Estimations of dome seeng by results of optics quality tests with Shack-Hartman wavefront sensor.

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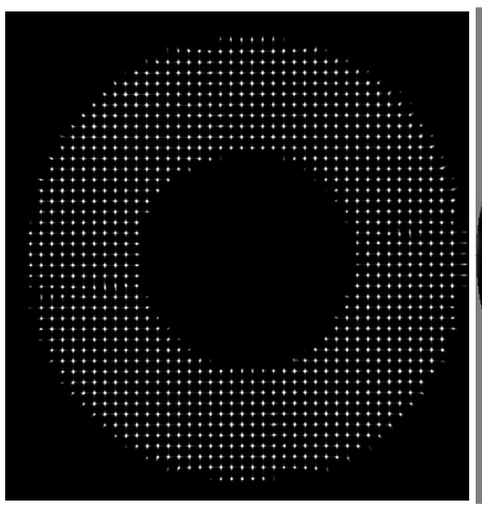
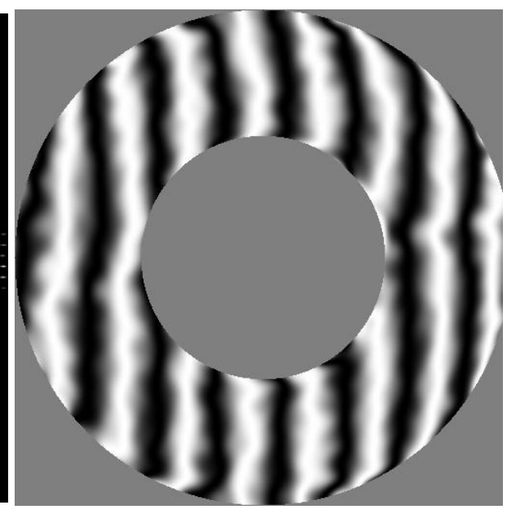
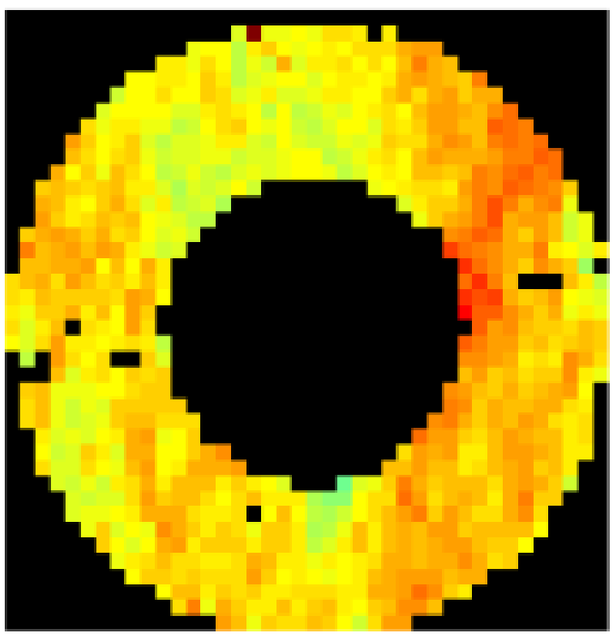
The Shack-Hartman wavefront sensor designed for final acceptance of 2.5m SAI telescope allows to measure the form of wavefront on exit pupil using a bright star. The reference laser source on wavelength 532 nm is used for measurements. At testing of the device for different telescopes it was found out what probably to estimate some properties of air streams in the dome.

Photo of the device (at the left), Hartmanogramm and a total interferogramm (at 532 nm) of 1.5m telescope AZT-22 of the Maidanak observatory. Optical quality: wavefront RMS=37nm.



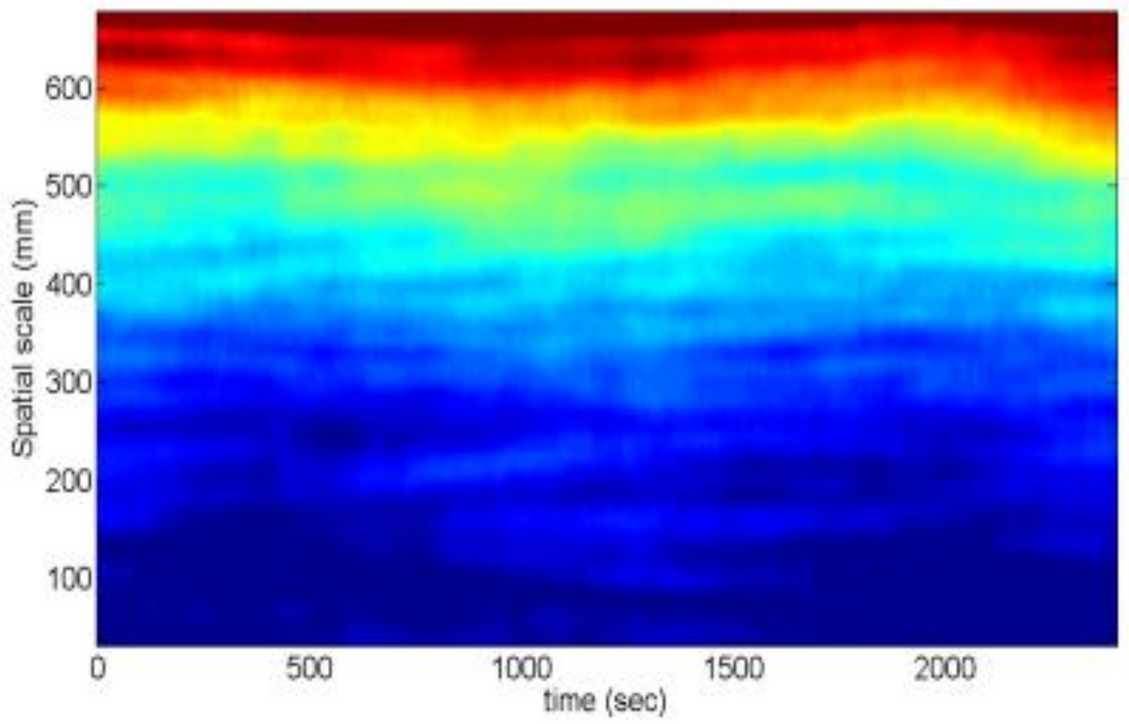


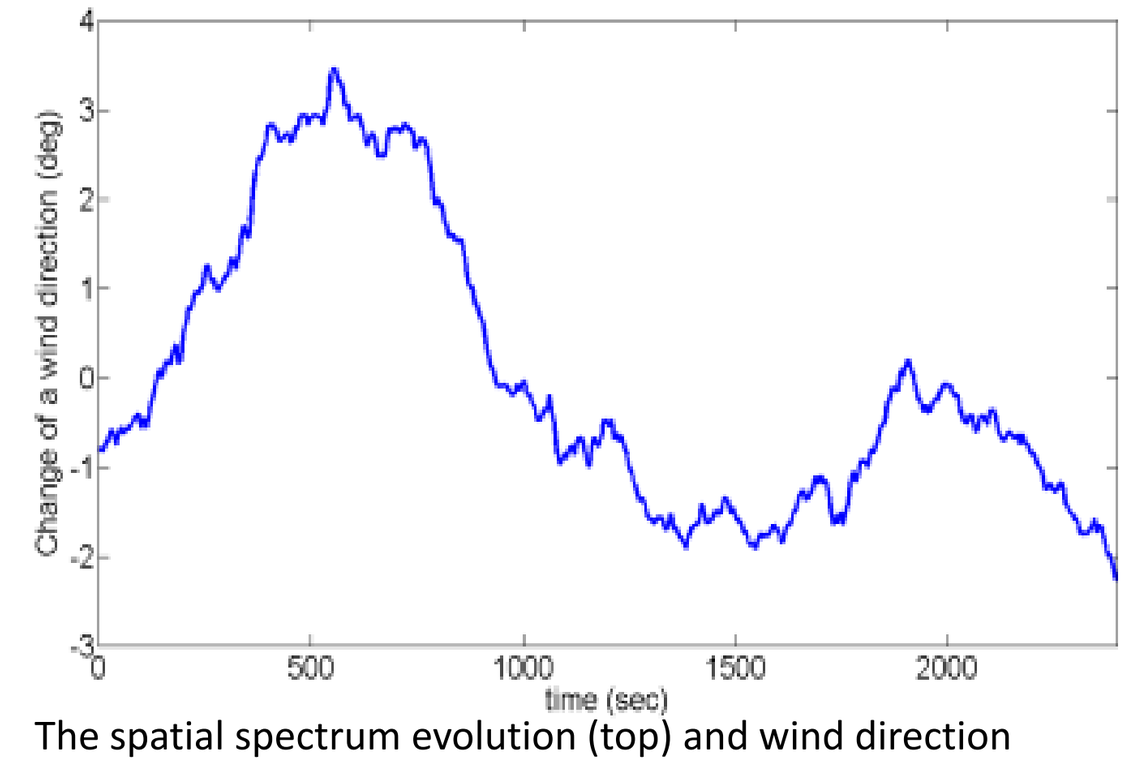
Measurements on AZT-22
Telescope diameter: 1000 mm F/7.7
Effective subaperture: 37.5 mm
Exposure time: 100 ms
Time between exposures: 5 s



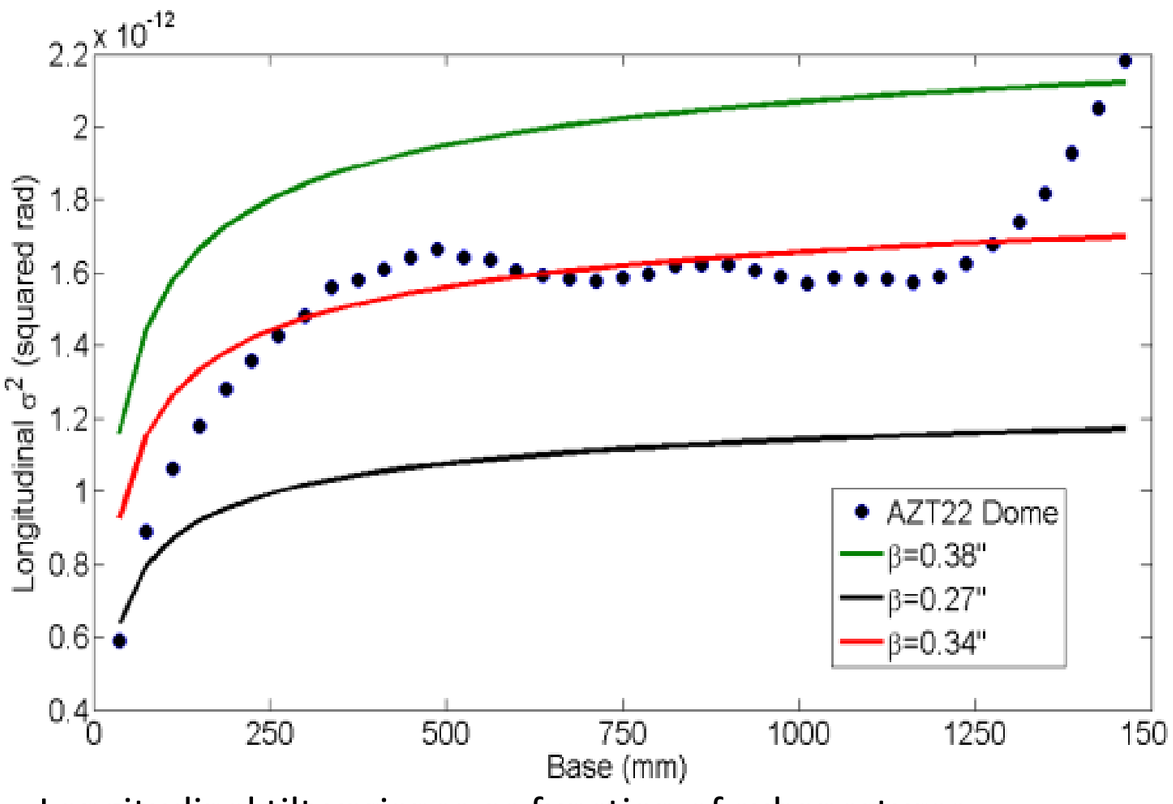
Individual image with tilts in X direction

AZT-22 tower





The spatial spectrum evolution (top) and wind direction in measurements processes . AZT-22.



Longitudinal tilt variance as function of subapertures separation and theoretical curves (standard model for free atmosphere) for different values of the seeng. Dome seeng estimate: 0.34 arcsec.

With this device have been made optical tests for 6 telescopes from 0.7 to 2.6 m. In all cases it is possible to receive an estimation dome seeng for slow (quasistationary) streams . As probably to establish dependence of a direction and speed of a wind on time.

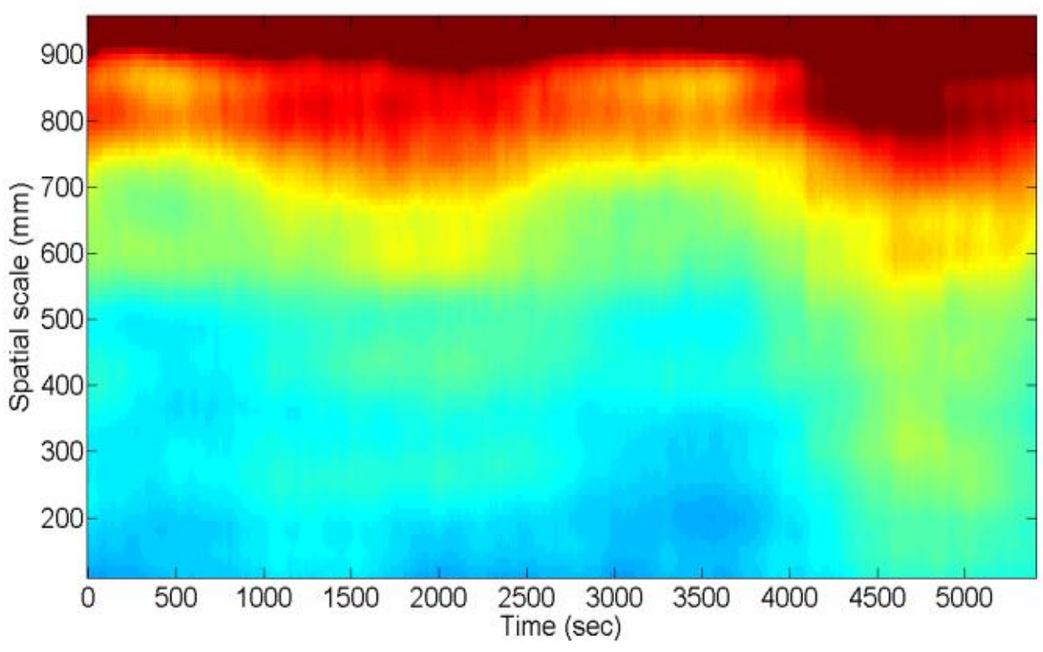
Measurements on ZTSH (Crimean observatory)
Telescope diameter: 2600 mm F/16
Effective subaperture: 130 mm
Exposure time: 100 ms
Time between exposures: 7.7 s

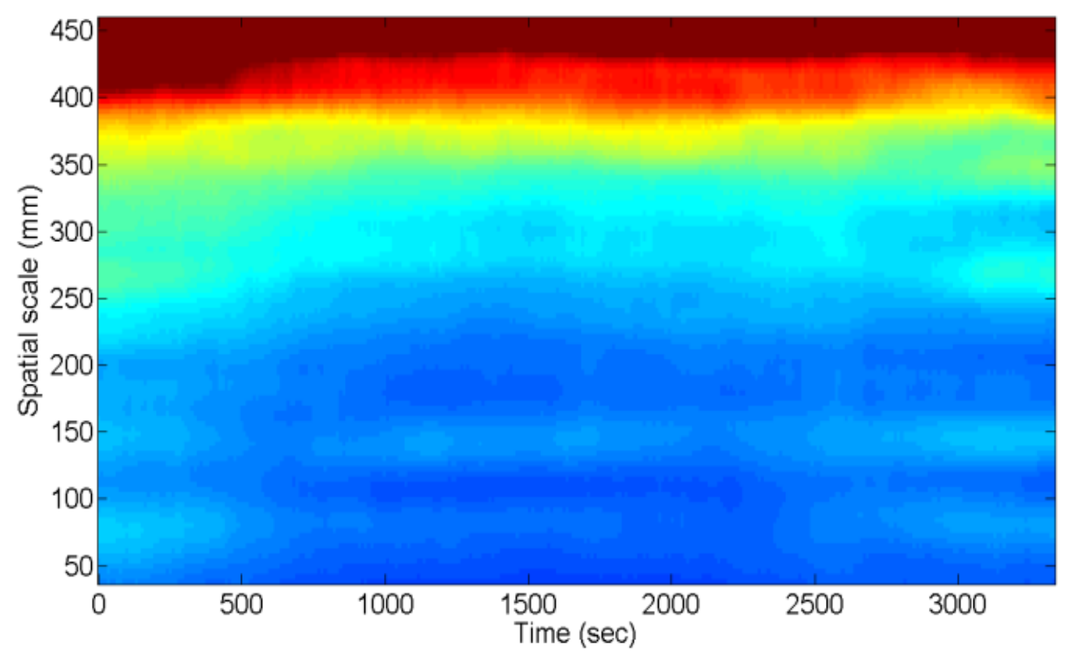
Measurements on Zeiss-1000 (Maidanak)
Telescope diameter: 1000 mm F/10
Effective subaperture: 41.7 mm
Exposure time: 300 ms
Time between exposures: 6.5 s

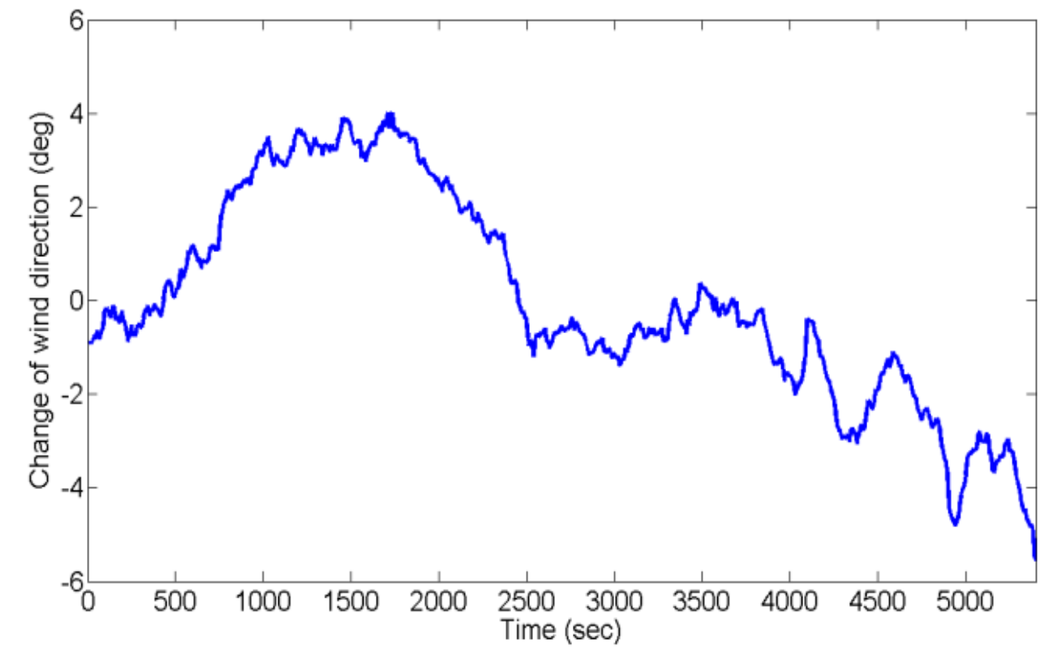
ZTSH dome

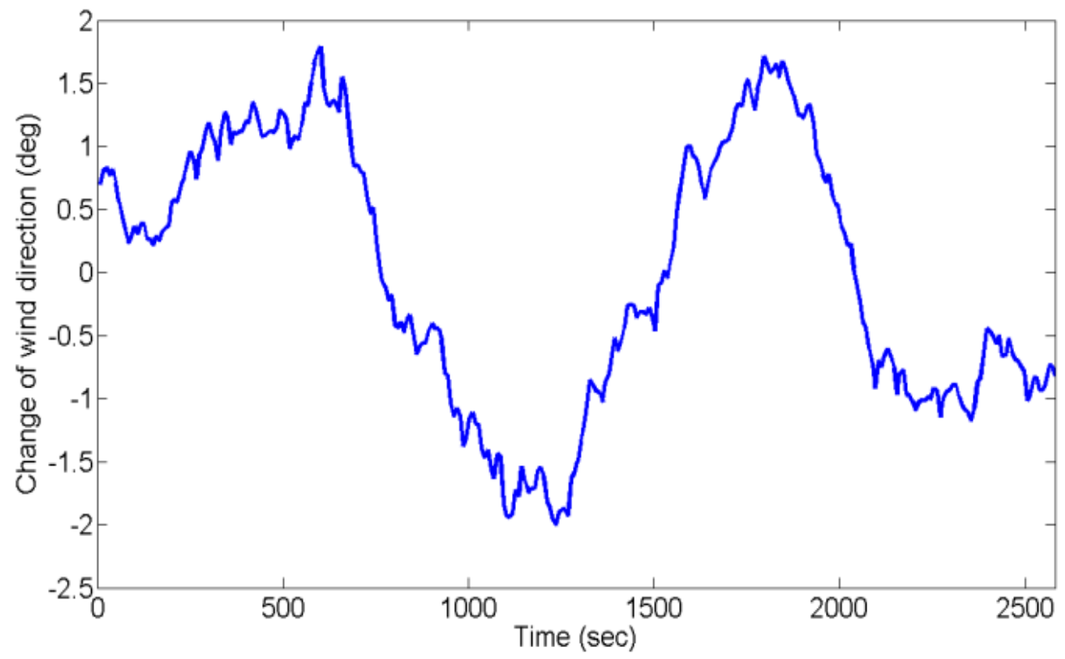
These two domes illustrate much more the worst situation than for AZT-22. For ZTSH estimated dome seeng is 0.69", and for Zeiss-1000 - 0.67". It can be explained that the Zeiss1000 dome is low and the ZTSH tower is surrounded by high trees.

Zeiss-1000 dome

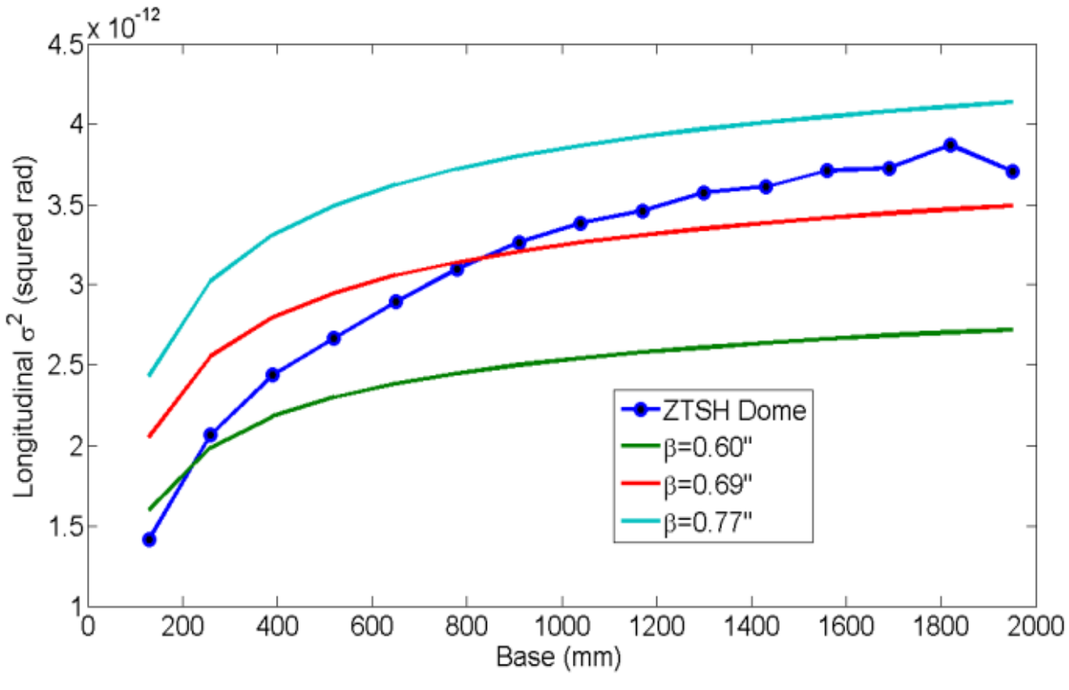


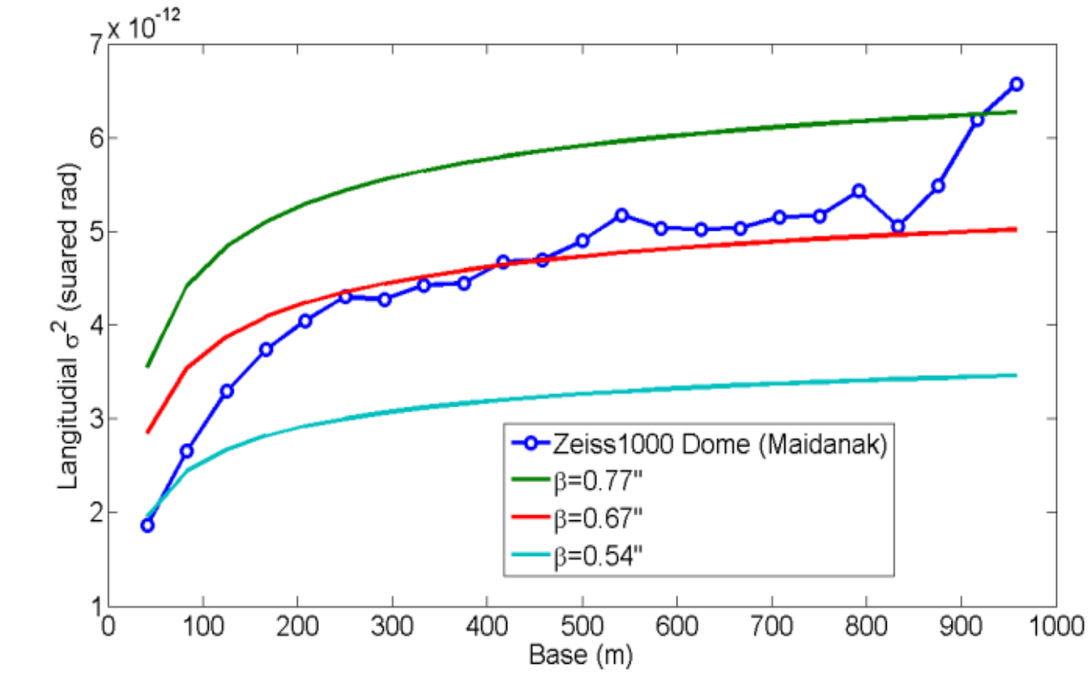






The spatial spectrum evolution (up) end wind direction through time.





Estimation of the dome seeng from longitudinal tilt dispersions