8.7 THE GEOMAGNETIC CONTROL OF THE LOWER THERMOSPHERE WIND SYSTEM OVER EAST SIBERIA

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The geomagnetic control of ionospheric D-region dynamics was revealed and confirmed on the basis of radiophysical wind measurements (1978-1983) over East Siberia. The monthly mean parameters of the wind system are different for quiet ($K_p \leq 3$) and disturbed ($K_p > 3$) conditions. There is an increase in stability of the meridional wind with increasing level of geomagnetic activity. The influence of geomagnetic storms on the measured wind is considered on the basis of 31 events. There are effects on the phase of the semidiurnal tidal wind, but variations of amplitude are weak. The effect of the geomagnetic storm depends on the intensity and is more clear-cut for the $A_p > 100$.
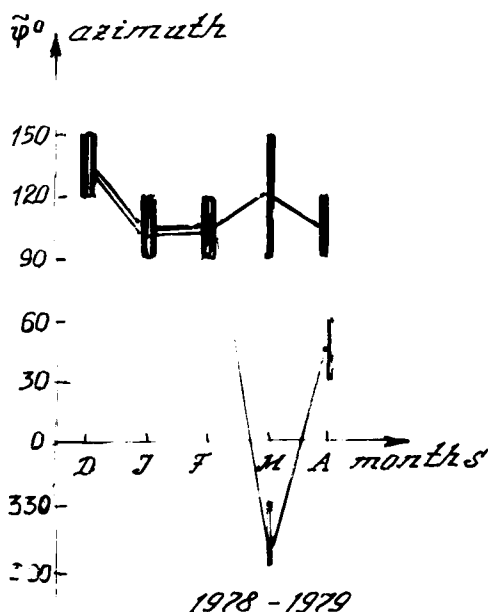
Figure 1. The most probable azimuths of D-region wind over East Siberia for quiet and disturbed conditions.

$$V_k(t) = V_{ok} + \sum_{j=1}^{3} V_{jk} \cdot \cos\left[\frac{\pi j}{12}(t - T_{jk})\right] + \delta_k(t), \quad (1)$$

$$k = x, y; \qquad j = 1, 2, 3.$$

$$\Delta V_{jk} = |V_{jk}^q - V_{jk}^d|, \quad \Delta T_{jk} = |T_{jk}^q - T_{jk}^d|, \quad (2)$$
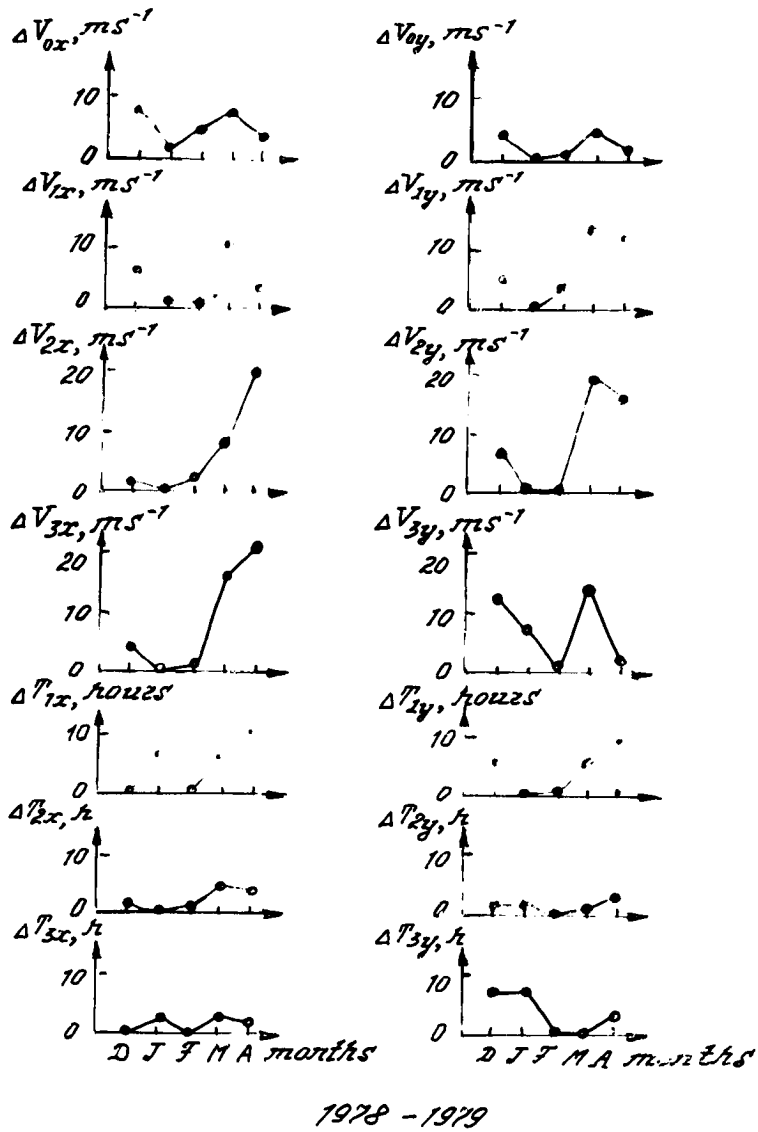
$$j = 0, 1, 2, 3; \qquad k = x, y.$$

Figure 2. The variations of absolute differences between quiet and disturbed amplitudes and phases (ΔV_{jk} and ΔT_{jk}).
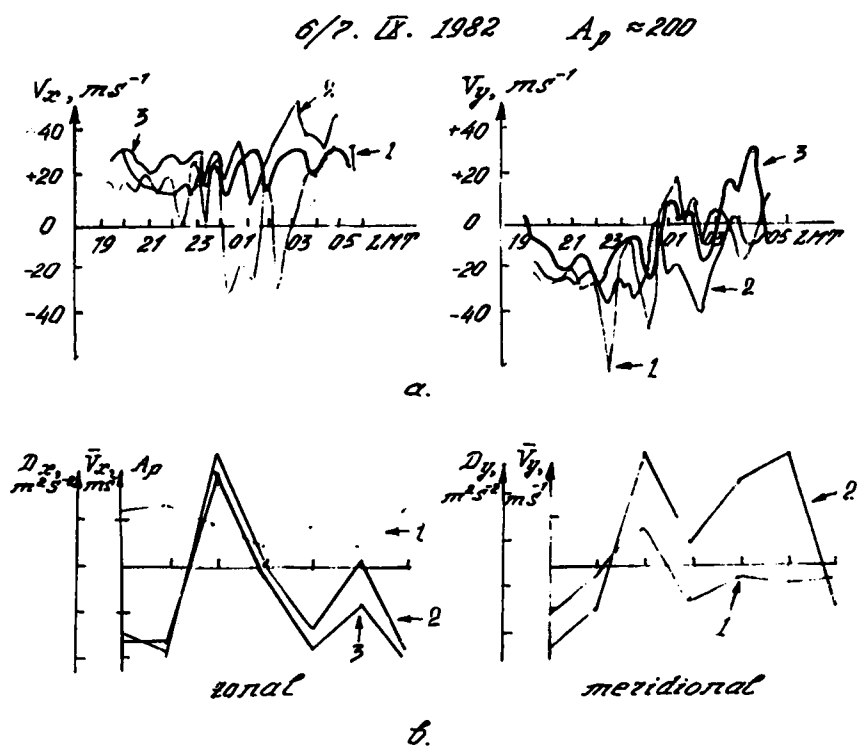
Figure 3. (a) Diurnal variations of prevailing wind (V_x - zonal, V_y - meridional) for the day of magnetic disturbance (curve 1), one day before (curve 2) and one day after (curve 3). (b) The variations of average amplitude (curve 1), dispersion (curve 2) and A_p index (curve 3).
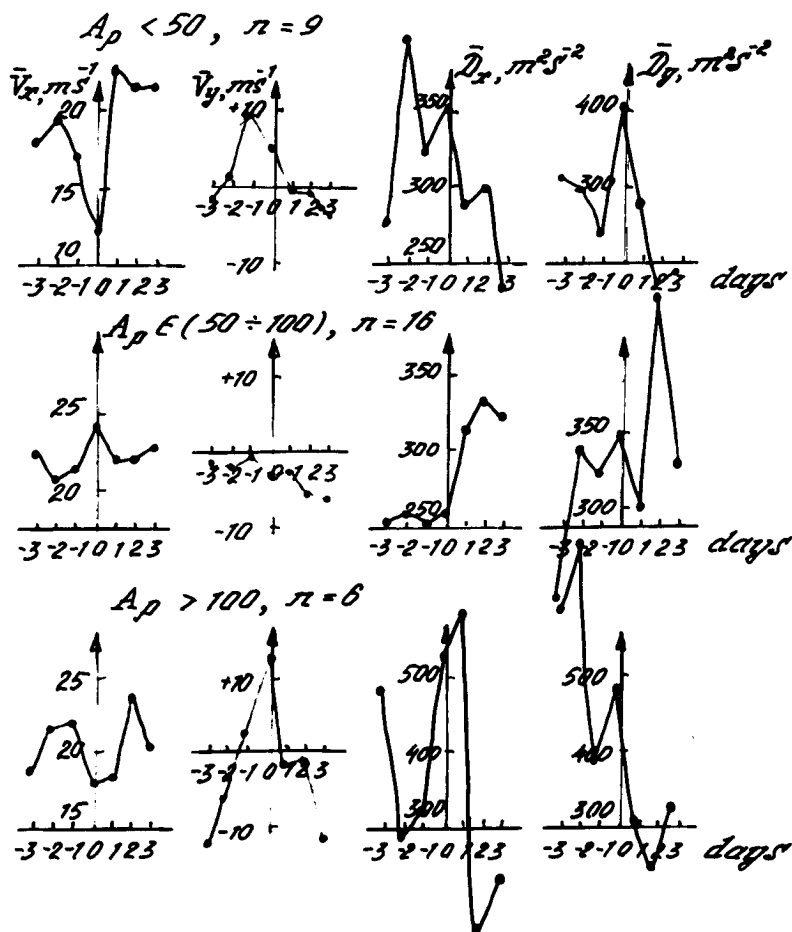
Figure 4. The comparison of geomagnetic storm effects for three levels of geomagnetic activity (V_x - zonal, V_y - meridional, D_x, D_y - dispersions). Superposed epoch method, 0-day with maximal value of A_p.