

AEROCLIMATIC CHARACTERISTIC OF WIND REGIME IN BOUNDARY LAYER OF ATMOSPHERE IN CHUI VALLEY

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The following aeroclimatic characteristic of wind regime in boundary layer of atmosphere (0-900 m) in the central part of Chui Valley have been studied by me for the first time:

- 1. Frequency of wind directions at different altitude**
- 2. Vertical profile of wind speed**
- 3. Vertical wind shear**

This research has been carried out using pilot-balloon data (the Manas airport, 1984 – 1991) for different seasons and parts of a day.

1. Frequency of wind directions at different altitude

2. Vertical profile of wind speed

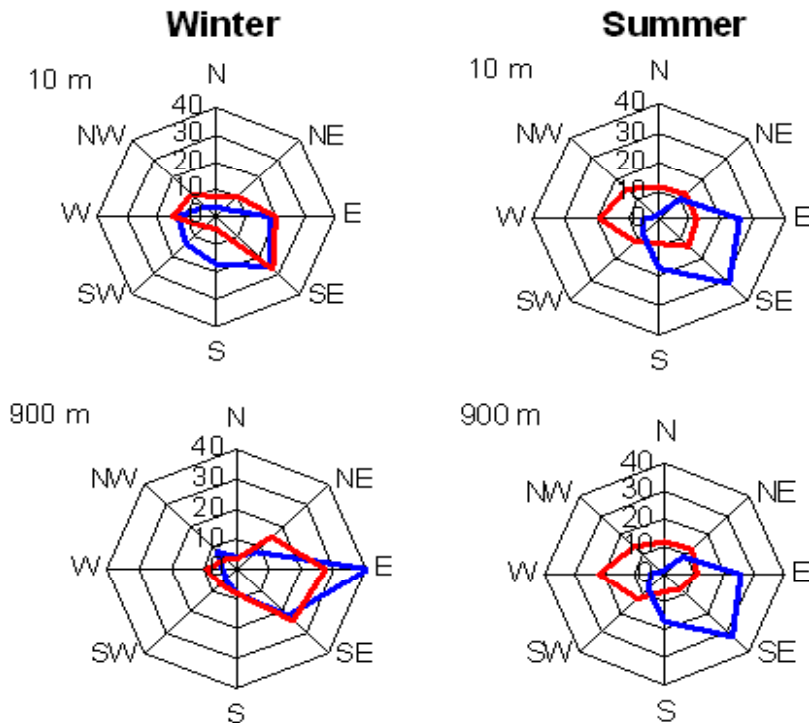


Figure. Roses wind directions (%) at 10 and 900 m over the central part of Chui valley
 — Day — Night

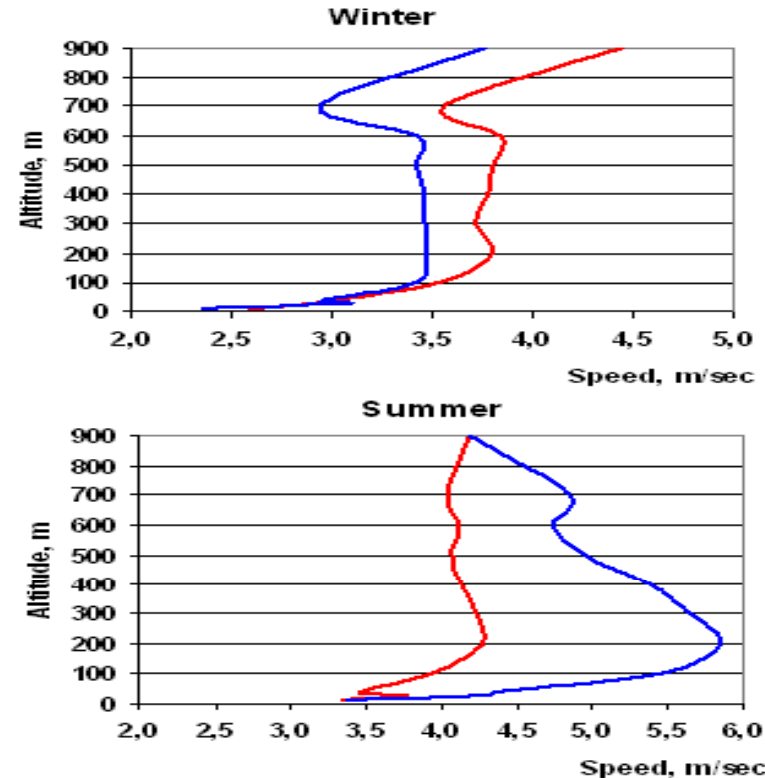


Figure. Altitude profiles of module average speed over the central part of Chui valley
 — Day — Night

There are two groups of wind directions (10-900m):

- 1. West wind and the adjacent rhumbs (frequency is about 35%);**
- 2. East wind and adjacent rhumbs (50%).**

The frequency of other wind directions totally less then 15-20%.

There are two layers with different patterns of variation of wind speed up to 900 m:

- 1. The wind speed increases (from 2,9-3,5 m/sec to 5,6-6,4 m/sec) up to 200 m.**
- 2. The wind speed decreases (till 3,5 – 4,8 m/sec) from 200 m to 900 m.**

3

2. Vertical profile of wind speed

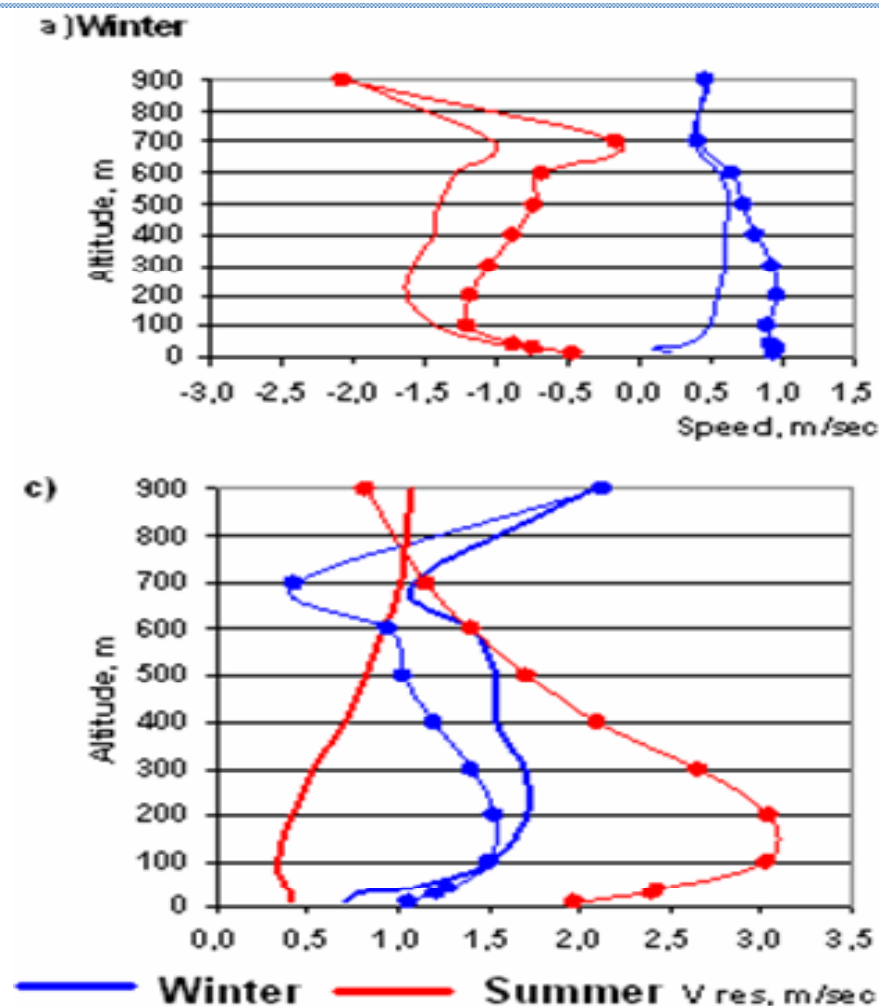
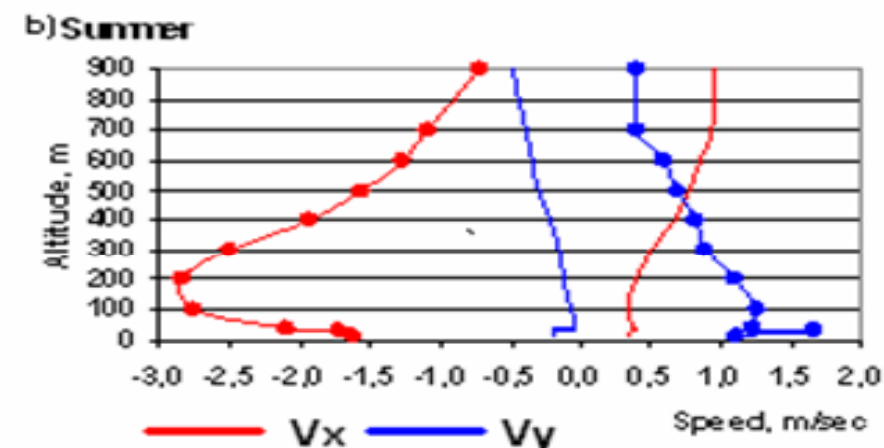


Figure. Altitude profiles of module average speed components V_x and V_y (a-b), the resulting wind (c) over the central part of Chui valley
 — Day ● Night



Profiles of zonal (V_x) and meridional (V_y) components have the following features:

- 1) $-V_x$ (east) reaches clearly defined profile with a maximum at altitudes of 100-200m (1,5-2,8 m/s), $+V_x$ (west) does not undergo big change with height increase;
- 2) the $\pm V_y$ have weakly expressed profile (varying at height within $\pm 0,5$ m/s).

Altitude profiles of the resulting module of wind (V_{res}) are divided during the day into two groups in all seasons but for winter:

- 1) a night and morning group with a distinct maximum at 2-3 m/s (100-200 m) and decrease of the wind speed on the overlying layer,
- 2) day and evening group with increasing V_{res} with height without the clearly defined maximum.

3. Vertical wind shear

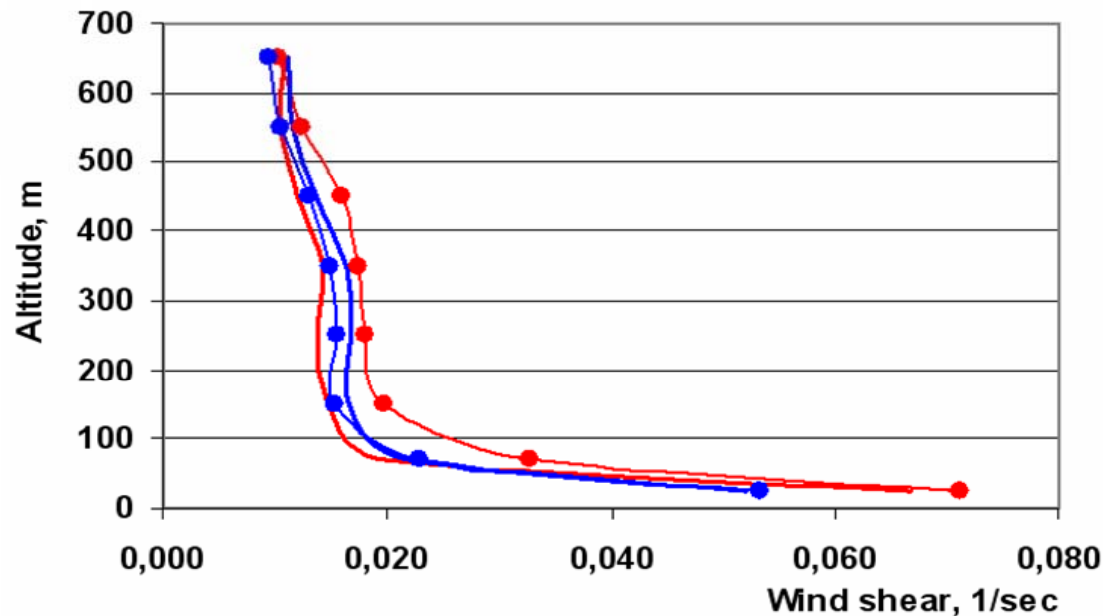


Figure. Altitude profiles of mean values of vertical wind shear over the central part of Chui valley
 — Winter — Summer
 — Day —●— Night

The average value of the vertical wind shear (VWS, β) is situated between light and moderate VWS, and equals to 0,052-0,081 sec^{-1} .

The maximum of the VWS is more than average ($\beta = 0,24-0,43 \text{ sec}^{-1}$) and it changes from strong to very strong. β decreases from 10-40 m to 100-200 m (approximately 3-4 times).



**Thank you
for your
attention!**