

## **Altitude variation of aurora breakups during a magnetic storm on March 17, 2013**

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The altitude variation of aurora provides important information on the energy of precipitating electrons as well as on their generation mechanisms. The purpose of this study is to estimate the time variation of the emission altitude of aurora as resolved by two digital SLR cameras. We installed two cameras with the separation distance of 8 km across Chatanika area in Alaska to take stereoscopic fish-eye time-lapse images for the time interval from December 2012 to April 2013. Estimation method itself of the emission altitude by the stereoscopic photographs taken by multiple ground-based cameras has been already carried out by many former researchers. In this study, we divide an all-sky image into 25 areas to estimate the localized emission altitudes and an averaged altitude and the standard deviation, using a standard method of geographic coordinate transform. As a result of the analysis applying to the best magnetic storm event on March 17, 2013, in which the minimum Dst index was -132 nT and the AE index reached around 1000 nT, it is found that the average altitudes mostly distribute between 70 km and 200 km. It is also found that the standard deviation tends to be larger when the average altitude is higher. These obtained results are consistent with the standard knowledge of “tall” discrete aurora and “thin and low” diffuse aurora. We are still trying to make the estimation method of altitudes more robust and accurate for all of the obtained images to find unexpected and unknown variations in the altitude variation of aurora.