

CORRESPONDENCE

Certain items printed in "A.M.M" No. 1 have given rise to comments and correspondence received, together with replies, are printed below:-

Weather Bureau,  
Melbourne 15/9/52

"The Editor,  
Australian Meteorological Magazine".

Dear Sir,

I wish to point out two errors which appear in the first number of the Magazine.

(1) On page 10 (E.A. Mizon's article "Darossa Valley Frost Forecasting") an attempt is made to evaluate the katabatic wind speed using the circulation theorem.

It should be realised that the circulation theorem gives a formula for acceleration of circulation, which is the line integral of velocity round a closed curve. Thus velocity can only be obtained by integrating with respect to time.

Using Mr. Mizon's symbols, and assuming with him that only the solenoid term is important, we have:-

$$\begin{aligned} \frac{d}{dt} \oint u ds &= R T \Delta \ln \frac{p_0}{p} \\ &= \frac{d}{dt} (u \cdot s) \quad \text{where } s \text{ is distance round a closed circuit.} \\ &= s \frac{d\bar{u}}{dt} + \bar{u} \frac{ds}{dt} \end{aligned}$$

$$\text{If } \frac{ds}{dt} = 0 \text{ this gives } \frac{d\bar{u}}{dt} = \frac{t \cdot R \Delta T}{s} \ln \frac{p_0}{p}$$

if  $\bar{u} = 0$  at  $t = 0$  and  $\Delta T$  is constant.

The value of  $\bar{u}$  after 10 hours, under these conditions, and assuming  $s = 10$  kms. is  $1.9 T$  m/sec.

Hence for the critical speed of 3 m.p.h. after 10 hours,

$$\Delta T = .7^\circ C$$

On p.22 of the Magazine, in the report of the discussion on Dr. Godson's article it is stated "on upper charts the drawing of a sharp V- trough was incorrect"

Actually, this is not stated by Godson, nor, I maintain, can it be supported by evidence, even if the tendency to draw sharp troughs with strong winds is to be deplored. Godson points out that a front is not located either on surface or upper charts, at the trough, but at some distance on the warm air side of it; the front is marked, not by an orientation discontinuity of isobars or contours (i.e. a trough) but by a curvature discontinuity. (p.637 Q.J.R.M.S. Oct.1951)

- R.A. Clarke. "

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Department of the Interior,  
Weather Bureau,  
Adelaide. S.A.

10th October, 1952.

The Editor,  
"Australian Meteorological Magazine",  
Commonwealth Meteorological Bureau,  
G.P.O. Box 1289K,  
MELBOURNE. C.I.

Dear Sir,

I wish to thank Mr. Clarke for the interest he has shown in my paper "Barossa Valley Frost Forecasting" and drawing attention to what may appear as a blatant mathematical error in it.

However, the normal course of a katabatic wind at a fixed point is a steady increase in speed, during a certain variable time, followed by a fairly constant speed for the remainder of the period of influence.

The treatment Mr. Clark follows is applicable to the first part of this sequence only, whereas that which I employed was an approximation to the latter stage, assuming that  $\frac{ds}{dt} = -u$ , s being a closed circuit around the region affected by the katabatic wind. For this reason I stated

" $\frac{ds}{dt}$  is approximately  $u^2$ ".

There is an error in the values quoted by Mr. Clarke, the correct values being,  $\bar{u} = 1.9 \Delta T$  mps for  $s = 10$  kms. and  $t = 1$  (one) hour.

Yours faithfully,

(Sgd.) E. A. Mizon.

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The second criticism contained in Mr. Clarke's letter appears justified, although only because of the synoptic nature of the report published. The last sentence of this report quoted by Mr. Clarke, and criticised by him, should have read "On upper charts the drawing of a sharp shaped trough at the front was incorrect".

-Ed.A.M.M.