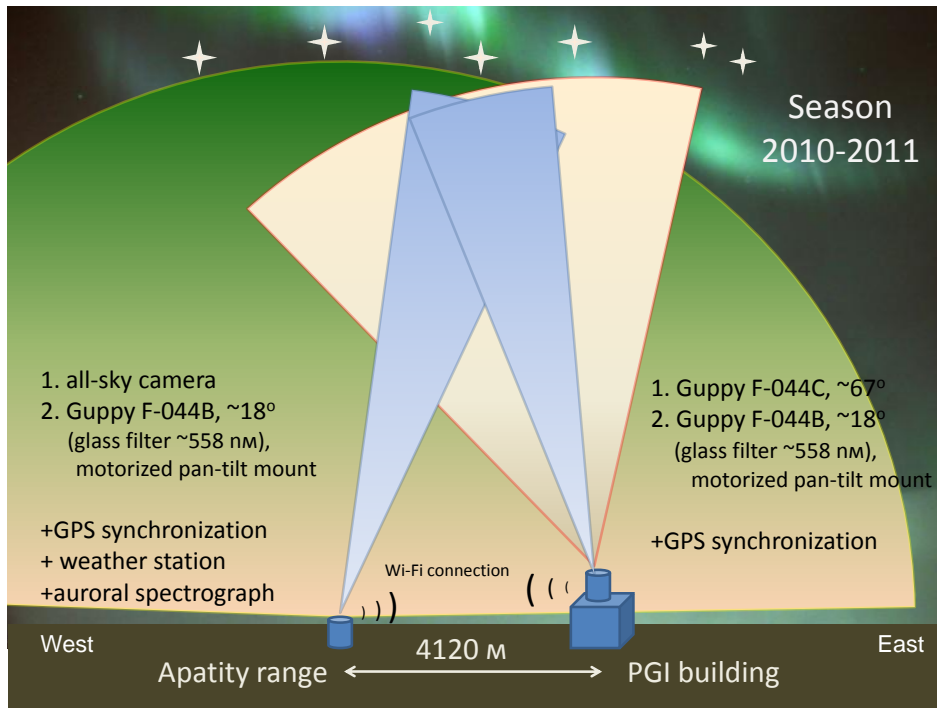


Fig. 1. Corrected Fig.1.