Reply

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1. (i) Brost's approach to our paper takes a curious but, unfortunately, precedented approach to a scientific problem. He holds that field measurements we report may be incorrect because certain models (with their various assumptions and "hard to evaluate effects of turbulent transport") cannot predict certain of our results.

(ii) Hicks and Everett's comments (shown earlier) appear to support our view that it *is* theoretically possible for K_H to be greater than K_W when H and LE are of opposite sign.

(iii) Based on our experience, Brost's suggestion that our lysimeters may have overestimated LE by 20% does not hold water. As pointed out in the paper, evapotranspiration rates were measured with two precision weighing lysimeters which agreed quite well (generally within 5%, sometimes within 10%). The lysimeters are equipped with manifolds of five ceramic candles each (bubbling pressure $\sim\frac{1}{3}$ bar) which permit the removal of excess water and help to maintain a soil moisture profile similar to that in the adjacent undisturbed soil. No visible differences were noted between the alfalfa (1976) and soybeans (1970) growing in the lysimeters and growing in the field. Soil moisture conditions, as determined by neutron probe measurements, were similar in both field and lysimeters. The lysimeters are regularly calibrated against known precision weights. Brost's suggestion that water may have leaked down the sides indicates a lack of understanding on his part of how lysimeters function. We suggest that Brost consult Blad and Rosenberg (1974) for a detailed discussion of the field and methods we used in establishing evapotranspiration rates. In view of the preceeding, we strongly reject Brost's contention that the lysimetric measurements overestimated actual field LE by 20%.

2. We *have* made direct measurements of turbulence under conditions of sensible heat advection and our preliminary results (Motha *et al.*, 1979) corroborate the observations which are presented in Verma *et al.* (1978).

3. We agree with Brost's comment that the Warhaft[1] model does not predict $K_H > K_W$ under conditions of sensible heat advection (when H and LE are of opposite sign). We had meant simply to emphasize that, prior to Warhaft's work, most investigators had assumed or accepted $K_H = K_W$. Warhaft, however, considered the possibility that, under certain conditions, $K_H \neq K_W$. Our interpretation follows from Warhaft's conclusion ". . . it appears that the causes for which the largest departure of K_H/K_W from unity will occur when either T or e is acting as a passive additive or when the temperature gradient is opposite to the humidity gradient."

4. We would certainly be interested in seeing a detailed application of a turbulent closure model applied to the phenomena of "sensible heat advection." In recent conversations with several turbulence modelers we have offered access to our data for this purpose. We invite cooperative efforts for further research on this interesting subject.

5. We thank Dr. Brost for his interest in our paper.

REFERENCES

Blad, B. L., and N. J. Rosenberg, 1974: Lysimetric calibration of the Bowen ratio-energy balance method for evapotranspiration estimation in the central Great Plains. *J. Appl. Meteor.*, **13**, 227–236.

Motha, R. P., S. B. Verma and N. J. Rosenberg, 1979: Exchange coefficients under sensible heat advection determined by eddy correlation. *Agric. Meteor.* (in press).

Verma, S. B., N. J. Rosenberg and B. L. Blad, 1978: Turbulent exchange coefficients for sensible heat and water vapor under advective conditions. *J. Appl. Meteor.*, **17**, 330–338.

[1] In personal conversation with Dr. Warhaft we were made aware that he does not consider his model applicable to our data because the latter were measured under advection-induced inversion conditions when the strength of the vertical temperature gradient was small.

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