Observation of proton auroras at Husafell, Iceland.

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The proton auroras have significant differences from electron auroras in their spectral shape. They show Doppler-shifted and broadened spectra: the spectra have Doppler-shifted (˜0.5 nm shorter) peak and both bluewing (˜2-4 nm) and redwing (˜1.5 nm) extending. Energy spectra of precipitating protons have been estimated from this shape. Recently it is found that the intensity in the extent of the blue wing reflects more effectively by the change of the mean energy of precipitating protons than the shift of peak wavelength [Lanchester et al., 2003]. Another character of the H-beta aurora is that it is diffuse form because a proton becomes hydrogen atom due to a charge-exchange reaction with atmospheric constituent and then possible to move across the magnetic field line. By using a scanning photometer, the movement of the proton auroral belt and change of a spectrum shape associated with the variation of proton source region due to storm and substorm were reported, however, not discussed indetail yet [Deehr and Lummerzheim, 2001].

The purpose of this study is to obtain the detail characteristics of H-beta aurora for understanding of source region of energetic protons in the magnetosphere. For this purpose, a new meridian-scanning photometer (MSP) was installed at Husafell station in Iceland in last summer season. It will contribute to investigate the distribution of energetic protons and plasma waves which cause the pitch angle scattering in the magnetosphere. The meridian-scanning photometer is able to observe at five wavelengths for H-beta emission. One channel is to measure the background level. By analyzing the data obtained by the MSP, the H-beta spectrum can be estimated by fitting a model function with it. Then it is possible to obtain distribution of precipitating protons in north-south direction. It is also possible to estimate an energy spectrum of precipitating proton, simultaneously. The instrumental parameters of the MSP is defined by the transmission characteristics of the interference filters; they are 485.7 nm (FWHM: 3.0 nm), 484.5 nm (0.6 nm), 485.5 nm (0.6 nm), 486.5 nm (0.6 nm) and 487.5 nm (0.6 nm) for H-beta auroras, and OI 630 nm (0.6 nm), $N_2$1PG 670.5 nm (5.0 nm) and OI 844.6 nm (0.6 nm) for electron auroras.

We analyzed the event at 0230 UT 8th Sep., 2008. The channels with small FWHM filter (0.6 nm) couldn't measure aurora because of low intensity (30 R/nm). We are going to report the more detailed result of this event and new events of proton aurora.