Development of On-site Data Analysis System for Suprime-Cam

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We develop on-site quick data analysis system for the prime-focus camera Suprime-Cam at Subaru Telescope [1]. This system is designed to assist observation with Suprime-Cam and to improve productivity of scientific outcomes[2], by considering the following subjects:

(1) Automated evaluation of data quality: In order to assist observations, we target automation of data evaluation during the night. In typical observations with Suprime-Cam, data check is a burdensome task for observers, and it was difficult to conduct sufficient data evaluation. We consider assisting the qualitative data evaluation at the observing site is a key to improve the productivity of the observation. The new on-site data analysis system performs automated data check for every data frame, deriving qualitative information of data quality, including seeing, median ellipticity of stellar sources, sky-background level, and read noise level estimated from the overscan regions. Variation of those values againt time are shown on a web browser within a couple of minutes after the data acquisition. Coarse astrometric calibration and determination of photometric zeropoint for reference fields are also performed. The obserevers can grasp the achievement of their observation at some point and plan the next exposures.

(2) Management of data evaluation results in database: We also aim at efficient recording and making use of the derived data evaluation results. This system employs database (DB) to register all the derived information and analysis history in the data check processes. Data frames are tagged based on thresholding values for quality information of seeing, sky-background level, and the number of detected sources. The observers can easily choose data frames which satisfy requirements by clicking a web browser only several times. Mosaic-stacking analysis to check depths of data or creation of flat frames can also be applied to those particular range of frames upon request. The evaluation results in DB has an advantage of making it easier to pick up necessary data frame only in the final analysis after the observation, which may be more useful in a large and long-term survey programs. As a future prospect, the DB information could contribute to construct useful data archive by adding extra-information of the observing situation such as weather conditions, status of the instrument etc.

This system uses paralellized processing on multiple PC nodes, in order to facilitate data evaluation exposure to exposure. Analysis applications are made of in-house C/C+/Python codes, open sources, and a commercialbased middleware on a 64-bit Linux OS. This system has been operated since March 2010 in Suprime-Cam observations (Figure 1). In prospective large imaging surveys with the next-generation instrument HSC, experience in this study will play an important role for making efficient execution of the survey and constructing a useful data archive[3].

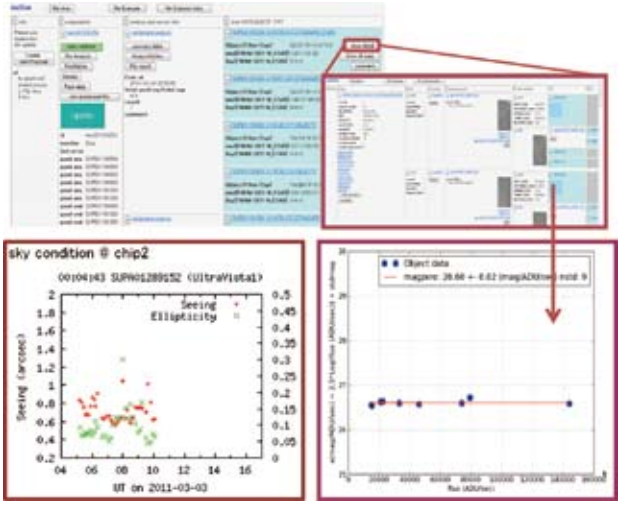

Figure 1: A snapshot of the on-site data analysis system, which shows a summary window for the automated data check, web-basis result monitor, and a result of flux calibration.

References

[1] Miyazaki, S., et al.: 2002, *PASJ*, **54**, 833.
[2] Furusawa, H., et al.: 2011, *PASJ*, **63**, S585.
[3] Furusawa, H., et al.: 2010, *Proc. SPIE*, **7740**, 83.