Observations of roAp stars at the Mt. Dushak-Erekdag station of Odessa Astronomical Observatory

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Abstract. Since 1992, observations of roAp stars have been carried out using the dual-channel photometer attached to the 0.8m telescope, which is situated in Central Asia, at the Mt. Dushak-Erekdag station of Odessa Astronomical Observatory. Some results of observations of γ Equ and of HD 134214 are presented. 5 stars were investigated as roAp candidates. The Fourier spectra of 4 stars did not show any variability in the high-frequency region. The Fourier spectrum of HD 99563 revealed a peak at a frequency f=128.9 c/d and with a semi-amplitude of 3.98 mmag.

Key words: stars: chemically peculiar - stars: oscillations - stars: variables: other

Rapidly oscillating Ap stars were discovered by D. Kurtz in 1978 (Kurtz, 1990). Up to now the list of roAp stars comprises 28 names, and nearly all of the stars were discovered in SAAO (see Kurtz 1990, Martinez et al. 1991, Martinez & Kurtz 1994a, b). Therefore, most of the objects were detected in the southern hemisphere. Although there were several surveys aimed at discovering especially northern roAp stars (see for example Nelson & Kreidl 1993), only two stars from the list have positive declinations.

We used for roAp stars' observations the dual-channel photometer mounted on the 0.8m telescope at the Mt. Dushak-Erekdag station (Central Asia) of Odessa Astronomical Observatory (Dorokhov et al., 1995).

In 1992 Mt. Dushak-Erekdag station participated in the multisite photometric campaign on γ Equ organised by T. Krejdl and M. Nelson (see Martinez et al., 1996). We continued observations of γ Equ in the years 1993 and 1994. It would be interesting to investigate the variability on short timescales corresponding to modes with extremely low pulsational amplitudes.

In 1993 we observed HD 134214 simultaneously in Strömgren's v-filter and Johnson's R-filter, using a split-beam prism on cloudy-windy nights to test the possibility of dual-channel photometry. It appeared that atmospheric variations have a common tendency through both filters at low frequencies, but are different at frequencies higher than 50 c/d: their amplitudes are lower and the characteristic times somewhat longer in the red spectral region than in the blue one (Dorokhov et al., 1996).

The search for new roAp stars in the northern hemisphere is particularly important to balance the number of southern and northern roAp stars. Our search was somewhat arbitrary at the beginning, then we used the photometric criteria by Martinez et al. (1991), extracted the list of candidates from the uvbyβ Catalogue (Hauck & Mermilliod, 1990) and verified the list with the Catalogue of Ap and Am stars (Renson, 1991).

The observations were episodic, because the Mt. Dushak-Erekdag station is located three thousand kilometers away from Odessa, and we visited the station to participate in international programs or multisite campaigns. During 4 years we were able to observe 5 stars of the candidates' list: HD 15257, HD 17317, HD 99563, HD 115606, HD 217401.

The data were acquired as continuous 10 or 20 sec integrations, a comparison star was observed simultaneously in the second channel, whenever a suitable star occurred in the field of view of the telescope. 2 - 6 hours' series per star in Johnson's B or Strömgren's v filters were obtained in one or two nights. The Fourier spectra of 4 stars did not show any variability larger than the 1 - 1.2 mmag level in the frequency region 50 - 400 c/d. The Fourier spectrum of HD 99563 revealed a peak at the frequency 127.6 c/d. Normalized data yielded a more prominent peak at the frequency f=128.9±0.635 c/d (semi-amplitude 3.978±0.38 mmag) (Fig.1).

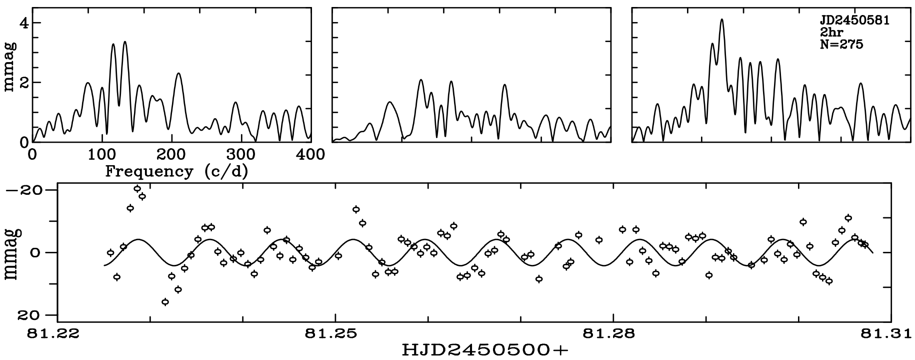

Figure 1. Top: Fourier spectra of HD 99563 (left), comparison star (centre) and Fourier spectrum of differences (right). **Bottom:** Light curve of HD 99563 with the best-fit sinusoid for the 11.2 min period.

The bottom panel in Fig. 1 shows 2 hours' lightcurve of the star. The results of the work may be considered as only preliminary. We share the cautions made by Martinez & Kurtz (1994b), that roAp stars must be observed in the best atmospheric conditions and the observations should be continued until reliable results are achieved repeatedly.

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