

SHORTER CONTRIBUTION

Tropospheric Geopotential and Velocity Variances

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In connection with a recent publication of GODSON and MACFARLANE (1958), we would like to present Figs. 1 and 2 which show the relationship between $(\sin \varphi) \sigma_4$ (timewise vector standard deviation of wind at a point) and S_4 (timewise standard deviation of height at a

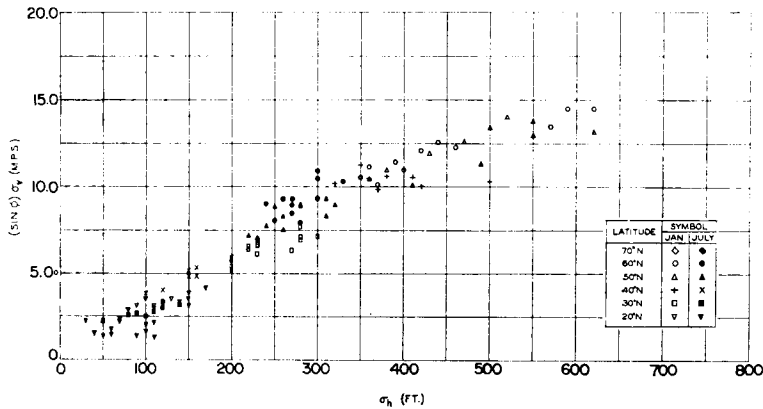


Fig. 1. $(\sin \varphi) \sigma_4$ vs. S_4 over North America, 500 mb.

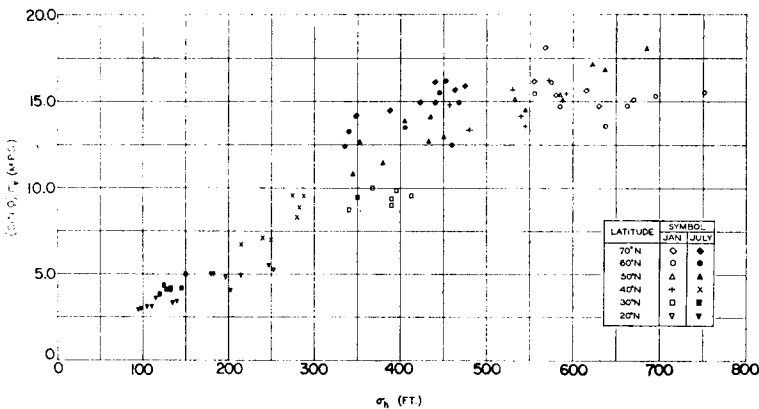


Fig. 2. $(\sin \varphi) \sigma_4$ vs. S_4 over North America, 300 mb.

point) over North America. The data were obtained from the computations made at the University of Wisconsin (LAHEY ET AL., 1958; 1959). The point symbols indicate the latitude and season to which the data pertain. It seems quite evident that the relation proposed, valid for the northern latitudes (larger values of S_4), does not describe the situation in general. In particular, the vertical tangent at $S_4 = 0$ and the sudden increase in values of $(\sin \varphi) \sigma_4$ for small S_4 are absent. A general description was attempted in earlier analyses (BUELL, 1957) where real winds were used in place of geostrophic winds and where winds and height (pressure) data were by no means synchronous. (This heterogeneity of the data naturally increases the depression.)

That such a general description is possible is

connected with the fact that, though height systems vary in size from place to place, this variation amounts to only about 20 % of a nominal value and may be absorbed in the dispersion about the regression line.

The relation suggested by the Arctic data (GODSON and MACFARLANE, 1960) tends to imply that the size of height systems decreases with latitude, which is not generally the case (BUELL, 1954; 1961). This would suggest that the relation concerned (GODSON and MACFARLANE, 1960) is restricted to (near) the area of the initial data.

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