

Stellar variability from Dome A, Antarctica

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Abstract. The Antarctic plateau is one of the best observing sites on the surface of the Earth thanks to its extremely cold, dry, stable and transparent atmosphere conditions. Various astronomical activities are underway there and the Chinese Center for Antarctic Astronomy (CCAA) is dedicated to developing Antarctic astronomy at the highest point, Dome A or the Chinese Kunlun station. So far a large number of images have been collected from a 14.5-cm quad-telescope called the Chinese Small Telescope AR-ray (CSTAR) and the first two of a trio of 50-cm Antarctic Survey Telescopes (AST3-1 and AST3-2).

1 Photometric Data and Stellar Variability

A large number of time-series photometric data in Table 1 had been acquired since 2008 from the first-generation optical telescope CSTAR ([1]) and the second-generation optical telescopes AST3-1, AST3-2 ([2–4]). The high-cadence time-series observations from CSTAR were obtained over 4, 5,

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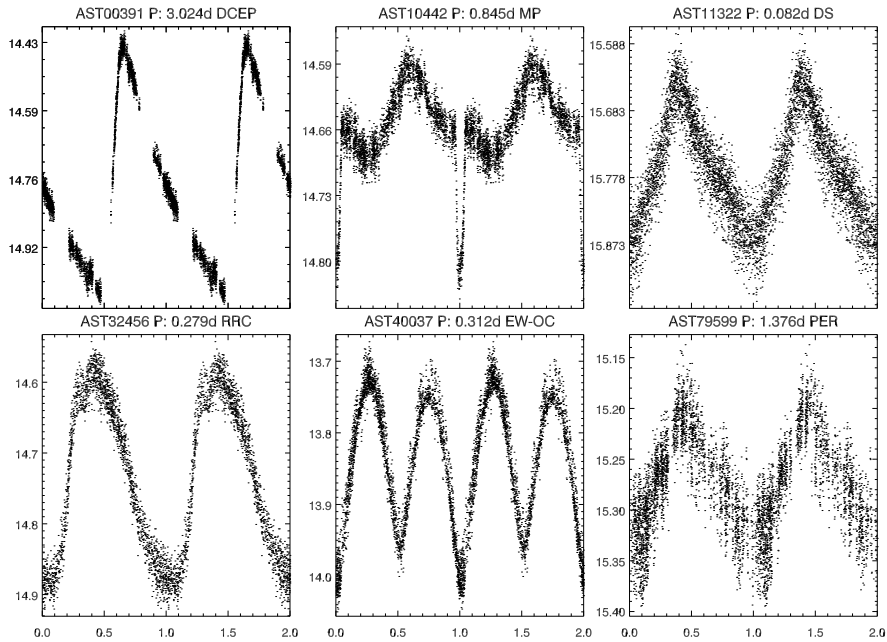


Figure 1. Phased light curves for six typical periodic variable stars from AST3-1 during 8-day observations. The AST IDs, periods, and tentative types are listed above each panel. Top row (from left to right): DCEP, δ Cephei variable; MP, multiperiodic variable; DS, δ Scuti variable. Bottom row (from left to right): RRC, RRC Lyrae variable; EW-OC, W Ursae Majoris-type eclipsing binary (EW) with O’Connell effect; PER, unclassified periodic variable.

6 months of the 2008, 2009, 2010 Antarctic winters, respectively ([5–9]). Those long-term high-cadence data showed that the high-precision long-term photometry is possible at Dome A, Antarctica thanks to its long, continuous, stable and clear atmosphere conditions. Based on time-series photometry of 92583 stars measured by AST3-1, 560 variable stars were detected with i magnitude ≤ 16.5 mag during 8 days of observations ([10]). We show the phased light curves of 6 periodic variables stars from AST3-1 in Figure 1.

Table 1. Log of observations for CSTAR and AST3.

Telescope	Filter	Year	# images	Reference
CSTAR#1	i	2008	287840	[5, 6]
CSTAR#2	g	2009	251310	[7, 8]
CSTAR#3	<i>clear</i>	2009	74010	[7]
CSTAR#4	r	2009	536383	[7, 8]
CSTAR#1	i	2010	342353	[9]
AST3-1	i	2012	15783	[10]

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