

## Comment on "On the Use of Court's Versus Durst's Techniques for Computing Vector Correlation Coefficients"

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The gist of the note by Lamberth (1966) seems to be that the effort involved in computing the vector correlation of winds in a mathematically valid manner is unwarranted since the numerical value does not differ appreciably from that which would be obtained for the stretch correlation coefficient, a much easier quantity to compute.

That appreciable differences in the numerical values of the two measures can occur was demonstrated by Lenhard *et al.* (1963a) in a study which provoked some further discussion of the concept of vector correlation by the same authors (1963b), by Buell (1963), and by Charles (1964). The greatest difference was found at 12 km altitude where  $R=0.70$  and  $r=0.40$ . This difference was for time correlation (20-hr lag) which is not supposed to show any difference. I would like to reiterate one of the significant points upon which all of the discussants were agreed: The appropriate and valid measure of wind correlation depends upon the purpose of the measure, on how it is to be used.

There are many applications where the stretch correlation provides an economical and practically useful approximation of the vector correlation. Mr. Durst once told me of his successful use of it in conjunction with climatology to provide useful consultant service to commercial airlines planning their seasonal and annual operations. There are also cases where it is the

only valid measure, such as an alternative computation to the mean square difference measure of wind variability which is, in Court's notation,

$$\begin{aligned} \overline{(u-x)^2 + (v-y)^2} &= s_u^2 + s_v^2 + s_x^2 + s_y^2 - 2(s_{ux} + s_{vy}) \\ &= s_u^2 + s_v^2 + s_x^2 + s_y^2 \\ &\quad - 2r[(s_u^2 + s_v^2)(s_x^2 + s_y^2)]^{1/2}. \end{aligned}$$

But this does not mean that the stretch correlation is always an adequate estimate of the true vector correlation. To give such an impression is misleading. Rather than act on such a general impression, each problem involving vector correlation should be considered individually in order to be sure that the correlation measure selected is appropriate to the problem.

### REFERENCES

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