

Network observations of aurora and airglow with low-cost multi-wavelength imager system

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This paper introduces a new system that can monitor aurora and atmospheric airglow using a low-cost Watec monochromatic imager (WMI) equipped with a sensitive camera, a filter with high transmittance, and the non-telecentric optics. It is demonstrated that the WMI system is capable of detecting 428-nm, 486-nm, 558-nm, and 630-nm auroral intensities properly, through comparison with those measured with a collocated imager system with narrower band-pass filter. Since 2013 a set of multi-wavelength WMIs has been operating in northern Scandinavia, Svalbard, and Antarctica. The WMI system is currently used to obtain (1) 428-nm auroral data at multipoint sites (located in the horizontal range of about 50-100 km) for research on three-dimensional structure of aurora using the auroral tomography method, and (2) multipoint data with a wavelength of 630-nm (in the horizontal range of about a few 1000 km) for study of large scale phenomena such as dynamic variation of the auroral oval and drift motion of polar patches. Most of the current WMI databases are open to the public via the web page (<http://pc115.seg20.nipr.ac.jp/www/opt/index.html>). Future development of the low-cost WMI system is expected to provide a great opportunity for constructing a global network for multi-wavelength aurora and airglow monitoring.

Reference:

Ogawa, Y., Y. Tanaka, A. Kadokura, K. Hosokawa, Y. Ebihara, T. Motoba, B. Gustavsson, U. Brandstrom, Y. Sato, S. Oyama, M. Ozaki, T. Raita, F. Sigernes, S. Nozawa, K. Shiokawa, M. Kosch, K. Kauristie, C. Hall, S. Suzuki, Y. Miyoshi, A. Gerrard, H. Miyaoka, and R. Fujii, Development of low-cost multi-wavelength imager system for studies of aurora and airglow, *Polar Science*, doi:10.1016/j.polar.2019.100501, 2019.

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