NEW PECULIARITY OF ABSOLUTE BRIGHTNESS SECULAR VARIATIONS OF SHORT-PERIOD COMETS. V. S. Filonenko[1] and K. I. Churyumov[2], [1]Astronomical Institute of V.N.Karazin Kharkov National University (Sumskaja str., 35, Kharkov-22, Ukraine, filonenko@astron.kharkov.ua), [2]Astronomical Observatory of Kiev National University (Observatornaja str., 3, Kiev-53, Ukraine, klim.churyumov@observ.univ.kiev.ua).

Introduction: In the our previous contribution [1] we found an influence of the 90-year solar activity cycle upon the secular variations of absolute magnitude for some short-period comets.

We are studying this phenomenon in more detail here.

Secular Fading of Some Comets: Z. Sekanina [2] studied secular variations in the absolute brightness for 18 short-period comets. He determined secular-variations characteristics of these comets on the basis of observations until 1955. We used the new observational data which have been obtained after 1955. The values of secular fading were determined by us for 16 comets from Sekanina's list and for two comets absent there. The integrated absolute magnitude H_{10} in accordance with Vsekhsvyatsky defined as

$$H_{10} = m - 5\log\Delta - 10\log r,$$

where m is the observed magnitude, Δ and r is the geocentric and heliocentric distances, respectively. So, we continued the Sekanina's secular-variation curves until 2005.

An influence of secular 90-year cycle of solar activity upon brightness secular varioations of short-period comets: For all 17 comets (with the exception of comet Halley) had been calculated the magnitude deviations:

$$\Delta H_{10} = (H_{10}^{i} - \overline{H_{10}}) / A,$$

were H_{10}^{i} is the comet's absolute magnitude in i return, $\overline{H_{10}}$ is mean magnitude calculated from all comet's returns, A is amplitude of comet's secular variations. In the Figure the ΔH_{10}, averaged on 10 points for all 17 comets, as a function of the phase of Gleissberg solar cycle is presented. This phase calculated as:

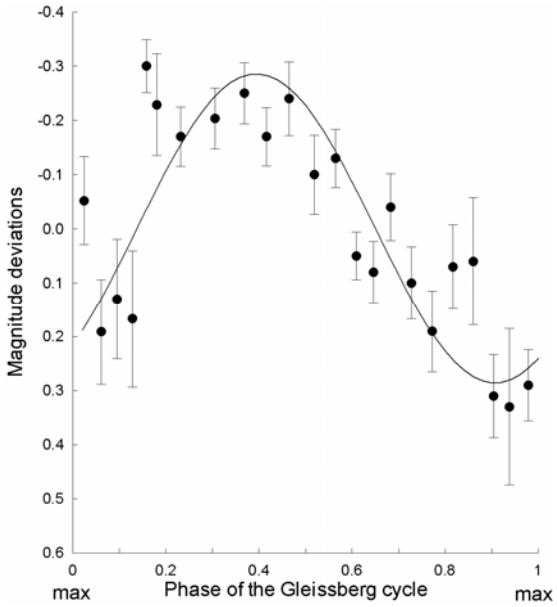
$$\Phi = \frac{t - T_0}{T},$$

were t is the moment of comet's return, T_0 is the moment of previous maximum of Gleissberg cycle, T is the length of the respective Gleissberg solar cycle (the annual means of Wolf numbers were smoothed by Gleissberg's method [3]**.**. This relationship had been approximated by sinusoid:

$$\Delta H_{10} = [\sin(1.95\pi\Phi + 2.3)] / 3.5$$

with correlation coefficient R = 0.81 ± 0.07 ($R_{crit}(0.05)$ = 0.41).

This phenomenon can explain the observational fact of non-monotone secular fading of short-period comets.



References:

[1] Filonenko V. S. (2006) *LPS XXXVII,* Abstract #1597. [2] Sekanina Z. (1964), *BAC*, 15, 1-7. [3] Gleissberg W. (1967), *Solar Physics*, 2, 231.