Mult-wavelength, simultaneous observations of auroras at South Pole and McMurdo stations

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We have conducted multi-wavelength auroral imaging observations at South Pole Station (−74 deg magnetic latitude) and McMurdo Station (−80 deg magnetic latitude) (Figure 1). South Pole Station is situated in the cusp, the polar cap and the auroral oval, depending on magnetic local time (MLT) and solar wind condition, while the McMurdo station is in the polar cap most of the time. The field of views of the auroras observed at South Pole Station and McMudo Station is overlapped with each other (Figure 2).One of the advantages of the ground-based auroral imaging is to resolve auroral structures of the aurora with scale length being less than a few 100s km. In total, 6 cameras are operated in the main building of the South Pole

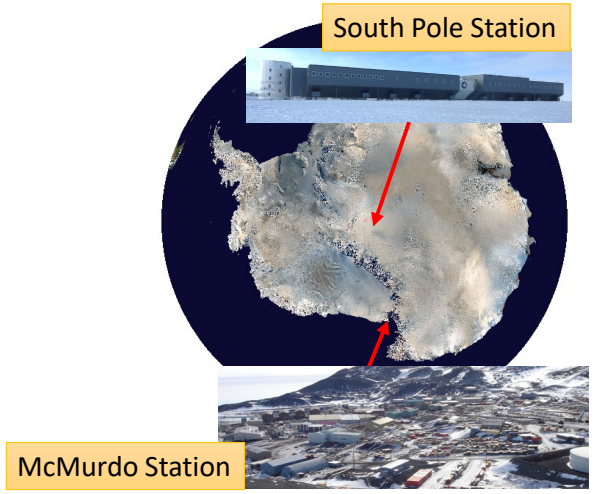

Figure 1: Locations of South Pole Station and McMurdo Station

Station, and 4 cameras at Arrival Heights in the McMurdo Station (Table 1). The observation starts in the middle of April, and last at the end of August. The data is open to public at the web http://www.southpole-aurora.org/.

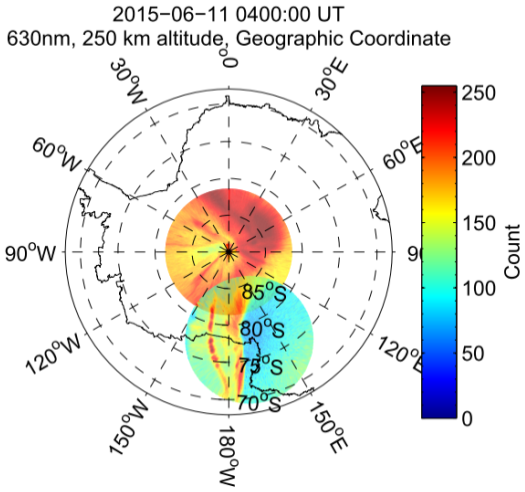

Figure 2: Example of auroral images simultaneously observed at South Pole Station and McMurdo Station. The images are mapped to the geographic coordinates.

The following scientific objectives will be in particular focused on for the upcoming 5 years. (1) *Evolution of substorm growth phase.* Thin auroral structures are known to move equatorward during the substorm growth phase. With the auroral images simultaneously observed at the two stations and data from the SuperDARN radars, we will investigate the evolution and the origin of the thin auroral structures in terms of the origin of the thin auroral structures and associatin with the ambient plasma convection. (2) *MLT dependence of pulsating auroras*. Pulsating aurora is known to appear in the postmidnight sector after substorm expansion. We will investigate the dependence of the characteristics of the pulstating aurora on the MLT. The eleveration angle of the sun is 12 deg below the horizon for ~4 months, which enables us to observe continuously aurora for ~4 hours. (3) *Polar patches.* Polar patch is the region where the ionospheric electron density is locally high, which traverses the polar cap. With auroral images from South Pole Station and McMurdo Station, we will investigate the evolution of the polar patches in the Southern Hemisphere.

Table 1. Imagers/cameras installed at South Pole Station and McMurdo Station.

Station	Name	Camera	Wavelengths
South Pole Station	ASI-1	Cooled CCD	427.8, 486.1, 557.7, 630.0, 589.0 nm
	ASI-2	EM-CCD	481.3, 386.1, 671.0, 845.1 mm
	Watcam	WAT-910HX	Black and white
	WMI	WAT-910HX	630, 558, and 670 nm
McMurdo Station	WMI	WAT-910HX	670, 558, 630 nm, color