

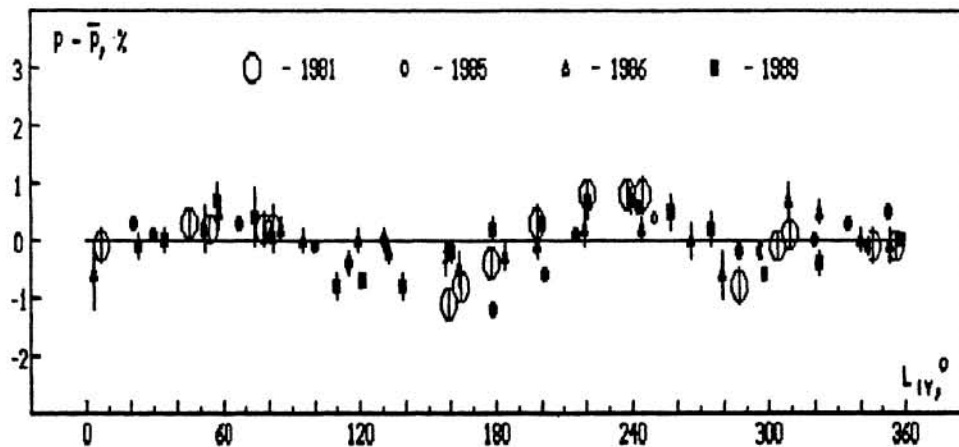
LONGITUDINAL VARIATIONS OF THE LINEAR POLARIZATION IN JUPITER'S POLAR REGIONS AT THE SYSTEM III AND IV PERIODS: O.M.Starodublseva, L.A.Akimov, U.U.Korokhin (Astron.Obs.Kharkov Univ.), U.G.Teifel (Astrophys.Institute Kazakhstan Academy Sci., Alma-Ata)

The polarimetric observations of Jupiter were carried out during several Jupiter apparitions using different technique: photographic pictures in 1981 and spectrograms in 1985 and 1986 were obtained through two-refracting crystal; the polarimetric equipment with CCD-line was used in 1989. Most of these observations were made with the 40-inch telescope of the high-altitude observatory near Alma-Ata. All observations were made in the visible spectral range. Measurements of the linear polarization degree along the central meridian were obtained for different longitudes.

Behaviour of polarization in polar latitudes (between 55 and 75 degrees) shows the following characteristics. All observations reveal the modulation of polarization if polarization is plotted versus the longitude in system III (rotation of Jovian magnetosphere). But this modulation shows the systematic phase shift about 50 degrees per year to smaller longitudes. One possible natural explanation for such yearly drift is that the rotation period in polar regions is about 5,6 sec less than the period in system III rotation. But other values for the period are also feasible because of the possibility of other values for yearly phase shift, namely  $50 \pm 360 \times n$  deg. ( $n$  is an integer). This ambiguity is related to the intervals of year and several years between particular sets of observations.

There are some magnetospheric phenomena which either show no particular organization in system III or drift in system III [1]. In order to organize these phenomena Sandel and Dessler [1] have offered hypothesis about dual periodicity of the Jovian magnetosphere and defined longitude system IV with the rotation period being 3% larger than the period for system III. The difference of -25,486 degrees between rotation rates for III and IV systems results in the drift of 51,2 degrees per year (365,25 days). This is almost the same yearly phase shift that we have observed in our data, presented in the system III period.

## LONGITUDINAL VARIATIONS OF POLARIZATION: Starodubtseva O.M. et al.



In figure our data are presented as a function of system IV central meridian longitude. The polarization in this figure is shown as the deviation from the mean for each year. Each point is a value averaged over the 40 degrees longitude interval with the 20 degrees step. The figure indicates explicitly that the phase of modulation is stationary if polarization is plotted as a function of the system IV central meridian.

We suggest that there is a possible relationship between the magnetospheric processes and variations of the aerosol concentration in the polar stratosphere of Jupiter which may be the reason of the observed variations of polarization. On the other hand the fact that variations of polarization are organized in system IV is the evidence of validity of system IV because the data described here exhibit the phenomenon in the spectral and time intervals which are different from those used by Sandel and Dessler.

References: (1) Sandel B.R., Dessler A.J. J.Geoph.Res., 1988, 93, N A6, 5487.