3.7.4 ON THE VARYING SLOPE OF VELOCITY SPECTRA

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Spectra of zonal, meridional and vertical wind velocity, measured during a 24-hour period with the spaced-antenna technique indicate quite a variable slope as a function of height (Figure 1, from ROTTGER, 1981). It is found that the spectral slope (1h-24h) of all three components correlates with the mean horizontal wind velocity (Figure 2). A possible conclusion is that the frequency dependence of power density of horizontal and vertical fluctuation component apparently depends on the mean wind velocity. However, the vertical spectra at periods larger than about 1 hour can also be influenced by spillover (due to finite radar antenna beam width) from the horizontal fluctuation component or by a Doppler shift.

REFERENCES

Rottger, J. (1981), Wind variability in the stratosphere deduced from spaced antenna VHF measurements, Proc. 20 AMS Conf. Radar Meteorol., Boston, MA.

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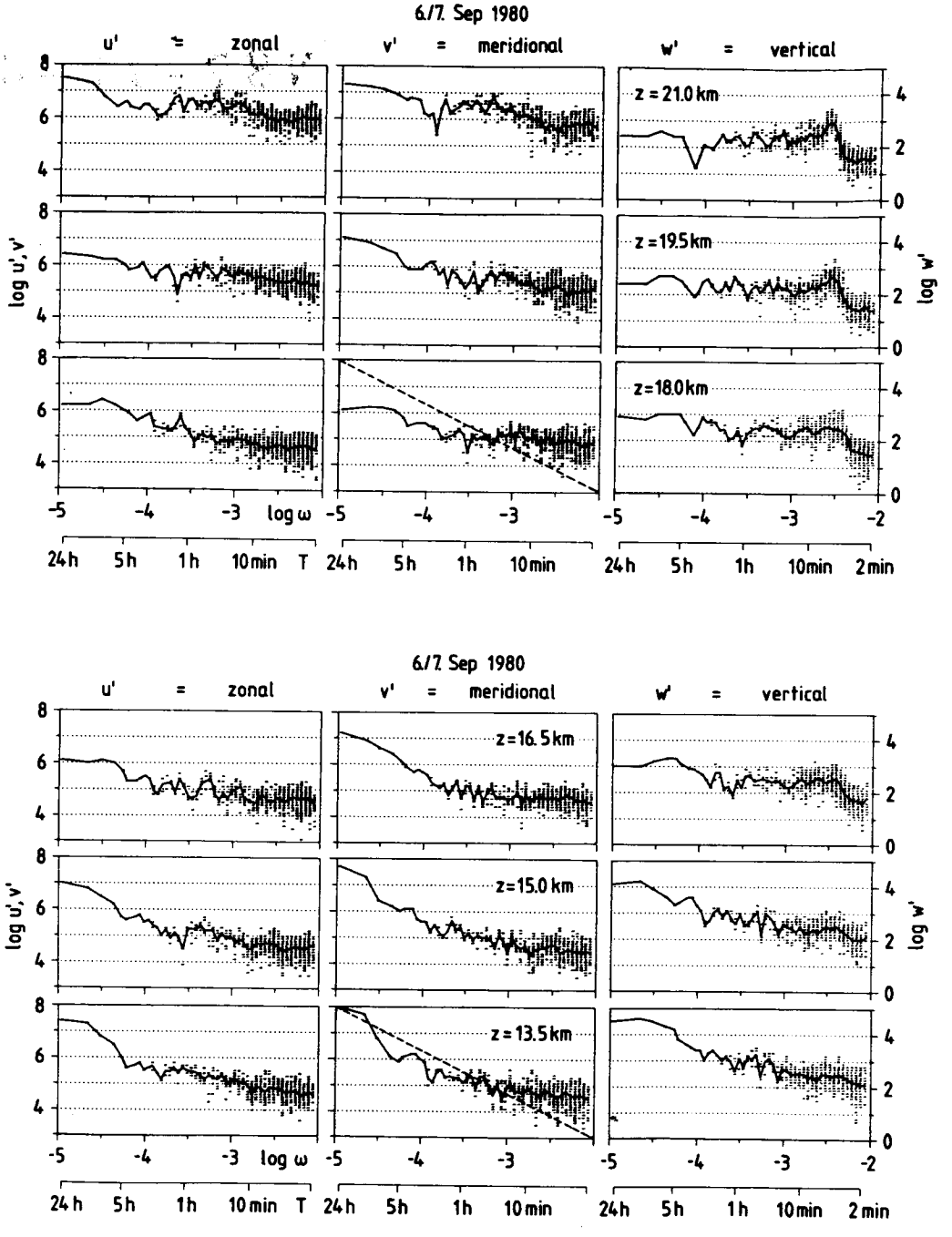

Figure 1. Power spectra of zonal (u), meridional (v) and vertical (w) velocity for a 24-hour period (from ROTTGER, 1981). The dashed lines give the m = -5/3 slope.

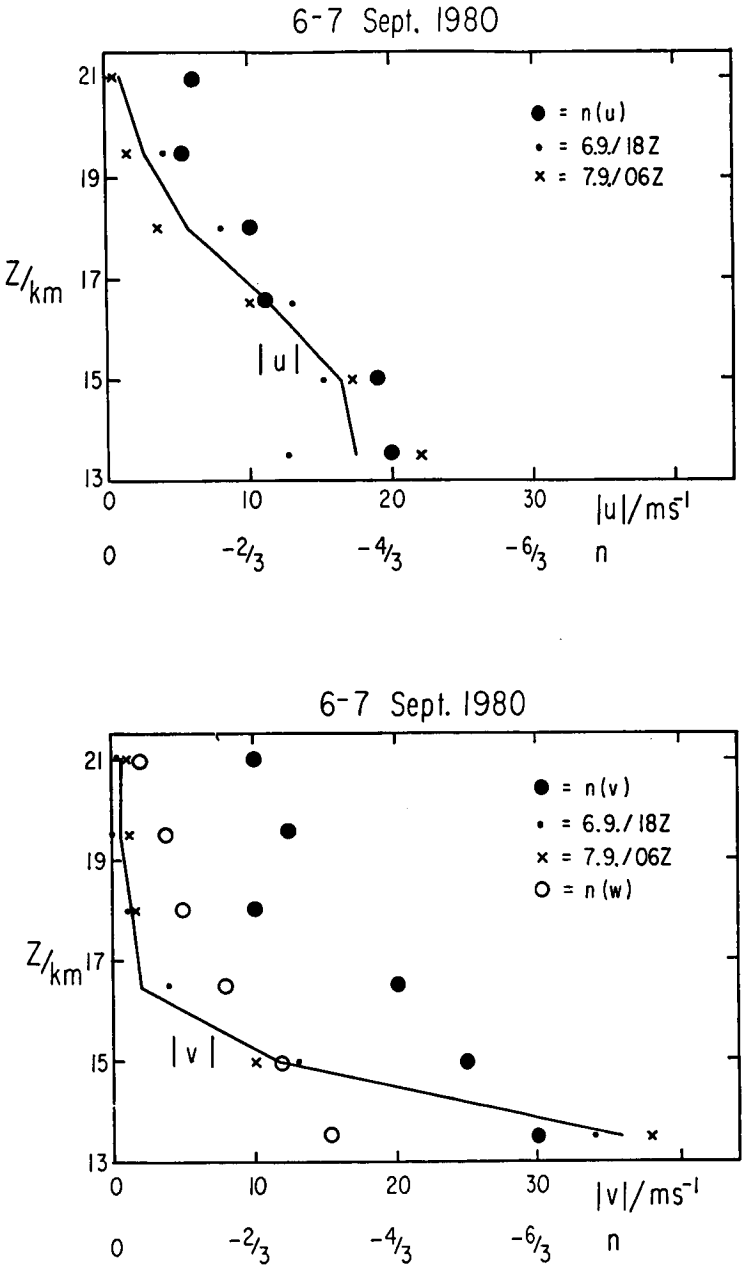

Figure 2. Absolute values of the mean horizontal wind components |u| and |v|, compared with the spectral slope n of the zonal (u), meridional (v) and vertical (w) fluctuation component.